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

FORM 10-K

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

For the fiscal year ended December 31, 2019

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

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $0.01 per share	RGEN	The Nasdaq Global Select Market

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

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

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

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ 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.

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

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. Yes ☐ No ☐ .

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates as of June 28, 2019, the last business day of the registrant's most recently completed second fiscal quarter, was $3,599,784,849.

The number of shares of the registrant's common stock outstanding as of February 18, 2020 was 52,083,563.

Documents Incorporated By Reference

The registrant intends to file a proxy statement pursuant to Regulation 14A within 120 days of the end of the fiscal year ended December 31, 2019.

Portions of such proxy statement are incorporated by reference into Part III of this Annual Report on Form 10-K.

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K ("Form 10-K") 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 Form 10-K do not constitute guarantees of future performance. Investors are cautioned that express or implied statements in this Form 10-K that are not strictly historical statements, including, without limitation, statements regarding current or future financial performance, potential impairment of future earnings, management's strategy, plans and objectives for future operations or acquisitions, product development and sales, research and development, selling, general and administrative expenditures, intellectual property 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, the risks identified under the caption "Risk Factors" and other risks detailed in this Form 10-K and our other filings with the Securities and Exchange Commission. We assume no obligation to update any forward-looking information contained in this Form 10-K, except as required by law.

PART I

ITEM 1. BUSINESS

The following discussion of our business contains forward-looking statements that involve risks and uncertainties. When used in this report, the words "intend," "anticipate," "believe," "estimate," "plan" and "expect" and similar expressions as they relate to us are included to identify forward-looking statements. Our actual results could differ materially from those anticipated in these forward-looking statements and are a result of certain factors, including those set forth under "Risk Factors" and elsewhere in this Annual Report on Form 10-K ("Form 10-K").

References throughout this Form 10-K to "Repligen Corporation", "Repligen", "we", "us", "our", or the "Company" refer to Repligen Corporation and its subsidiaries, taken as a whole, unless the context otherwise indicates.

Overview

Repligen Corporation is a global life sciences company that develops and commercializes highly innovative bioprocessing technologies and systems that increase efficiencies and flexibility in the process of manufacturing biological drugs.

As the overall market for biologics continues to grow and expand, our customers – primarily large biopharmaceutical companies and contract development and manufacturing organizations – face critical production cost, capacity, quality and time pressures. Built to address these concerns, our products are helping to set new standards for the way biologics are manufactured. We are committed to inspiring advances in bioprocessing as a trusted partner in the production of critical biologic drugs – including monoclonal antibodies ("mAb"), recombinant proteins, vaccines and gene therapies – that are improving human health worldwide.

We currently operate as one bioprocessing business, with a comprehensive suite of products to serve both upstream and downstream processes in biological drug manufacturing. Building on over 35 years of industry expertise, we have developed a broad and diversified product portfolio that reflects our passion for innovation and the customer-first culture that drives our entire organization. We continue to capitalize on opportunities to maximize the value of our product platform through both organic growth initiatives (internal innovation and commercial leverage) and targeted acquisitions.

Our Products

Our bioprocessing business is comprised of four main franchises, three of which we sell directly to end-users (Chromatography, Filtration and Process Analytics) and one that we sell through supply agreements (Proteins).

Direct-to-Customer Products

Since 2012, we have significantly expanded our direct-to-customer presence through our Chromatography, Filtration and Process Analytics franchises, each of which includes novel and differentiated technologies. We have diversified and grown our direct-to-customer product offering through internal innovation and through strategic, accretive acquisitions of assets or businesses that leverage existing product lines and/or expand our customer and geographic scope.

To support our sales growth goals for these products, we make ongoing investments in our commercial organization, our research and development ("R&D") team and our manufacturing capacity. Our commercial and R&D teams work together to develop and launch new products and applications that address specific biomanufacturing challenges, and to build new markets for acquired technologies. We have six key manufacturing sites across the United States, Sweden and Germany, with additional capacity being added by the end of 2020 in the Netherlands. We regularly evaluate and invest in capacity as needed to ensure timely deliveries and to stay ahead of increased customer demand for our products.

A substantial piece of our revenue comes from consumable and/or single-campaign ("single-use") products as compared to associated equipment. The customization, scalability and plug-and-play convenience of consumable and/or single-use products, and in many cases the closed nature of our technologies, make them ideal for use in biologics manufacturing processes where contamination risk is a critical concern of our customers.

Chromatography

Our Chromatography franchise includes a number of products used in downstream purification, development, manufacturing and quality control of biological drugs. The main driver of growth in this portfolio is our OPUS ® Column product line.

Additional chromatography products include our affinity capture resins, such as CaptivA ® Protein A Resins, that are used in a small number of commercial drug processes and our 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.

OPUS Pre-Packed Columns

Our Chromatography franchise features a wide range of OPUS columns, which we deliver to our customers sealed and pre-packed with their choice of resin. These are single-use or multiple-use disposable columns that replace the use of customer-packed glass columns used in downstream purification processes. By designing OPUS columns to be a technologically advanced and flexible option for the purification of biologics from process development through clinical and commercial-scale manufacturing, Repligen has become a leader in the pre-packed column ("PPC") market. Our biomanufacturing customers value the significant cost savings that OPUS columns deliver by reducing set up time, labor, equipment and facility costs – in addition to delivering product consistency and "plug and play" convenience.

We launched our first production-scale OPUS columns in 2012 and have since added larger diameter options that scale up to use with 2,000 liter bioreactors. Our OPUS 80R column is the largest available PPC on the market for use in late-stage clinical or commercial purification processes. We have also introduced next-generation features such as a resin recovery port on our larger columns, which allows our customers to remove and reuse the recovered resin in other applications. We believe the OPUS 5-80R product line is the most flexible and platformable PPC product offered in the marketplace today, and is serving the purification needs of customers manufacturing monoclonal antibodies ("mAb") and other biologics such as cell and gene therapies ("C&GT").

In addition to our larger scale OPUS columns, our portfolio includes our smaller-scale OPUS columns, including specifically RoboColumn ®, MiniChrom ™ and ValiChrom ™ columns for process development and validation. These columns are used in high-throughput process development screening, viral clearance validation studies and scale down validation of chromatography processes.

We maintain customer-facing centers in both the United States and Europe for OPUS columns, and offer our customers an unmatched ability to pack any of over 100 resins in our OPUS 5-80R range and any of over 300 resin choices in our small-scale OPUS columns.

Other Chromatography

Our Chromatography portfolio also includes ELISA kits, which are analytical test kits to quantitate the proteins and growth factors, and chromatography resins, including our CaptivA brand.

Filtration

XCell ATF ™ Cell Retention Systems

Our Filtration products offer a number of advantages to manufacturers of biologic drugs and are used in development, clinical and commercial-scale production. We first moved into Filtration technology with our

acquisition of XCell Alternating Tangential Flow ("ATF") assets from Refine Technology ("Refine") in 2014. XCell ATF systems are used primarily in upstream perfusion (continuous) cell culture processing.

XCell ATF is a cell retention technology. The system is comprised of an advanced hollow fiber ("HF") filtration device, a low shear pump and a controller. The XCell ATF system is connected to a bioreactor and enables the cell culture to be run continuously, with cells being retained in the bioreactor, fresh nutrients (cell culture media) being fed into the reactor continuously and clarified biological product and cell waste being removed continuously. The cells are maintained in a consistent nutrient-rich environment and can reach cell densities two- and three-times higher than those achieved by standard fed-batch culture. By continuously removing waste products from the fermenter, the XCell ATF systems routinely increases cell densities to two- or three-times the levels achieved by standard fed-batch culture. As a result, product yield is increased, which improves facility utilization and can reduce the size of a bioreactor required to manufacture a given volume of biologic drug product. XCell ATF systems are available in a wide range of sizes that can easily scale from laboratory use through full production with bioreactors as large as 5,000 liters.

Through internal innovation, we developed and launched single-use formats of the original stainless steel XCell ATF devices to address increasing industry demand for single-use sterile systems with "plug-and-play" technology. The XCell ATF device is now available to customers in both its original configuration (steel housing and single-use filters) in all sizes (2, 4, 6 and 10), and/or as a single-use device (disposable housing/filter combination) in most sizes (2, 6, and 10). The availability of XCell ATF technology in a single-use format eliminates the time intensive workflow associated with autoclaving, leading to an 80% reduction in implementation speed. The single-use format also enables our customers to accelerate evaluations of the product with a lower initial overall cost of ownership.

In September 2018, we entered into a collaboration agreement with industry leader Sartorius Stedim Biotech ("SSB") to integrate our XCell ATF controller technology into SSB's BIOSTAT ® STR large-scale, single-use bioreactors, to create novel perfusion-enabled bioreactors.

TangenX ™ Flat Sheet Cassettes

In December 2016, we acquired TangenX ™ Technology Corporation ("TangenX"), balancing our upstream XCell ATF systems with a portfolio of flat-sheet tangential flow filtration ("TFF") cassettes used in downstream biologic drug concentration and formulation processes. The TangenX product portfolio includes our single-use SIUS ™ brand, providing customers with a high-performance, cost saving alternative to reusable TFF cassettes.

TFF is a rapid and efficient method for the concentration and formulation of biomolecules that is widely used in many applications in biopharmaceutical development and manufacturing. SIUS cassettes are the only purpose built single-use TFF cassettes on the market. The cassette features a high performing membrane and unique cartridge construction that enables a lower price point. Each disposable cassette is delivered pre-sanitized and ready to be equilibrated and used for tangential flow, ultrafiltration and diafiltration applications. Use of SIUS TFF cassettes eliminates non-value added steps of cleaning, testing between uses, storage and flushing required in reusable TFF products, providing cost and time savings. The cassettes are interchangeable with filter hardware from multiple manufacturers, simplifying customer trial and adoption of SIUS products.

Spectrum ® Hollow Fibers

We acquired Spectrum Life Sciences LLC ("Spectrum") and its subsidiaries in August 2017 to strengthen our filtration business with the addition of a leading portfolio of HF filtration solutions, including fully integrated KrosFlo ® TFF Systems with Konduit sensing and ProConnex ® Flow Path single-use assemblies. KrosFlo family of TFF systems for product concentration is fully scalable from 2 milliliters to 5,000 liters – from lab-scale to commercial manufacturing. Designed for purification and formulation applications, KrosFlo Systems enable robust downstream ultrafiltration and microfiltration.

We also gained the Spectra/Por ® portfolio of laboratory and process dialysis products and in 2019, we launched the SpectraFlo ™ Dynamic Dialysis Systems. Also, in 2019 we introduced the KrosFlo ® TFDF ™ (Tangential Flow Depth Filtration) Systems, which we believe have the potential to disrupt and displace traditional harvest clarification operations. The KrosFlo TFDF system includes control hardware, novel high throughput tubular depth filters and ProConnex single-use TFDF flow paths. When used for cell culture clarification, single-use KrosFlo TFDF technology delivers unprecedented high flux (>1,000 LMH), high capacity, low turbidity, and minimal dilution, making the technology a high-performance alternative to traditional centrifugation and depth filtration approaches to harvest clarification. TFDF technology also provides benefits such as low hold-up volume, high recovery, small footprint, simple set up and disposal, scalability and reduced process time.

The Spectrum product line of HF filters is used in bench-top through commercial-scale processes, primarily for the filtration, purification and concentration of biologics and diagnostic products. Our KrosFlo filtration systems and equipment offer both standard and customized solutions to bioprocessing customers, with particular strength in consumable and single-use offerings.

With the acquisition of Spectrum, we substantially increased our direct sales presence in Europe and Asia, and we diversified our end markets to include all biologic classes, including mAb, vaccines, recombinant proteins and gene therapies.

Other Filtration

In 2018, we introduced our Konduit monitor to automate concentration and buffer exchange. We have broadened the application for Konduit monitor to include use with both HF TFF from Spectrum and our TangenX flat sheet TFF systems. We also self-manufacture HF filters that are used in our XCell ATF, KrosFlo TFF and KrosFlo TFDF systems.

Process Analytics Products

In May 2019, we consummated our acquisition of C Technologies, Inc. (“C Technologies”) and added a fourth franchise, Process Analytics, to our bioprocessing business. Our Process Analytics products complement and support our Filtration, Chromatography and Proteins franchises as they allow end-users to make at-line or in-line absorbance measurements allowing for the determination of protein concentration in filtration, chromatography formulation and fill-finish applications.

SoloVPE ® Device

Our SoloVPE Slope Spectroscopy ® system is the industry standard for offline and at-line absorbance measurements for protein concentration determination in process development, manufacturing and quality control settings.

FlowVPE ® Device

Our FlowVPE Slope Spectroscopy system enhances the power of Slope Spectroscopy and provides in-line protein concentration measurement for filtration, chromatography and fill-finish applications. A key benefit of this in-line solution is the ability to monitor a manufacturing process in real time. We are developing a next-generation FlowVPE to incorporate GMP-compliant software for production-scale biologics manufacturing.

Use of VPE Slope Spectroscopy delivers multiple process benefits for our biopharmaceutical manufacturing customers, compared to traditional UV-Vis approaches. Key benefits include: the elimination of manual dilutions and sample transfers from process development/manufacturing to labs, rapid time to results (minutes versus hours), improved precision, built-in data quality for improved reporting and validation, and ease of use.

OEM Products (Proteins)

Our OEM products are represented by our Protein A affinity ligands, which are a critical component of Protein A chromatography resins used in downstream purification of mAb, and cell culture growth factor products, which are a key component of cell culture media used in upstream bioprocessing to increase cell density and improve product yield.

Proteins – Ligands

We are a leading provider of Protein A affinity ligands to life sciences companies. Protein A ligands are an essential "binding" component of Protein A affinity chromatography resins used in the purification of virtually all monoclonal antibody-based drugs on the market or in development. We manufacture multiple forms of Protein A ligands under long-term supply agreements with major life sciences companies including GE Healthcare ("GE"), MilliporeSigma and Purolite Life Sciences ("Purolite"), who in turn sell their Protein A chromatography resins to end users (mAb manufacturers). We have two manufacturing sites supporting overall global demand for our Protein A ligands: one in Lund, Sweden and another in Waltham, Massachusetts.

Protein A chromatography resins are considered the industry standard for purification of antibody-based therapeutics due to the ability of the Protein A ligand to very selectively bind to or "capture" antibodies from crude protein mixtures. Protein A resins are packed into the first chromatography column of typically three columns used in a mAb purification process. As a result of Protein A's high affinity for antibodies, the mAb product is highly purified and concentrated within this first capture step before moving to polishing steps.

In June 2018, we entered into an agreement with Navigo Proteins GmbH ("Navigo") for the exclusive co-development of multiple affinity ligands for which Repligen holds commercialization rights. We are manufacturing and have agreed to supply the first of these ligands, NGL-Impact ® A, exclusively to Purolite, who will pair our high-performance ligand with Purolite's agarose jetting base bead technology used in their Jetted A50 Protein A resin product. We also signed a long-term supply agreement with Purolite for NGL-Impact A and potential additional affinity ligands that may advance from our Navigo collaboration. The Navigo and Purolite agreements are supportive of our strategy to secure and reinforce our Proteins franchise.

Proteins – Growth Factors

Most biopharmaceuticals are produced through an upstream mammalian cell culture process. In order to stimulate increased cell growth and maximize overall yield from a bioreactor, manufacturers often add growth factors, such as insulin, to their cell culture media. Our cell culture growth factor additives include LONG ® R 3 IGF 1 ("LR3"), our insulin-like growth factor that has been shown to be up to 100 times more biologically potent than insulin (the industry standard), thereby increasing recombinant protein production in cell culture fermentation applications. LR3 is currently sold through a distribution partnership with MilliporeSigma.

Corporate Information

We are a Delaware corporation with global headquarters in Waltham, Massachusetts. We were incorporated in 1981 and became a publicly traded company in 1986. Our common stock is listed on The Nasdaq Global Market under the symbol "RGEN". We have over 761 employees and operate globally with offices and manufacturing sites located at multiple locations in the United States, Europe and Asia. Our principal executive offices are located at 41 Seyon Street, Waltham, Massachusetts 02453, our website is www.repligen.com and our telephone number is (781) 250-0111.

Our Market Opportunity

Bioprocessing Addressable Market

The global addressable market for bioprocessing products is estimated to be over $10 billion of which we estimate Repligen's addressable market to be approximately $2.8 billion at year end 2019. This market includes

products used to manufacture therapeutic antibodies, recombinant proteins and vaccines, as well as gene therapies – a rapidly emerging class of biologics.

Monoclonal Antibody Market

Antibody-based biologics alone accounted for over $130 billion of global biopharma revenue in 2018 and represented a majority of the top 10 best-selling drugs across the pharmaceutical industry. Industry sources project the mAb market to grow approximately 10% annually through 2022 driven by new approvals and expanded clinical uses for marketed antibodies as well as the emergence of biosimilar versions of originator mAbs.

In 2019, 12 mAbs/fusion proteins (nine originator and three biosimilars) were approved by the U.S. Food and Drug Administration ("FDA") to treat a diverse range of diseases. Indicative of the increased rate of approvals by the FDA since the first therapeutic antibody was brought to market in 1986, over 53% of the 112 U.S.-marketed mAbs were approved in the latest five-year period from 2015 through 2019, versus 18% in the prior five-year period from 2010 through 2014. In addition, R&D remains robust, with more than 550 mAbs at various stages of clinical development addressing a wide range of medical conditions.

In addition to investments in the discovery and development of novel biologic drugs, there has been substantial investment in follow-on products (biosimilars) by generic and specialty pharmaceutical as well as large biopharmaceutical companies. Development of follow-on products has accelerated as the first major mAbs have come off patent in the European Union and United States. Due to the high cost of biologic drugs, many countries in the developing and emerging markets have been aggressively investing in biomanufacturing capabilities to supply lower cost biosimilars for the local markets. For both originator and follow-on biologics manufacturing, Repligen products are well-positioned to enable greater manufacturing flexibility, production yields and lower costs through improved process efficiencies.

Cell and Gene Therapy Market

C&GT have emerged in the past few years to become a rapidly growing area of biological drug development, with over 1,000 clinical trials underway in 2019 according to industry sources. Eight cell therapies and two gene therapies have been approved by the FDA as of the end of 2019. Statements by the FDA are supported by industry reports that estimate annual revenue growth of 20% to 30% for the C&GT market over the next five years. This scientifically advanced therapeutic approach has unique manufacturing challenges that many of our products can help address. We believe we are well positioned to participate in gene therapy production, particularly in the manufacture of plasmids and viral vectors.

Direct Product Growth

Many of the products we manufacture are in the early stages of their adoption cycle, and, together with the expansion of our commercial organization and strategic acquisitions, have contributed to product revenue growth from $60.4 million in 2014, to $270.1 million in 2019. While all product lines have grown over this period, our diversification strategy has resulted in a significant increase in direct product sales as a percent of total product revenue, from 28% in 2014. By year end 2019, 76% of total bioprocessing revenue was attributable to direct product sales; 44% from our Filtration product line, 24% from our Chromatography product line, 6% from our Process Analytics product line and a small percentage from other sources including sales of hospital products that we obtained through our acquisition of Spectrum.

Customers use our products to produce initial quantities of drug for clinical studies, and then scale-up to larger volumes as the drug progresses to commercial production following regulatory approval. Detailed specifications for a drug's manufacturing process are included in applications that must be approved by regulators, such as the FDA, and the European Medicines Agency ("EMA"), throughout the clinical trial process and prior to final

commercial approval. As a result, products that become part of the manufacturing specifications of a late-stage clinical or commercial process can be very sensitive given the costs and uncertainties associated with displacing them.

The Biologics Manufacturing Process

Manufacturing biologic drugs requires three fundamental steps. First, upstream manufacturing involves the production of the biologic by living cells that are grown in a bioreactor (seed bioreactors, scaling up to a production bioreactor) under controlled conditions. These living cell "factories" are highly sensitive to the condition under which they grow, including the culture process and the composition of the cell culture media and the growth factors used to stimulate increased cell growth and protein production, or titre. Methods of production vary within the industry with the standard approach being fed-batch. With fed-batch culture, nutrients (cell culture media) are added to a production bioreactor only at the beginning of the culture or at defined feeding times to stimulate cell growth and production of the biologic drug of interest. The cells typically live and produce a biologic for 10-14 days prior to the culture health being impacted due to the accumulation of waste by-products. At the end of the culture time, the contents of the bioreactor then go through a harvest clarification step. The industry is increasingly adopting the perfusion (or continuous) method of cell culture. With perfusion cell culture, a cell retention device, like the XCell ATF system, is used to retain cells in the reactor. Fresh nutrients (cell culture media) can be circulated into the reactor continuously while clarified biological product and waste by-products are simultaneously and continuously removed from the reactor. Perfusion cultures can be run for up to 100 days, 30 days being typical, and the cell factories can be grown to a higher concentration and remain alive and producing biologic for significantly more time than with a fed-batch culture. The biologic of interest being removed continuously is already clarified, thus the harvest clarification step required for fed-batch cell culture, is not required for perfusion cell culture. The elimination of this step provides efficiency and cost savings in manufacturing. Some manufacturers are embracing a hybrid approach combining both fed-batch and perfusion methods. The second step is downstream processing where the biologic made during cell culture must be isolated and purified, typically through various filtration and chromatography steps. Each downstream purification process is unique but requires multiple chromatography and filtration steps to render the biologic of interest over 99% pure. Finally, the purified biologic drug is concentrated, formulated and then packaged into its final injectable form.

Biologics are generally high value therapies. Given the inherent complexities of the process and the final drug product, we have observed that manufacturers are seeking and investing in innovative technologies that address pain points in the production process in order to improve yields and improve throughput. Manufacturers are also seeking technologies that reduce costs as the biologic drug moves through clinical stages and into commercial processes by adopting single-use technologies as well as other products that yield increased flexibility and efficiency.

Our Strategy

We are focused on the development, production and commercialization of differentiated, technology-leading solutions or products that address specific pressure points in the biologics manufacturing process and deliver substantial value to our customers. Our products are designed to increase our customers' product yield, and we are committed to supporting our customers with strong customer service and applications expertise.

We intend to build on our recent history of developing market-leading solutions and delivering strong financial performance through the following strategies:

- *Continued innovation* . We plan to capitalize on our internal technological expertise to develop products that address unmet needs in upstream and downstream bioprocessing. We intend to invest further in our Proteins franchise while developing platform and derivative products to support our Filtration, Chromatography and Process Analytics franchises. We plan to strengthen our existing product lines

with complementary products and technologies that are designed to allow us to provide customers with a more efficient manufacturing process on one or more measures including flexibility, convenience, time savings, cost reduction and product yield.

- *Platforming our products.* A key strategy for accelerating market adoption of our products is delivery of enabling technologies that become the standard, or "platform," technology in markets where we compete. We focus our efforts on winning early-stage technology evaluations through direct interaction with the key biomanufacturing decision makers in process development labs. This strategy is designed to establish early adoption of our enabling technologies at key accounts, with opportunity for customers to scale up as the molecule advances to later stages of development and potential commercialization. We believe this approach can accelerate the implementation of our products as platform products, thereby strengthening our competitive advantage and contributing to long-term growth.
- *Targeted acquisitions* . We intend to continue to selectively pursue acquisitions of innovative technologies and products. We intend to leverage our balance sheet to acquire technologies and products that improve our overall financial performance by improving our competitiveness in filtration, chromatography or process analytics or by moving us into adjacent markets with common commercial call points.
- *Geographical expansion* . We intend to expand our global commercial presence by continuing to selectively build out our global sales, marketing, field applications and services infrastructure.
- *Operational efficiency* . We seek to expand operating margins through capacity utilization and process optimization strategies designed to increase our manufacturing yields. We plan to invest in systems to support our global operations, optimizing resources across our global footprint to maximize productivity.

Research and Development

Our research activities are focused on developing new high-value bioprocessing products across all of our franchises. We strive to continue to introduce truly differentiated products that address specific pain points in the biologics manufacturing process. Our commitment to innovation is core to the Repligen culture and our success as a company, with 6% to 8% of revenue focused on new product development and market expansion for existing products.

Sales and Marketing

Our sales and marketing strategy supports our objective of strengthening our position as a leading provider of products and services, addressing upstream, downstream and quality control needs of bioprocessing customers in the biopharmaceutical industry.

Direct-to-Customer Team

To support our sales goals for our direct-to-consumer products, we have invested in our commercial organization. Since 2014, we have significantly expanded our global commercial organization from less than 10, to a 134-person commercial team as of December 31, 2019. This includes 82 people in field positions (sales, field applications and field service), and 52 people in internal positions (marketing and customer service). We also have 22 employees in product management who support our commercial organization as well. Geographically, 81 members of our commercial team are located in North America, 23 in Europe and 30 in Asia-Pacific regions. Since 2018, we have substantially expanded our direct sales team in Asia, where we also work effectively with key distributors to serve our expanding customer base.

Our bioprocess account managers are supported in each region by bioprocess sales specialists with expertise in Filtration, Chromatography or Process Analytics, and by technically trained field applications specialists and

field service providers, who can work closely with customers on product demonstrations, implementation and support. We believe that this model helps drive further adoption at our key accounts and also open up new sales opportunities within each region.

OEM Agreements

For our Proteins franchise, we are committed to be a partner of choice for our customers with distributor and supply agreements in place with large life sciences companies such as GE, MilliporeSigma and Purolite. The GE Protein A supply agreement relating to our Lund, Sweden facility ran, pursuant to its terms, through 2019 and we expect GE to transfer a portion of their ligand manufacturing in-house in 2020. The GE Protein A supply agreement relating to our Waltham, Massachusetts facility runs, pursuant to its terms, through 2021. Our Protein A supply agreement with MilliporeSigma runs, pursuant to its terms, through 2023, and in 2018 we amended our Protein A supply agreement with Purolite that runs, pursuant to its terms, to August 2026 with an option for renewal through 2028. Our dual manufacturing capability provides strong business continuity and reduces overall supply risk for our OEM customers.

Significant Customers and Geographic Reporting

Customers for our bioprocessing products include major life science companies, contract manufacturing organizations, biopharmaceutical companies, diagnostics companies and laboratory researchers.

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

	For the Years Ended December 31,		
	2019	2018	2017
Revenue by customers' geographic locations:			
North America	51%	48%	43%
Europe	37%	40%	46%
APAC	12%	12%	11%
Other	0%	0%	0%
Total revenue	100%	100%	100%

GE, one of our largest bioprocessing customers, accounted for 12%, 15% and 21% of total revenues in the years ended December 31, 2019, 2018 and 2017, respectively. Another customer, MilliporeSigma, accounted for 13%, 15% and 18% of total revenues in the years ended December 31, 2019, 2018 and 2017, respectively.

Employees

As of December 31, 2019, we had 761 employees, an increase of 213 since December 31, 2018. This includes 134 employees in our commercial organization (82 field and 52 internal), 77 in engineering and R&D, 274 in manufacturing, 98 in quality, 61 in supply chain roles, 22 in product management and 86 in administrative functions. Each of our employees has signed a confidentiality agreement. None of our U.S. employees are covered by collective bargaining agreements. We have one collective bargaining agreement with two unions that covers our 63 employees in Sweden, comprising approximately 8% of our total workforce. We renewed these collective bargaining agreements during 2017, and these collective bargaining agreements expire on March 31, 2020. We consider our employee relations to be satisfactory.

Intellectual Property

We are committed to protecting our intellectual property through a combination of patent, copyright, trade secret and trademark laws, as well as confidentiality agreements. As further described below, we own or have exclusive

rights to a number of U.S. patents and U.S. pending patent applications as well as corresponding foreign patents and patent applications.

Chromatography

Our issued patents cover certain unique methods and features of our OPUS PPC, including methods of making and loading these chromatography columns as well as the column structure. We continually seek to improve upon this technology and have multiple new patent filings including those covering gamma irradiation sterilization, packing methods, and methods of removing air using specialized tubing and valve systems.

Filtration

For our Filtration franchise, we are focusing on ATF, TFDF and TFF HF systems and filters. We continually seek to improve upon these technologies and have multiple new patent filings including those covering pumps and controllers, methods of harvesting, single-use products, and filters. Our patent for ATF and associated methods to use such a device in perfusion, acquired from Refine, expires in 2020, and we are proactively developing technology in an effort to mitigate any effects resulting from the expiration of this patent.

We currently have 52 patents granted (which expire over the next 20 years) and 106 patents pending in countries including Australia, Canada, China, France, Germany, India, Japan, Korea, Sweden, United Kingdom and the United States.

Our policy is to require each of our employees, consultants, business partners, potential collaborators and major customers to execute confidentiality agreements upon the commencement of an employment, consulting, business relationship, or product related audit with us. These agreements provide that all confidential information developed or made known to the other party during the course of the relationship with us is to be kept confidential and not disclosed to third parties except in specific circumstances. In the case of employees and consultants, the agreements generally provide that all inventions conceived by the individual in the course of rendering services to Repligen shall be our exclusive property and must be assigned to Repligen.

Process Analytics

Through our 2019 acquisition of C Technologies, we hold issued patents to Slope Spectroscopy instruments and related methods. These include patents to an “Interactive Variable Pathlength Device” that are set to expire in the United States beginning in April 2028. We also hold pending patents to methods of making Slope Spectroscopy standards and methods for using an interactive variable pathlength device.

Protein A

We currently hold a patent for “Nucleic Acids Encoding Recombinant Protein A,” which claims an isolated nucleic acid molecule that encodes a Protein A molecule with an amino acid sequence identical to that of the natural Protein A, which has long been commercialized for bioprocessing applications. This patent will remain in effect until June 2028. We also have two pending patents covering affinity ligands through our collaboration with Navigo.

Trademarks

We vigilantly protect our products and services’ branding by maintaining trademark registrations globally for the Repligen trademark and our key product brands. We have a comprehensive branding policy that includes trademark usage guidelines to ensure Repligen trademarks are used in a manner that provides the maximum protection.

We prioritize our “housemark” trademarks, (i.e., Repligen, Spectrum and TangenX), and ensure they are sufficiently protected and registered in key countries or regions globally, such as the United States, Canada, Europe and China. We also have product trademarks, including OPUS, XCell ATF, TFDF, KrosFlo, SIUS, ProConnex, Spectra/Por, NGL-Impact, SoloVPE and FlowVPE, that provide valuable company recognition and goodwill with our customers.

Our ability to compete effectively in the marketplace is dependent in part on our ability to protect our intellectual property rights, which includes protecting the trademarks we use in connection with our products and services. We rely on several registered and unregistered trademarks to protect our brand.

Licensing Agreements

We have entered into multiple licensing and collaboration relationships with third-party business partners in an effort to fully exploit our technology and advance our bioprocessing business strategy.

Competition

Our bioprocessing products compete on the basis of value proposition, performance, quality, cost effectiveness, and application suitability with numerous established technologies. Additional products using new technologies that may be competitive with our products may also be introduced. Many of the companies selling or developing competitive products, which in some cases include GE and MilliporeSigma, two of our largest customers, have greater financial and human resources, R&D, manufacturing and marketing experience than we do. They may undertake their own development of products that are substantially similar to or compete with our products and they may succeed in developing products that are more effective or less costly than any that we may develop. These competitors may also prove to be more successful in their production, marketing and commercialization activities. We cannot be certain that the research, development and commercialization efforts of our competitors will not render any of our existing or potential products obsolete.

Manufacturing

We manufacture seven commercial forms of Protein A, including “native” Protein A for life sciences companies, including GE, MilliporeSigma and Purolite, under long-term supply agreements which expire between 2020 and 2026. Native Protein A is manufactured in Lund, Sweden, while the recombinant forms are manufactured in both Waltham, Massachusetts and Lund, Sweden. We currently manufacture our growth factor products in Lund, Sweden. Our OPUS chromatography columns and ELISA test kit products are manufactured in Waltham, Massachusetts. Our OPUS columns are manufactured in Ravensburg, Germany, and our XCell ATF systems, XCell ATF single-use devices and SIUS TFF products are manufactured in our facility in Marlborough, Massachusetts. Our TFDF, KrosFlo, Spectra/Pro, Konduit and ProConnex lines of products are manufactured in Rancho Dominguez, California. Our operating room products are manufactured in Irving, Texas and our SoloVPE/VPM and FlowVPE/VPX Slope Spectroscopy variable pathlength products are manufactured in Bridgewater, New Jersey.

We utilize our own facilities in Waltham, Massachusetts and Lund, Sweden as well as third-party contract manufacturing organizations to carry out certain fermentation and recovery operations, while the purification, immobilization, packaging and quality control testing of our bioprocessing products are conducted at our facilities. Our facilities located in Waltham, Massachusetts; Lund, Sweden; Ravensburg, Germany; Bridgewater, New Jersey; and Rancho Dominguez, California are ISO 9001:2015 certified and maintain formal quality systems to maintain process control, traceability, and product conformance. Additionally, our facility in Irving, Texas is ISO 13485:2012 certified. We practice continuous improvement initiatives based on routine internal audits as well as external feedback and audits performed by our partners and customers. In addition, we maintain a business continuity management system which focuses on key areas such as contingency planning, security stocks and off-site storage of raw materials and finished goods to ensure continuous supply of our products.

Available Information

We maintain a website with the address www.repligen.com . We are not including the information contained on our website as a part of, or incorporating it by reference into, this Form 10-K. We make available free of charge through our website our Form 10-Ks, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, and amendments to these reports, as soon as reasonably practicable after we electronically file such materials with, or furnish such materials to, the Securities and Exchange Commission ("SEC"). Our Code of Business Conduct and Ethics is also available free of charge through our website.

Our filings with the SEC may be accessed through the SEC's Electronic Data Gathering, Analysis and Retrieval ("EDGAR") system at www.sec.gov .

ITEM 1A. RISK FACTORS

Investors should carefully consider the risk factors described below before making an investment decision.

If any of the events described in the following risk factors occur, our business, financial condition or results of operations could be materially harmed. In that case the trading price of our common stock could decline, and investors may lose all or part of their investment. Additional risks and uncertainties that we are unaware of or that we currently deem immaterial may also become important factors that affect Repligen.

This Annual Report on Form 10-K ("Form 10-K") contains forward looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including the risks faced by us described below and elsewhere in this Form 10-K.

We face competition from numerous competitors, most of whom have far greater resources than we have, which may make it more difficult for us to achieve significant market penetration.

The bioprocessing market is intensely competitive, subject to rapid change and significantly affected by new product introductions and other market activities of industry participants.

Many of our competitors are large, well-capitalized companies with significantly more market share and resources than we have. As a consequence, they are able to spend more aggressively on product development, marketing, sales and other product initiatives than we can. Many of these competitors have:

- significantly greater name recognition;
- larger and more established distribution networks;
- additional lines of products and the ability to bundle products to offer higher discounts or other incentives to gain a competitive advantage;
- greater experience in conducting research and development, manufacturing, clinical trials, marketing, obtaining regulatory approval and entering into collaborations or other strategic partnership arrangements; and
- greater financial and human resources for product development, sales and marketing and patent litigation.

Our current and future competitors, including certain of our customers, may at any time develop additional products that compete with our products. If any company develops products that compete with or are superior to our products, our revenue may decline. In addition, some of our competitors may compete by lowering the price of their products. If prices were to fall, we may not be able to improve our gross margins or sales growth sufficiently to maintain and grow our profitability.

Despite our increasingly diversified client base, we have historically depended on a limited number of customers for a high percentage of our revenues.

The loss of, or a significant reduction in orders from, any of our large customers, including following any termination or failure to renew a long-term supply contract, would significantly reduce our revenues and harm our results of operations. If a large customer purchases fewer of our products, defers orders or fails to place additional orders with us for any reason, including for business continuity purposes, our revenue could decline, and our operating results may not meet market expectations. Under long-term supply agreements with GE Healthcare ("GE"), we have supplied Protein A ligands to GE from our manufacturing facilities in Lund, Sweden and Waltham, Massachusetts (the "Lund Agreement" and "Waltham Agreement," respectively). The Lund Agreement terminated pursuant to its terms in December 2019 and was not renewed. The Waltham Agreement runs, pursuant to its terms, through December 2021.

In addition, if our customers order our products, but fail to pay on time or at all, our liquidity and operating results could be materially and adversely affected. Furthermore, if any of our current or future products compete with those of any of our largest customers, these customers may place fewer orders with us or cease placing orders with us, which would negatively affect our revenues and operating results.

If we are unable to expand our product portfolio, our ability to generate revenue could be adversely affected.

We are increasingly seeking to develop and commercialize our portfolio of products. Our future financial performance will depend, in part, on our ability to successfully develop and acquire additional bioprocessing products. There is no guarantee that we will be able to successfully acquire or develop additional bioprocessing products, and the Company's financial performance will likely suffer if we are unable to do so.

If intangible assets and goodwill that we recorded in connection with our acquisitions become impaired, we may have to take significant charges against earnings.

In connection with the accounting for our completed acquisitions, we recorded a significant amount of intangible assets, including developed technology and customer relationships relating to the acquired product lines, and goodwill. Under U.S. GAAP, we must assess, at least annually and potentially more frequently, whether the value of intangible assets and goodwill has been impaired. Intangible assets and goodwill will be assessed for impairment in the event of an impairment indicator. Any reduction or impairment of the value of intangible assets and goodwill will result in a charge against earnings, which could materially adversely affect our results of operations and shareholders' equity in future periods.

Our exposure to political, economic and other risks that arise from operating a multinational business has and may continue to increase.

We operate on a global basis with offices or activities in Japan, South Korea, China, India, Europe and North America. Our operations and sales outside of the United States have increased as a result of our strategic acquisitions and the continued expansion of our commercial organization. Risks related to these increased foreign operations include:

- fluctuations in foreign currency exchange rates, which may affect the costs incurred in international operations and could harm our results of operations and financial condition;
- changes in general economic and political conditions in countries where we operate, particularly as a result of ongoing economic instability within foreign jurisdictions;
- the occurrence of a trade war, or other governmental action related to tariffs or trade agreements;
- being subject to complex and restrictive employment and labor laws and regulations, as well as union and works council restrictions;

- changes in tax laws or rulings in the United States or other foreign jurisdictions that may have an adverse impact on our effective tax rate;
- being subject to burdensome foreign laws and regulations, including regulations that may place an increased tax burden on our operations;
- being subject to longer payment cycles from customers and experiencing greater difficulties in timely accounts receivable collections; and
- required compliance with a variety of foreign laws and regulations, such as data privacy requirements, real estate and property laws, anti-competition regulations, import and trade restrictions, export requirements, U.S. laws such as the Foreign Corrupt Practices Act of 1977 and the U.S. Department of Commerce's Export Administration Regulations, and other U.S. federal laws and regulations established by the office of Foreign Asset Control, local laws such as the U.K. Bribery Act of 2010 or other local laws that prohibit corrupt payments to governmental officials or certain payments or remunerations to customers.

Our business success depends in part on our ability to anticipate and effectively manage these and other related factors. We cannot assure you that these and other related factors will not materially adversely affect our international operations or business as a whole.

In addition, a deterioration in diplomatic relations between the United States and any country where we conduct business could adversely affect our future operations and lead to a decline in profitability. In 2018 and 2019, the United States imposed tariffs on goods imported from China and certain other countries, which has resulted in retaliatory tariffs by China and other countries. Additional tariffs or further retaliatory trade measures taken by China or other countries in response, could affect the demand for our products and services, impact the competitive position of our products, prevent us from being able to sell products in certain countries or otherwise adversely impact our results of operations.

We are subject to export and import control laws and regulations that could impair our ability to compete in international markets or subject us to liability if we violate such laws and regulations.

We are subject to U.S. export controls and sanctions regulations that restrict the shipment or provision of certain products and services to certain countries, governments, and persons. While we take precautions to prevent our products and services from being exported in violation of these laws, we cannot guarantee that the precautions we take will prevent violations of export control and sanctions laws. We believe that, in the past, we and our subsidiaries may have exported certain products without a required export license in apparent violation of U.S. export control laws. As a result, we have submitted to the U.S. Department of Commerce's Bureau of Industry and Security various notices of voluntary self-disclosure concerning potential violations. If we are found to be in violation of U.S. sanctions or export control laws, it could result in substantial fines and penalties for us and for the individuals working for us. We may also be adversely affected through other penalties, reputational harm, loss of access to certain markets, or otherwise.

Complying with export control and sanctions regulations may be time consuming and may result in the delay or loss of sales opportunities or impose other costs. Any change in export or import regulations, economic sanctions or related legislation, or change in the countries, governments, persons or technologies targeted by such regulations, could result in our decreased ability to export or sell certain products to existing or potential customers in affected jurisdictions.

We may be unable to efficiently manage our growth as a larger and more geographically diverse organization.

Our strategic acquisitions, the continued expansion of our commercial sales operations, and our organic growth have increased the scope and complexity of our business. As a result, we will face challenges inherent in

efficiently managing a more complex business with an increased number of employees over large geographic distances, including the need to implement appropriate systems, policies, benefits and compliance programs. Our inability to manage successfully the geographically more diverse (including from a cultural perspective) and substantially larger combined organization could materially adversely affect our operating results and, as a result, the market price of our common stock.

Our business is subject to a number of environmental risks.

Our manufacturing business involves the controlled use of hazardous materials and chemicals and is therefore subject to numerous environmental and safety laws and regulations and to periodic inspections for possible violations of these laws and regulations. In addition to these hazardous materials and chemicals, our facility in Sweden also uses Staphylococcus aureus and toxins produced by Staphylococcus aureus in some of its manufacturing processes. Staphylococcus aureus and the toxins it produces, particularly enterotoxins, can cause severe illness in humans. The costs of compliance with environmental and safety laws and regulations are significant. Any violations, even if inadvertent or accidental, of current or future environmental and safety laws or regulations and the cost of compliance with any resulting order or fine could adversely affect our operations.

Our acquisitions expose us to risks that could adversely affect our business, and we may not achieve the anticipated benefits of acquisitions of businesses or technologies.

As a part of our growth strategy, we may make selected acquisitions of complementary products and/or businesses. Any acquisition involves numerous risks and operational, financial, and managerial challenges, including the following, any of which could adversely affect our business, financial condition, or results of operations:

- difficulties in integrating new operations, technologies, products, and personnel;
- problems maintaining uniform procedures, controls and policies with respect to our financial accounting systems;
- lack of synergies or the inability to realize expected synergies and cost-savings;
- difficulties in managing geographically dispersed operations, including risks associated with entering foreign markets in which we have no or limited prior experience;
- underperformance of any acquired technology, product, or business relative to our expectations and the price we paid;
- negative near-term impacts on financial results after an acquisition, including acquisition-related earnings charges;
- the potential loss of key employees, customers, and strategic partners of acquired companies;
- claims by terminated employees and shareholders of acquired companies or other third parties related to the transaction;
- the assumption or incurrence of additional debt obligations or expenses, or use of substantial portions of our cash;
- the issuance of equity securities to finance or as consideration for any acquisitions that dilute the ownership of our stockholders;
- the issuance of equity securities to finance or as consideration for any acquisitions may not be an option if the price of our common stock is low or volatile which could preclude us from completing any such acquisitions;
- any collaboration, strategic alliance and licensing arrangement may require us to relinquish valuable rights to our technologies or product candidates, or grant licenses on terms that are not favorable to us;

- diversion of management's attention and company resources from existing operations of the business;
- inconsistencies in standards, controls, procedures, and policies;
- the impairment of intangible assets as a result of technological advancements, or worse-than-expected performance of acquired companies;
- assumption of, or exposure to, historical liabilities of the acquired business, including unknown contingent or similar liabilities that are difficult to identify or accurately quantify; and
- risks associated with acquiring intellectual property, including potential disputes regarding acquired companies' intellectual property.

In addition, the successful integration of acquired businesses requires significant efforts and expense across all operational areas, including sales and marketing, research and development, manufacturing, finance, legal, and information technologies. There can be no assurance that any of the acquisitions we may make will be successful or will be, or will remain, profitable. Our failure to successfully address the foregoing risks may prevent us from achieving the anticipated benefits from any acquisition in a reasonable time frame, or at all.

Servicing our debt will require a significant amount of cash, and we may not have sufficient cash flow from our business to make payments on our debt.

In 2019, we incurred significant indebtedness in the amount of $287.5 million in aggregate principal with additional accrued interest under our 0.375% Convertible Senior Notes due 2024 (the "2019 Notes"). Our ability to make scheduled payments of the principal of, to pay interest on, or to refinance our indebtedness, including the 2019 Notes, depends on our future performance, which is subject to economic, financial, competitive and other factors that may be beyond our control. Our business may not generate cash flow from operations in the future sufficient to service our debt and make necessary capital expenditures. If we are unable to generate such cash flow, we may be required to adopt one or more alternatives, such as selling assets, restructuring debt or obtaining additional equity capital on terms that may be onerous or highly dilutive. Our ability to refinance our indebtedness will depend on the capital markets and our financial condition at such time. In addition, in the event of a fundamental change or a default under the 2019 Notes, the holders and/or the trustee under the indentures governing the 2019 Notes may accelerate the payment obligations or trigger the holders' repurchase rights under the 2019 Notes. We may not be able to engage in any of these activities or engage in these activities on desirable terms, which could result in a default on our debt obligations, including the 2019 Notes.

If a make-whole fundamental change, such as an acquisition of our company, occurs prior to the maturity of the 2019 Notes, under certain circumstances, the conversion rate for the 2019 Notes will increase such that additional shares of our common stock will be issued upon conversion of the 2019 Notes in connection with such make-whole fundamental change. The increase in the conversion rate will be determined based on the date on which the make-whole fundamental change occurs or becomes effective and the price paid (or deemed paid) per share of our common stock in such transaction. Upon conversion of the 2019 Notes, unless we elect to deliver solely shares of our common stock to settle such conversion (other than paying cash in lieu of delivering any fractional share), we will be required to make cash payments in respect of the 2019 Notes being converted. We may not have enough available cash or be able to obtain financing at the time we are required to make repurchases of 2019 Notes surrendered therefor or notes being converted. Our failure to repurchase 2019 Notes at a time when the repurchase is required by the indenture or to pay any cash payable on future conversions of the 2019 Notes as required by the indenture would constitute a default under the indenture. If the repayment of the related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness and repurchase the 2019 Notes or make cash payments upon conversions thereof.

In addition, our significant indebtedness, combined with our other financial obligations and contractual commitments, could have other important consequences. For example, it could:

- make us more vulnerable to adverse changes in general U.S. and worldwide economic, industry and competitive conditions and adverse changes in government regulation;

- limit our flexibility in planning for, or reacting to, changes in our business and our industry;
- place us at a disadvantage compared to our competitors who have less debt; and
- limit our ability to borrow additional amounts for working capital and other general corporate purposes, including to fund possible acquisitions of, or investments in, complementary businesses, products, services and technologies.

Any of these factors could materially and adversely affect our business, financial condition and results of operations. In addition, if we incur additional indebtedness, the risks related to our business and our ability to service or repay our indebtedness would increase.

Future strategic transactions or acquisitions may require us to seek additional financing, which we may not be able to secure on favorable terms, if at all.

We plan to continue a strategy of growth and development for our bioprocessing business, and we actively evaluate various strategic transactions on an ongoing basis, including licensing or acquiring complementary products, technologies or businesses that would complement our existing portfolio of development programs. In order to complete such strategic transactions, we may need to seek additional financing to fund these investments and acquisitions. Should we need to do so, 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. In addition, future acquisitions may require the issuance or sale of additional equity or debt securities, which may result in additional dilution to our stockholders.

We rely on a limited number of suppliers or, for certain of our products, one supplier, and we may not be able to find replacements or immediately transition to alternative suppliers, which could have a material adverse effect on our financial condition, results of operations and reputation.

There are only a limited number of suppliers of materials for certain of our products. An interruption in operations of the business related to these products could occur if we encounter delays or difficulties in securing the required materials, or if we cannot then obtain an acceptable substitute. Any such interruption could significantly affect the business related to these products and our financial condition, results of operations and reputation.

For example, we believe that only a small number of suppliers are currently qualified to supply materials for the XCell Alternating Tangential Filtration ("ATF") ™ systems. The use of materials furnished by these replacement suppliers would require us to alter our operations related to the XCell ATF systems. Transitioning to a new supplier for our products would be time consuming and expensive, may result in interruptions in our operations, could affect the performance specifications of our product lines or could require that we revalidate the materials. There can be no assurance that we will be able to secure alternative materials and bring such materials online and revalidate them without experiencing interruptions in our workflow. If we should encounter delays or difficulties in securing, reconfiguring or revalidating the materials required for our products, our business related to these products and our financial condition, results of operations and reputation could be adversely affected.

As we evolve from a company dependent on others to commercialize our products to a company selling directly to end users, we may encounter difficulties in expanding our product portfolio and our commercial marketing capabilities.

Prior to 2016, we generated most of our revenues through sales of bioprocessing products to a limited number of life sciences companies, such as GE, MilliporeSigma and other individual distributors. However, due in part to our recent strategic acquisitions, an increasing amount of our revenue is attributable to our commercialization of bioprocessing products that we sell directly to end-users, including biopharmaceutical companies and contract manufacturing organizations. This has required and will continue to require us to invest additional resources in

our sales and marketing capabilities. We may not be able to attract and retain additional sales and marketing professionals, and the cost of building the sales and marketing function may not generate our anticipated revenue growth. In addition, our sales and marketing efforts may be unsuccessful. Our failure to manage these risks may have a negative impact on our financial condition, or results of operations and may cause our stock price to decline.

If we are unable to obtain or maintain our intellectual property, we may not be able to succeed commercially.

We endeavor to obtain and maintain trade secrets and, to a lesser extent with respect to the products that currently account for a majority of our revenue, patent protection when available in order to protect our products and processes from unauthorized use and to produce a financial return consistent with the significant time and expense required to bring our products to market. Our success will depend, in part, on our ability to:

- preserve our trade secrets and know-how;
- operate without infringing the proprietary rights of third parties;
- obtain and maintain patent protection for our products and manufacturing processes; and
- secure any necessary licenses from others on acceptable terms.

We consider trade secrets, know-how and other forms of market protection to be among the most important elements of our proprietary position, in particular, as it relates to the products that currently account for a majority of our revenue. We also own or have exclusive rights to a number of U.S. patents and U.S. pending patent applications as well as corresponding foreign patents and patent applications. We continue to actively and selectively pursue patent protection and seek to expand our patent estate, particularly for our products currently in development, and we cannot be sure that any patent applications that we will file in the future or that any currently pending applications will issue on a timely basis, if ever. We cannot be certain that we were the first to make the inventions covered by each of our pending patent applications or that we were the first to file patent applications for such inventions. Even if patents are issued, the degree of protection afforded by such patents will depend upon the:

- scope of the patent claims;
- validity and enforceability of the claims obtained in such patents; and
- our willingness and financial ability to enforce and/or defend them.

The patent position of life sciences companies is often highly uncertain and usually involves complex legal and scientific questions. Patents which may be granted to us in certain foreign countries may be subject to opposition proceedings brought by third parties or result in suits by us, which may be costly and result in adverse consequences for us.

In some cases, litigation or other proceedings may be necessary to assert claims of infringement, to enforce patents issued to us or our licensors, to protect trade secrets, know-how or other intellectual property rights we own or to determine the scope and validity of the proprietary rights of third parties. Such litigation could result in substantial cost to us and diversion of our resources. An adverse outcome in any such litigation or proceeding could have a material adverse effect on our business, financial condition and results of operations. If our competitors prepare and file patent applications in the United States that claim technology also claimed by us, we may be required to participate in interference proceedings declared by the U.S. Patent and Trademark Office to determine priority of invention, which would result in substantial costs to us.

While one of our U.S. patents covering recombinant Protein A had its term adjusted to expire in 2028, our other U.S. patents covering recombinant Protein A have expired, and as a result, we may face increased competition, which could harm our results of operations, financial condition, cash flow and future prospects.

Other companies could begin manufacturing and selling native or some of the commercial forms of recombinant Protein A in the United States and may directly compete with us on certain Protein A products. This may induce us to sell Protein A at lower prices and may erode our market share, which could adversely affect our results of operations, financial condition, cash flow and future prospects.

Our freedom to develop our products may be challenged by others, and we may have to engage in litigation to determine the scope and validity of competitors' patents and proprietary rights, which, if we do not prevail, could harm our business, results of operations, financial condition, cash flow and future prospects.

There has been substantial litigation and other proceedings regarding the complex patent and other intellectual property rights in the life sciences industry. We have been a party to, and in the future may become a party to, patent litigation or other proceedings regarding intellectual property rights.

Other types of situations in which we may become involved in patent litigation or other intellectual property proceedings include:

We may initiate litigation or other proceedings against third parties to seek to invalidate the patents held by such third parties or to obtain a judgment that our products or services do not infringe such third parties' patents.

- We may initiate litigation or other proceedings against third parties to seek to enforce our patents against infringement.
- If our competitors file patent applications that claim technology also claimed by us, we may participate in interference or opposition proceedings to determine the priority of invention.
- If third-parties initiate litigation claiming that our processes or products infringe their patent or other intellectual property rights, we will need to defend against such claims.

The cost to us of any patent litigation or other proceeding, even if resolved in our favor, could be substantial. Some of our competitors may be able to sustain the cost of such litigation or proceedings more effectively than we can because of their substantially greater financial resources. If a patent litigation or other intellectual property proceeding is resolved in a way that is unfavorable to us, we or our collaborative or strategic partners may be enjoined from manufacturing or selling our products and services without a license from the other party and be held liable for significant damages. The failure to obtain any required license on commercially acceptable terms or at all may harm our business, results of operations, financial condition, cash flow and future prospects.

Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace. Patent litigation and other proceedings may also absorb significant management time, attention and resources.

We may become involved in litigation or other proceedings with collaborative partners, which may be time consuming, costly and could result in delays in our development and commercialization efforts.

In connection with the Company's decision to focus its efforts on the growth of its core bioprocessing business, we sought development and commercialization partnerships for our remaining portfolio of clinical stage assets. Any disputes with such partners that lead to litigation or similar proceedings may result in us incurring legal expenses, as well as facing potential legal liability. Such disputes, litigation or other proceedings are also time consuming and may cause delays in our development and commercialization efforts. If we fail to resolve these disputes quickly and with terms that are no less favorable to us than the current terms of the arrangements, our business, results of operations, financial condition, cash flow and future prospects may be harmed.

If we are unable to continue to hire and retain skilled personnel, then we will have trouble developing and marketing our products.

Our success depends largely upon the continued service of our management and scientific staff and our ability to attract, retain and motivate highly skilled technical, scientific, management and marketing personnel. We also face significant competition in the hiring and retention of such personnel from other companies, research and academic institutions, government and other organizations who have superior funding and resources. The loss of key personnel or our inability to hire and retain skilled personnel could materially adversely affect our product development efforts and our business.

The market may not be receptive to our new bioprocessing products upon their introduction.

We expect a portion of our future revenue growth to come from introducing new bioprocessing products, including line extensions and new features for our OPUS ® disposable chromatography columns, our XCell ATF system, our SIUS ™ tangential flow filtration ("TFF") cassettes, our Spectrum ® hollow fiber modules TFF line of cassettes and our growth factors. The commercial success of all of our products will depend upon their acceptance by the life science and biopharmaceutical industries. Many of the bioprocessing products that we are developing are based upon new technologies or approaches. As a result, there can be no assurance that these new products, even if successfully developed and introduced, will be accepted by customers. If customers do not adopt our new products and technologies, our results of operations may suffer and, as a result, the market price of our common stock may decline.

Our products are subject to quality control requirements.

Whether a product is produced by us or purchased from outside suppliers, it is subjected to quality control procedures, including the verification of porosity and with certain products, the complete validation for good manufacturing practices, U.S. Food and Drug Administration, CE and ISO 2001 compliance, prior to final packaging. Quality control is performed by a staff of technicians utilizing calibrated equipment. In the event we, or our manufacturers, produce products that fail to comply with required quality standards, it may incur delays in fulfilling orders, write-downs, damage to our reputation and damages resulting from product liability claims.

If our products do not perform as expected or the reliability of the technology on which our products are based is questioned, we could experience lost revenue, delayed or reduced market acceptance of our products, increased costs and damage to our reputation.

Our success depends on the market's confidence that we can provide reliable, high-quality bioprocessing products. We believe that customers in our target markets are likely to be particularly sensitive to product defects and errors. Our reputation and the public image of our products and technologies may be impaired if our products fail to perform as expected. Although our products are tested prior to shipment, defects or errors could nonetheless occur in our products. Furthermore, the Protein A that we manufacture is subsequently incorporated into products that are sold by other life sciences companies and we have no control over the manufacture and production of those products. In the future, if our products experience, or are perceived to experience, a material defect or error, this could result in loss or delay of revenues, delayed market acceptance, damaged reputation, diversion of development resources, legal claims, increased insurance costs or increased service and warranty costs, any of which could harm our business. Such defects or errors could also narrow the scope of the use of our products, which could hinder our success in the market. Even after any underlying concerns or problems are resolved, any lingering concerns in our target market regarding our technology or any manufacturing defects or performance errors in our products could continue to result in lost revenue, delayed market acceptance, damaged reputation, increased service and warranty costs and claims against us.

If we are unable to manufacture our products in sufficient quantities and in a timely manner, our operating results will be harmed, our ability to generate revenue could be diminished and our gross margin may be negatively impacted.

Our revenues and other operating results will depend in large part on our ability to manufacture and assemble our products in sufficient quantities and in a timely manner. Any interruptions we experience in the manufacturing or shipping of our products could delay our ability to recognize revenues in a particular quarter. Manufacturing problems can and do arise, and as demand for our products increases, any such problems could have an increasingly significant impact on our operating results. While we have not generally experienced problems with, or delays in, our production capabilities that resulted in delays in our ability to ship finished products, there can be no assurance that we will not encounter such problems in the future. We may not be able to quickly ship products and recognize anticipated revenues for a given period if we experience significant delays in the manufacturing process. In addition, we must maintain sufficient production capacity in order to meet anticipated customer demand, which carries fixed costs that we may not be able to offset if orders slow, which would adversely affect our operating margins. If we are unable to manufacture our products consistently, in sufficient quantities, and on a timely basis, our bioprocessing revenue, gross margins and our other operating results will be materially and adversely affected.

Our operating results may fluctuate significantly, our customers' future purchases are difficult to predict and any failure to meet financial expectations may result in a decline in our stock price.

Our quarterly operating results may fluctuate in the future as a result of many factors such as the impact of seasonal spending patterns, changes in overall spending levels in the life sciences industry, the inability of some of our customers to consummate anticipated purchases of our products due to changes in end-user demand, and other unpredictable factors that may affect ordering patterns. Because our revenue and operating results are difficult to predict, we believe that our past results of operations are not necessarily a good indicator of our future performance. Additionally, if revenue declines in a quarter, whether due to a delay in recognizing expected revenue, adverse economic conditions or otherwise, our results of operations will be harmed because many of our expenses are relatively fixed. In particular, a large portion of our manufacturing costs, our research and development, sales and marketing and general and administrative expenses are not significantly affected by variations in revenue. Further, our gross margins are dependent on product mix. A shift in sales mix away from our higher margin products to lower margin products will adversely affect our gross margins. If our quarterly operating results fail to meet investor expectations, the price of our common stock may decline.

Securities or industry analysts may not publish favorable research or reports about our business or may publish no information, which could cause our stock price or trading volume to decline.

The trading market for our common stock is influenced by the research and reports that industry or securities analysts publish about us and our business. We do not have any control over these analysts and we cannot provide any assurance that analysts will cover us or provide favorable coverage. If any of the analysts who cover us issue an adverse opinion regarding our stock price, our business or stock price would likely decline. If one or more of these analysts cease coverage of our company or fail to regularly publish reports covering us, we could lose visibility in the market, which in turn could cause our stock price or trading volume to decline.

Health care reform measures could adversely affect our business.

The efforts of governmental and third-party payors to contain or reduce the costs of health care may adversely affect the business and financial condition of pharmaceutical and biotechnology companies, including ours. Specifically, in both the United States and some foreign jurisdictions, there have been a number of legislative and regulatory proposals to change the health care system in ways that could affect our ability to sell our products profitably. For example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010 (together, the "Affordable Care Act"), was passed, which

substantially changes the way health care is financed by both governmental and private insurers and significantly impacts the U.S. life sciences industry. The Affordable Care Act and other federal and state proposals and health care reforms could limit the prices that can be charged for the products we develop and may limit our commercial opportunity. In the United States, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, also called the Medicare Modernization Act (the "MMA") changed the way Medicare covers and pays for pharmaceutical products. These cost reduction initiatives and other provisions of this legislation could decrease the coverage and price that we receive for any approved products and could seriously harm our business. While the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates, and any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors. Efforts by the government and other third-party payors to contain or reduce the costs of health care through various means may limit our commercial opportunities and result in a decrease in the price of our common stock or limit our ability to raise capital.

Recent federal government efforts have been aimed at amending or repealing all or portions of existing health care reform legislation, including the Affordable Care Act. Changes in existing health care reform measures may result in uncertainty with respect to legislation, regulation and government policy that could significantly impact our business and the life sciences industry.

The enactment of legislation implementing changes in taxation of international business activities, the adoption of other corporate tax reform policies, or changes in tax legislation or policies, or interpretations thereof, could materially impact our financial position and results of operations.

Corporate tax reform, base-erosion efforts and tax transparency continue to be high priorities in many tax jurisdictions where we have business operations. As a result, policies regarding corporate income and other taxes in numerous jurisdictions are under heightened scrutiny and tax reform legislation is being proposed or enacted in a number of jurisdictions. For example, the Tax Cuts and Jobs Act (the "2017 Tax Reform Act"), adopting broad U.S. corporate income tax reform will, among other things, reduce the U.S. corporate income tax rate, but will impose base-erosion prevention measures on earnings of non-U.S. subsidiaries of U.S. entities as well as the transition tax on mandatory deemed repatriation of accumulated non-U.S. earnings of U.S. controlled foreign corporations. There is no assurance that our actual income tax liability will not be materially different than what is reflected in our income tax provisions and accruals.

In addition, many countries are beginning to implement legislation and other guidance to align their international tax rules with the Organisation for Economic Co-operation and Development's Base Erosion and Profit Shifting recommendations and action plan that aim to standardize and modernize global corporate tax policy, including changes to cross-border tax, transfer pricing documentation rules, and nexus-based tax incentive practices. Because of the heightened scrutiny of corporate taxation policies, prior decisions by tax authorities regarding treatments and positions of corporate income taxes could be subject to enforcement activities, and legislative investigation and inquiry, which could also result in changes in tax policies or prior tax rulings. Any such changes in policies or rulings may also result in the taxes we previously paid being subject to change.

Due to the large scale of our international business activities, any substantial changes in international corporate tax policies, enforcement activities or legislative initiatives may materially adversely affect our business, the amount of taxes we are required to pay and our financial condition and results of operations generally.

We compete with life science, pharmaceutical and biotechnology companies who are capable of developing new approaches that could make our products and technology obsolete.

The market for therapeutic and commercial products is intensely competitive, rapidly evolving and subject to rapid technological change. We compete with several medium and small companies in each of our product categories as well as several large companies, including GE, Danaher Corporation (Pall), Thermo Fisher

Scientific Inc., MilliporeSigma and Sartorius. These competitors, as well as other life science, pharmaceutical and biotechnology companies may have greater financial, manufacturing, marketing, and research and development resources than we have, as well as stronger name recognition, longer operating histories and benefits derived from greater economies of scale. These factors, among others, may enable our competitors to market their products at lower prices or on terms more advantageous to customers than what we can offer. Competition may result in price reductions, reduced gross margins and loss of market share, any of which could have a material adverse effect on our business, financial condition and results of operations. Additionally, new approaches by these competitors may make our products and technologies obsolete or noncompetitive.

We may become subject to litigation, which could result in substantial costs and divert management's attention and resources from our business.

From time to time, we may become involved in litigation or other legal proceedings relating to claims arising from the ordinary course of business. Litigation is subject to inherent risks and uncertainties that may cause actual results to differ materially from our expectations. If we receive an adverse judgment in any litigation, we could be required to pay substantial damages. With or without merit, litigation can be complex, can extend for a protracted period of time, can be very expensive and the expense can be unpredictable. Litigation initiated by us could also result in counter-claims against us, which could increase the costs associated with the litigation and result in our payment of damages or other judgments against us. In addition, litigation, and any related publicity, may divert the efforts and attention of some of our management and key personnel, which could adversely affect our business.

We may be exposed to liabilities under the Foreign Corrupt Practices Act, and any determination that we violated the Foreign Corrupt Practices Act could have a material adverse effect on our business.

We are subject to the Foreign Corrupt Practice Act of 1977 (the "FCPA") and other laws that prohibit improper payments or offers of payments to foreign governments and their officials and political parties by U.S. persons and issuers as defined by the statute for the purpose of obtaining or retaining business. We have operations and agreements with third parties and make sales in jurisdictions outside of the United States, which may experience corruption. Our activities in jurisdictions outside of the United States create the risk of unauthorized payments or offers of payments by one of our employees, consultants, sales agents or distributors, because these parties are not always subject to our control. These risks have increased following our recent acquisitions of overseas operations and facilities. It is our policy to implement safeguards to discourage these practices by our employees. However, our existing safeguards and any future improvements may prove to be less than effective, and the employees, consultants, sales agents or distributors of our Company may engage in conduct for which we might be held responsible. Violations of the FCPA may result in severe criminal or civil sanctions, and we may be subject to other liabilities, which could negatively affect our business, operating results and financial condition. In addition, the government may seek to hold us liable for successor liability FCPA violations committed by any companies in which we invest or that we acquire.

Our stock price could be volatile, which could cause shareholders to lose part or all of their investment.

The market price of our common stock, like that of the common stock of many other companies with similar market capitalizations, is highly volatile. In addition, the stock market has experienced extreme price and volume fluctuations. This volatility has significantly affected the market prices of securities of many life sciences, biotechnology and pharmaceutical companies for reasons frequently unrelated to or disproportionate to the operating performance of the specific companies. These broad market fluctuations may adversely affect the market price of our common stock.

Anti-takeover provisions in our charter documents, certain of our contracts with third parties, and under Delaware law could make an acquisition of us, even one that may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

Provisions in our certificate of incorporation and by-laws may delay or prevent an acquisition of us or a change in our management. These provisions include the ability of our board of directors to issue preferred stock without stockholder approval. In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us. Although we believe these provisions collectively provide for an opportunity to obtain greater value for stockholders by requiring potential acquirers to negotiate with our board of directors, they would apply even if an offer rejected by our board were considered beneficial by some stockholders. Additionally, certain of our contracts with third parties allow for termination upon specified change of control transactions. Anti-takeover provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors, which is responsible for appointing the members of our management, and anti-takeover or change of control contract termination rights may frustrate or prevent any attempts by a third party to acquire or attempt to acquire the Company.

Changes in accounting standards and subjective assumptions, estimates, and judgments by management related to complex accounting matters could significantly affect our financial results or financial condition.

Generally accepted accounting principles and related accounting pronouncements, implementation guidelines, and interpretations with regard to a wide range of matters that are relevant to our business, such as revenue recognition, asset impairment and fair value determinations, inventories, business combinations and intangible asset valuations, leases, and litigation, are highly complex and involve many subjective assumptions, estimates, and judgments. Changes in these rules or their interpretation or changes in underlying assumptions, estimates, or judgments could significantly change our reported or expected financial performance or financial condition.

Our results of operations could be negatively affected by potential fluctuations in foreign currency exchange rates.

We conduct a large portion of our business in international markets. For the fiscal year ended December 31, 2019, 29% of our revenues and 17% of our costs and expenses were denominated in foreign currencies, primarily the Swedish krona, the British pound sterling, and the Euro. We are exposed to the risk of an increase or decrease in the value of the foreign currencies relative to the U.S. Dollar, which could increase the value of our expenses and decrease the value of our revenue when measured in U.S. Dollars. As a result, our results of operation may be influenced by the effects of future exchange rate fluctuations and such effects may have an adverse impact on our common stock price.

Our ability to use net operating loss and tax credit carryforwards and certain built-in losses to reduce future tax payments is limited by provisions of the Internal Revenue Code, and it is possible that certain transactions or a combination of certain transactions may result in material additional limitations on our ability to use our net operating loss and tax credit carryforwards.

Section 382 and 383 of the Internal Revenue Code of 1986, as amended, contain rules that limit the ability of a company that undergoes an ownership change, which is generally any change in ownership of more than 50% of its stock over a three-year period, to utilize its net operating loss and tax credit carryforwards and certain built-in losses recognized in years after the ownership change. These rules generally operate by focusing on ownership changes involving stockholders owning directly or indirectly 5% or more of the stock of a company and any change in ownership arising from a new issuance of stock by the company. Generally, if an ownership change occurs, the yearly taxable income limitation on the use of net operating loss and tax credit carryforwards and certain built-in losses is equal to the product of the applicable long-term, tax-exempt rate and the value of the

company's stock immediately before the ownership change. We may be unable to offset our taxable income with losses, or our tax liability with credits, before such losses and credits expire and therefore would incur larger federal income tax liability. While our most recent Section 382 analysis did not show any current exposure, future transactions or combinations of future transactions may result in a change in control under Section 382 in the future.

If we fail to maintain an effective system of internal controls, we may not be able to accurately report financial results or prevent fraud. If we identify a material weakness in our internal control over financial reporting, our ability to meet our reporting obligations and the trading price of our stock could be negatively affected.

Effective internal controls are necessary to provide reliable financial reports and to assist in the effective prevention of fraud. Any inability to provide reliable financial reports or prevent fraud could harm our business. We regularly review and update our internal controls, disclosure controls and procedures, and corporate governance policies. In addition, we are required under the Sarbanes-Oxley Act of 2002 to report annually on our internal control over financial reporting. Any system of internal controls, however well designed and operated, is based in part on certain assumptions and can provide only reasonable, not absolute, assurances that the objectives of the system are met. If we, or our independent registered public accounting firm, determine that our internal controls over financial reporting are not effective, discover areas that need improvement in the future or discover a material weakness, these shortcomings could have an adverse effect on our business and financial results, and the price of our common stock could be negatively affected. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis. Accordingly, a material weakness increases the risk that the financial information we report contains material errors.

If we cannot conclude that we have effective internal control over our financial reporting, or if our independent registered public accounting firm is unable to provide an unqualified opinion regarding the effectiveness of our internal control over financial reporting, investors could lose confidence in the reliability of our financial statements, which could lead to a decline in our stock price. Failure to comply with reporting requirements could also subject us to sanctions and/or investigations by the SEC, The Nasdaq Stock Market or other regulatory authorities. We have previously implemented several significant ERP modules and expect to implement additional ERP modules in the future. The implementation of the ERP system represents a change in our internal control over financial reporting. Although we continue to monitor and assess our internal controls in the new ERP system environment as changes are made and new modules are implemented, and we have taken additional steps to modify and enhance the design and effectiveness of our internal control over financial reporting, there is a risk that deficiencies may occur that could constitute significant deficiencies or in the aggregate a material weakness.

If we fail to remedy any deficiencies or maintain the adequacy of our internal controls, we could be subject to regulatory scrutiny, civil or criminal penalties or shareholder litigation. In addition, failure to maintain adequate internal controls could result in financial statements that do not accurately reflect our operating results or financial condition.

Our internal computer systems, or those of our customers, collaborators or other contractors, may be subject to cyber-attacks or security breaches, which could result in a material disruption of our product development programs.

Despite the implementation of security measures, our internal computer systems and those of our customers, collaborators and other contractors are vulnerable to damage from computer viruses and unauthorized access. Cyber-attacks are increasing in their frequency, sophistication and intensity, and have become increasingly difficult to detect. Cyber-attacks could include the deployment of harmful malware, ransomware,

denial-of-service attacks, social engineering and other means to affect service reliability and threaten the confidentiality, integrity and availability of information. Cyber-attacks also could include phishing attempts or e-mail fraud to cause payments or information to be transmitted to an unintended recipient. A material cyber-attack or security breach could cause interruptions in our operations and could result in a material disruption of our business operations, damage to our reputation or a loss of revenues.

In the ordinary course of our business, we collect and store sensitive data, including, among other things, personally identifiable information about our employees, intellectual property, and proprietary business information. Any cyber-attack or security breach that leads to unauthorized access, use or disclosure of personal or proprietary information could harm our reputation, cause us not to comply with federal and/or state breach notification laws and foreign law equivalents and otherwise subject us to liability under laws and regulations that protect the privacy and security of personal information. In addition, we could be subject to risks caused by misappropriation, misuse, leakage, falsification or intentional or accidental release or loss of information maintained in the information systems and networks of our company and our vendors, including personal information of our employees, and company and vendor confidential data. In addition, outside parties may attempt to penetrate our systems or those of our vendors or fraudulently induce our personnel or the personnel of our vendors to disclose sensitive information in order to gain access to our data and/or systems. Like other companies, we have on occasion experienced, and will continue to experience, data security incidents involving access to company data threats to our data and systems, including malicious codes and viruses, phishing, business email compromise attacks, or other cyber-attacks. The number and complexity of these threats continue to increase over time. If a material breach of our information technology systems or those of our vendors occurs, the market perception of the effectiveness of our security measures could be harmed and our reputation and credibility could be damaged.

We could be required to expend significant amounts of money and other resources to respond to these threats or breaches and to repair or replace information systems or networks and could suffer financial loss or the loss of valuable confidential information. In addition, we could be subject to regulatory actions and/or claims made by individuals and groups in private litigation involving privacy issues related to data collection and use practices and other data privacy laws and regulations, including claims for misuse or inappropriate disclosure of data, as well as unfair or deceptive practices. Although we develop and maintain systems and controls designed to prevent these events from occurring, and we have a process to identify and mitigate threats, the development and maintenance of these systems, controls and processes is costly and requires ongoing monitoring and updating as technologies change and efforts to overcome security measures become increasingly sophisticated. Moreover, despite our efforts, the possibility of these events occurring cannot be eliminated entirely and there can be no assurance that any measures we take will prevent cyber-attacks or security breaches that could adversely affect our business.

Legal, political and economic uncertainty surrounding the planned exit of the United Kingdom from the European Union is a source of instability and uncertainty.

In June 2016, a majority of the eligible members of the electorate in the United Kingdom voted to withdraw from the European Union in a national referendum, commonly referred to as “Brexit.” The United Kingdom and the European Union agreed to a withdrawal agreement (the “Withdrawal Agreement”). The Withdrawal Agreement was approved by the U.K. Parliament and the United Kingdom formally left the European Union on January 31, 2020. Under the Withdrawal Agreement, the United Kingdom is subject to a transition period until December 31, 2020 (the “Transition Period”), during which European Union rules will continue to apply.

Negotiations between the United Kingdom and the European Union are expected to continue in relation to the customs and trading relationship between the United Kingdom and the European Union following the expiry of the Transition Period.

The uncertainty concerning the United Kingdom’s legal, political and economic relationship with the European Union after the Transition Period may be a source of instability in the international markets, create significant

currency fluctuations, and/or otherwise adversely affect trading agreements or similar cross-border co-operation arrangements (whether economic, tax, fiscal, legal, regulatory or otherwise).

These developments, or the perception that any of them could occur, have had, and may continue to have, a significant adverse effect on global economic conditions and the stability of global financial markets, and could significantly reduce global market liquidity and limit the ability of key market participants to operate in certain financial markets. In particular, it could also lead to a period of considerable uncertainty in relation to the U.K. financial and banking markets, as well as on the regulatory process in Europe. Asset valuations, currency exchange rates and credit ratings may also be subject to increased market volatility.

If the United Kingdom and the EU are unable to negotiate acceptable trading and customs terms or if other EU Member States pursue withdrawal, barrier-free access between the United Kingdom and other EU Member States or among the European Economic Area ("E.E.A.") overall could be diminished or eliminated. The long-term effects of Brexit will depend on any agreements (or lack thereof) between the United Kingdom and the EU and, in particular, any arrangements for the United Kingdom to retain access to EU markets after the Transition Period. Such a withdrawal from the EU is unprecedented, and it is unclear how the U.K. access to the European single market for goods, capital, services and labor within the EU, or single market, and the wider commercial, legal and regulatory environment, will impact our U.K. operations.

We may also face new regulatory costs and challenges that could have an adverse effect on our operations and development programs. For example, the United Kingdom could lose the benefits of global trade agreements negotiated by the EU on behalf of its members, which may result in increased trade barriers that could make our doing business in the EU and the E.E.A. more difficult. There may continue to be economic uncertainty surrounding the consequences of Brexit, which could adversely affect our financial condition, results of operations, cash flows and market price of our common stock.

Natural disasters, geopolitical unrest, war, terrorism, public health issues or other catastrophic events could disrupt the supply, delivery or demand of products, which could negatively affect our operations and performance.

We are subject to the risk of disruption by earthquakes, floods and other natural disasters, fire, power shortages, geopolitical unrest, war, terrorist attacks and other hostile acts, public health issues, epidemics or pandemics and other events beyond our control and the control of the third parties on which we depend. Any of these catastrophic events, whether in the United States or abroad, may have a strong negative impact on the global economy, our employees, facilities, partners, suppliers, distributors or customers, and could decrease demand for our products, create delays and inefficiencies in our supply chain and make it difficult or impossible for us to deliver products to our customers.

For example, in December 2019 an outbreak of a novel strain of coronavirus originated in Wuhan, China, and has since spread to a number of other countries in which we or our suppliers operate, including the United States. This outbreak has resulted in the extended shutdown of certain businesses in the Wuhan region, which may in turn result in disruptions to our and our customer's supply chain and business operations. These could include disruptions from the temporary closure of third-party supplier and manufacturer facilities, interruptions in product supply, or restrictions on the export or shipment of our products. Global health concerns, such as coronavirus, could also result in social, economic, and labor instability in the countries in which we or our customers and suppliers operate. These uncertainties could have a material adverse effect on our business and our results of operation and financial condition.

In addition, a catastrophic event that results in the destruction or disruption of our data centers or our critical business or information technology systems would severely affect our ability to conduct normal business operations and, as a result, our operating results would be adversely affected.

Changes in laws and regulations governing the privacy and protection of data and personal information could adversely affect our business.

We are subject to data privacy and protection laws and regulations that apply to the collection, transmission, storage and use of proprietary information and personally-identifying information, which among other things, imposes certain requirements relating to the privacy, security and transmission of certain individually identifiable information. In addition, numerous other federal and state laws, including state security breach notification laws, state health information privacy laws and federal and state consumer protection laws, govern the collection, use, disclosure and security of personal information. These laws continue to change and evolve, and are increasing in breadth and impact. For example, the California Consumer Privacy Act grants consumers new rights with respect to their personal data, and provides for a private right of action for security breaches. This law and others like it are as yet untested and may subject the Company to increased regulatory scrutiny, litigation, and overall risk.

Various foreign countries also have, or are developing, laws governing the collection, use, disclosure, security, and cross-border transmission of personal information. The legislative and regulatory landscape for privacy and data protection continues to evolve, and there has been an increasing amount of focus on privacy and data protection issues with the potential to affect our business. For example, privacy requirements in the European Union ("EU") govern the transfer of personal information from the European Economic Area to the United States. While we continue to address the implications of changes to the EU data privacy regulations, the area remains an evolving landscape with new regulations coming into effect and continued legal challenges and our efforts to comply with the evolving data protection rules may be unsuccessful. Failure to comply with laws regarding data protection would expose us to risk of enforcement actions taken by data protection authorities in the EU and the potential for significant penalties if we are found to be non-compliant. Similarly, failure to comply with federal and state laws in the United States regarding privacy and security of personal information could expose us to penalties under such laws. Even if we are not determined to have violated these laws, government investigations into these issues typically require the expenditure of significant resources and generate negative publicity, which could harm our business.

Certain of our products are used by customers in the production of gene therapies, which represent a relatively new and still-developing mode of treatment. Unforeseen adverse events, negative clinical outcomes, or increased regulatory scrutiny of gene therapy and its financial cost may damage public perception of the safety, utility, or efficacy of gene therapies and may harm our customers' ability to conduct their business. Such events may negatively impact our revenues and have an adverse effect on our performance.

Gene therapy remains a relatively new and developing treatment method, with only a few gene therapies approved to date by regulatory authorities. Public perception may be influenced by claims that gene therapy is unsafe or ineffective, and gene therapy may not gain the acceptance of the public or the medical community. In addition, ethical, social, legal, and financial concerns about gene therapy and genetic testing could result in additional regulations or limitations or even prohibitions on certain gene therapies or gene-therapy-related products. More restrictive regulations or negative public perception could reduce certain of our customers' use of our products, which could negatively affect our revenue and performance.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Our material office and manufacturing leases are detailed below:

Location	Square Feet	Principal Use	Lease Expiration
Waltham, Massachusetts	108,135[1]	Corporate headquarters, manufacturing, research and development, marketing and administrative offices	April 1, 2030
Rancho Dominguez, California	68,908	Manufacturing, research and development, marketing and administrative operations	November 30, 2025 [2]
Marlborough, Massachusetts	63,761	Manufacturing operations	November 30, 2028
Lund, Sweden	45,381	Manufacturing and administrative operations	December 31, 2021
Bridgewater, New Jersey [3]	33,669	Manufacturing and administrative operations	January 14, 2029

(1) In 2019, we expanded our facility in Waltham, Massachusetts by approximately 33,000 square feet to accommodate additional office space and manufacturing.
(2) In 2018, we expanded our facility in Rancho Dominguez, California by approximately 15,000 square feet. The lease for the expanded portion of the facility expires on November 30, 2025.
(3) On May 31, 2019, we acquired C Technologies, an analytics company located in Bridgewater, New Jersey.

During the year ended December 31, 2019, we incurred total rental costs for all facilities of $6.0 million.

ITEM 3. 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 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information for Common Stock

Our common stock is traded on the Nasdaq Global Select Market under the symbol "RGEN."

Stockholders and Dividends

As of February 18, 2020, there were 338 stockholders of record of our common stock. We have not paid any dividends since our inception and do not intend to pay any dividends on our common stock in the foreseeable future. We anticipate that we will retain all earnings, if any, to support our operations. Any future determination as to the payment of dividends will be at the sole discretion of our Board of Directors and will depend on our financial condition, results of operations, capital requirements and other factors our Board of Directors deems relevant.

Equity Compensation Plan Information

The following table sets forth information as of December 31, 2019 regarding shares of common stock that may be issued under the Company's equity compensation plans, consisting of the Second Amended and Restated 2001 Repligen Corporation Stock Plan, the Amended and Restated 2012 Stock Option and Incentive Plan and the 2018 Stock Option and Incentive Plan.

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders	1,692,543 (1)	$ 30.81 (2)	2,555,281

(1) Includes 957,559 shares of common stock issuable upon the exercise of outstanding options and 734,984 shares of common stock issuable upon the vesting of stock units, which include restricted stock units and performance stock units. No shares of restricted stock are outstanding.

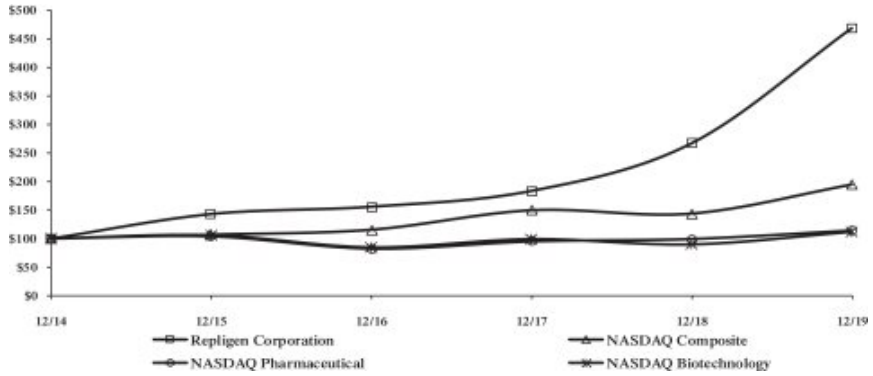
(2) Since stock units do not have any exercise price, such units are not included in the weighted average exercise price calculation.

Issuer Purchases of Equity Securities

In June 2008, the Board of Directors authorized a program to repurchase up to 1.25 million shares of our common stock to be repurchased at the discretion of management from time to time in the open market or through privately negotiated transactions. The repurchase program has no set expiration date and may be suspended or discontinued at any time. We did not repurchase any shares of common stock during the year ended December 31, 2019. In prior years, we repurchased a total of 592,827 shares, leaving 657,173 shares remaining under this authorization.

The graph below matches Repligen Corporation's cumulative 5-year total shareholder return on common stock with the cumulative total returns of the NASDAQ Composite index, the NASDAQ Pharmaceutical index, and the NASDAQ Biotechnology index. The graph tracks the performance of a $100 investment in our common stock and in each index (with the reinvestment of all dividends) from December 31, 2014 to December 31, 2019.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN*
Among Repligen Corporation, the NASDAQ Composite Index,
the NASDAQ Pharmaceutical Index and the NASDAQ Biotechnology Index



*$100 invested on 12/31/14 in stock or index, including reinvestment of dividends. Fiscal year ending December 31.

The information contained in the performance graph shall not be deemed to be "soliciting material" or to be "filed" with the SEC, and such information shall not be incorporated by reference into any future filing under the Securities Act of 1933, as amended (the "Securities Act") or the Securities Exchange Act of 1934, as amended (the "Exchange Act"), except to the extent that Repligen specifically incorporates it by reference into such filing.

ITEM 6. SELECTED CONSOLIDATED FINANCIAL DATA

The following selected consolidated financial data are derived from the audited consolidated financial statements of Repligen. The selected financial data set forth below should be read in conjunction with our consolidated financial statements and the related notes thereto and "Management's Discussion and Analysis of Financial Condition and Results of Operations" included elsewhere in this Annual Report on Form 10-K ("Form 10-K"), and in our Form 10-K's for the years ended December 31, 2019, 2018, 2017, 2016 and 2015.

	For the Years Ended December 31,				
	2019	2018 [1]	2017 [2]	2016	2015 [3]
	(Amounts in thousands, except per share data)				
Revenue:					
Product revenue	$ 270,097	$ 193,891	$ 141,089	$ 104,441	$ 83,537
Royalty and other revenue	148	141	147	100	—
Total revenue	270,245	194,032	141,236	104,541	83,537
Operating costs and expenses:					
Cost of product revenue	119,099	86,531	67,050	47,117	35,251
Research and development	19,450	15,821	8,672	7,355	5,740
Selling, general and administrative	95,613	65,692	51,509	30,853	24,699
Contingent consideration – fair value adjustments	—	—	—	3,242	4,083
Total operating costs and expenses	234,162	168,044	127,231	88,567	69,773
Income from operations	36,083	25,988	14,005	15,974	13,764
Other expenses, net	(9,932)	(4,552)	(6,757)	(4,282)	(341)
Income before income taxes	26,151	21,436	7,248	11,692	13,423
Income tax provision (benefit)	4,740	4,819	(21,105)	11	4,078
Net income	$ 21,411	$ 16,617	$ 28,353	$ 11,681	$ 9,345
Earnings per share:					
Basic	$ 0.44	$ 0.38	$ 0.74	$ 0.35	$ 0.28
Diluted	$ 0.44	$ 0.37	$ 0.72	$ 0.34	$ 0.28
Weighted average shares outstanding:					
Basic	48,343	43,767	38,234	33,573	32,882
Diluted	49,206	45,471	39,150	34,099	33,577

	As of December 31,				
	2019	2018	2017	2016	2015
	(Amounts in thousands)				
Cash, cash equivalents and marketable securities [4]	$ 528,392	$ 193,822	$ 173,759	$ 141,780	$ 73,407
Working capital	593,515	145,897	217,571	163,078	84,471
Total assets [5]	1,400,113	774,621	743,519	288,913	146,237
Long-term obligations [5,6]	292,032	29,211	126,760	99,074	4,708
Accumulated earnings (deficit)	5,843	(15,568)	(31,508)	(59,861)	(71,542)
Total stockholders' equity	1,059,768	615,568	591,548	168,764	122,748

(1) Includes the full year impact of the acquisition of Spectrum Lifesciences, LLC on August 1, 2017

(2) Includes the full year impact of the acquisition of Atoll GmbH on April 1, 2016 and the acquisition of TangenX ™ Technology Corporation on December 14, 2016.

(3) Includes the full year impact of the acquisition of Refine Technology on June 2, 2014.

(4) During 2019, the Company increased cash through public offerings of common stock on May 3, 2019 and July 19, 2019, which totaled aggregate net proceeds of $320.7 million. In addition, on July 19, 2019, the Company issued $287.5 million aggregate principal amount of 0.375% Convertible Senior Notes (the "2019 Notes") due 2024 for net proceeds of $278.5 million. The Company utilized approximately $115 million of the proceeds from the issuance of the 2019 Notes to settle its outstanding 2.125% Convertible Senior Notes due 2021 (the "2016 Notes").

(5) As a result of the adoption of new accounting guidance on January 1, 2019, we recognized lease assets and liabilities for operating leases with terms of more than twelve months. Prior period amounts were not adjusted and continue to be reported in accordance with historic accounting policies around leases. See Note 4, *"Leases,"* included in Item 15(a)(1) of Part IV, Exhibits and Financial Statement Schedules – Financial Statements, for additional information.

(6) Long-term obligations include the $232.8 million carrying value of the 2019 Notes as of December 31, 2019. See Note 11, *"Convertible Senior Notes,"* included in Item 15(a)(1) of Part IV, Exhibits and Financial Statement Schedules – Financial Statements, for additional information.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Information pertaining to fiscal year 2017 was included in the Company's Annual Report on Form 10-K ("Form 10-K") for the year ended December 31, 2018 on pages 30 through 43 under Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations," which was filed with the SEC on March 1, 2019.

Repligen and its subsidiaries, collectively doing business as Repligen Corporation ("Repligen", "we", "our", or "the Company") is a global life sciences company that develops and commercializes highly innovated bioprocessing technology and systems that increase efficiencies and flexibility in the process of manufacturing biological drugs. As the overall market for biologics continues to grow and expand, our customers – primarily large biopharmaceutical companies and contract development and manufacturing organizations – face critical production cost, capacity, quality and time pressures. Built to address these concerns, our products helping set new standards for the way biologics are manufactured. We are committed to inspiring advances in bioprocessing as a trusted partner in the production of critical biologic drugs – including monoclonal antibodies, recombinant proteins, vaccines and gene therapies – that are improving human health worldwide.

Our Chromatography products feature pre-packed chromatography columns under our OPUS ® brand. OPUS columns, which we deliver to our customers pre-packed with their choice of chromatography resin, are single-campaign ("single-use") disposable columns that replace the use of traditional (more permanent) glass columns used in downstream purification and quality control of biological drugs. By designing OPUS columns as an advanced and flexible option for the purification of biologics from process development through clinical-scale and some commercial manufacturing, Repligen has become a leader in pre-packed columns ("PPC").

Our Filtration products offer a number of advantages to manufacturers of biologic drugs at volumes that span from pilot studies to clinical and commercial-scale production. XCell ATF ™ systems are alternating tangential flow ("ATF") and used primarily in upstream perfusion (continuous manufacturing) processes to increase cell concentration and significantly improve biologic product yield from a bioreactor. To address increasing industry demand for "plug-and-play" technology, we developed and launched single-use formats of the original stainless steel XCell ATF device. In December 2016, we acquired TangenX Technology Corporation ("TangenX"), balancing our upstream XCell ATF offering with a downstream portfolio of TangenX ™ Flat Sheet Cassettes used in biologic drug purification and formulation processes. The TangenX portfolio includes the single-use SIUS ™ TFF cassettes, providing customers with a high-performance, low-cost alternative to reusable TFF cassettes. We acquired Spectrum Life Sciences LLC ("Spectrum") and its subsidiaries in August 2017 to strengthen our filtration business with the addition of a leading portfolio of Spectrum ® Hollow Fibers. Spectrum brands include the KrosFlo ® TFF systems with Konduit monitor and ProConnex ® single-use, flow-path assemblies. We also gained the Spectra/Por ® portfolio of laboratory and process dialysis products and in 2019, we launched the SpectraFlo ™ Dynamic Dialysis Systems, and the KrosFlo ® TFDF ™ (Tangential Flow Depth Filtration) Systems, which we believe has the potential to disrupt and displace transitional harvest clarification operations. With the acquisition of Spectrum, we substantially increased our direct sales presence in Europe and Asia, and we diversified our end markets beyond monoclonal antibodies ("mAb") to include vaccines, recombinant proteins and gene therapies.

We are a leading supplier of Protein A affinity ligands to life sciences companies. Protein A affinity ligands are an essential "binding" component of Protein A chromatography resins used in the purification of virtually all mAb-based drugs on the market or in development. We manufacture multiple forms of Protein A affinity ligands under long-term supply agreements with major life sciences companies who in turn sell their Protein A chromatography resins to end users (mAb manufacturers).

Customers use our products to produce initial quantities of drug for clinical studies and then scale-up to larger volumes as the drug progresses to commercial production following regulatory approval. Detailed specifications

for a drug's manufacturing process are included in the applications that biopharmaceutical companies file for marketing approval with regulators, such as the U.S. Food and Drug Administration and the European Medicines Agency, throughout the clinical trial process and prior to final commercial approval. As a result, products that become part of the manufacturing specifications of a late-stage clinical or commercial process can be very sensitive given the costs and uncertainties associated with displacing them.

C Technologies, Inc. Acquisition

On April 25, 2019, we entered into a Stock Purchase Agreement ("Purchase Agreement") with C Technologies, Inc. ("C Technologies"), a New Jersey corporation, and Craig Harrison, an individual and sole stockholder of C Technologies. The deal was consummated on May 31, 2019 (the "C Technologies Acquisition").

C Technologies sells instruments, consumables and accessories that are designed to allow bioprocessing technicians to measure the protein concentration of a liquid sample using C Technologies' Slope Spectroscopy ® method, which eliminates the need for manual sample dilution. C Technologies' lead product, the SoloVPE ® Device, was launched in 2008 for off-line and at-line protein concentration measurements conducted in quality control, process development and manufacturing labs in the production of biological therapeutics. C Technologies' FlowVPE ® Device, an extension of the SoloVPE technology, was designed to allow end users to make in-line protein concentration measurements in filtration, chromatography and fill-finish applications, designed to allow for real-time process monitoring.

The C Technologies Acquisition was accounted for as a purchase of a business under Accounting Standard Codification No. ("ASC") 805, *"Business Combinations."* The cash paid for the C Technologies Acquisition was $195.0 million, $186.0 million of which will be consideration transferred pursuant to ASC 805, and $9.0 million of which will be compensation expense for future employment, and 779,221 of unregistered common shares totaling $53.9 million (based on a per share price of $69.22), for a total purchase price of $239.9 million.

Critical Accounting Policies and Estimates

While our significant accounting policies are more fully described in the notes to our consolidated financial statements, we have identified the policies and estimates below as being critical to our business operations and the understanding of our results of operations. These policies require management's most difficult, subjective or complex judgements, often as a result of the need to make estimates about the effect of matters that are inherently uncertain. The impact of and any associated risks related to these policies on our business operations are discussed throughout "Management's Discussion and Analysis of Financial Condition," including in the "Results of Operations" section, where such policies affect our reported and expected financial results. Although we believe that our estimates, assumptions, and judgements are reasonable, they are based upon information presently available. Actual results may differ significantly from these estimates under different assumptions, judgments, or conditions.

Revenue recognition

We generate revenue from the sale of bioprocessing products, equipment devices, and related consumables used with these equipment devices to customers in the life science and biopharmaceutical industries. Under ASC 606, " *Revenue from Contracts with Customers,"* 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 December 31, 2019.

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.

Inventories

We value inventory at cost or, if lower, net realizable value, using the first-in, first-out method. We review our inventory at least quarterly and record a provision for excess and obsolete inventory based on our 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 three to 12 months. We write 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 our 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 consolidated financial statements, there have been no material adjustments related to a revised estimate of inventory valuations.

Business combinations

Amounts paid for acquisitions are allocated to the tangible and intangible assets acquired and liabilities assumed, if any, based on their fair values at the dates of acquisition. This purchase price allocation process requires management to make significant estimates and assumptions with respect to intangible assets and deferred revenue obligations. The fair value of identifiable intangible assets is based on detailed valuations that use information and assumptions determined by management. Any excess of purchase price over the fair value of the net tangible and intangible assets acquired is allocated to goodwill. While we use our best estimates and assumptions to accurately value assets acquired and liabilities assumed at the acquisition date as well as any contingent consideration, where applicable, our estimates are inherently uncertain and subject to refinement. As a result, during the measurement period, which may be up to one year from the acquisition date, we record adjustments to the assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon

conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to our consolidated statements of comprehensive income. The fair value of contingent consideration includes estimates and judgments made by management regarding the probability that future contingent payments will be made, the extent of royalties to be earned in excess of the defined minimum royalties, etc. Management updates these estimates and the related fair value of contingent consideration at each reporting period based on the estimated probability of achieving the earnout targets and applying a discount rate that captures the risk associated with the expected contingent payments. To the extent our estimates change in the future regarding the likelihood of achieving these targets we may need to record material adjustments to our accrued contingent consideration. Changes in the fair value of contingent consideration are recorded in our consolidated statements of comprehensive income.

We use the income approach to determine the fair value of certain identifiable intangible assets including customer relationships and developed technology. This approach determines fair value by estimating after-tax cash flows attributable to these assets over their respective useful lives and then discounting these after-tax cash flows back to a present value. We base our assumptions on estimates of future cash flows, expected growth rates, expected trends in technology, etc. We base the discount rates used to arrive at a present value as of the date of acquisition on the time value of money and certain industry-specific risk factors. We believe the estimated purchased customer relationships, developed technologies, trademark / tradename, patents, and in process research and development amounts so determined represent the fair value at the date of acquisition and do not exceed the amount a third party would pay for the assets.

Intangible assets and goodwill

Intangible assets

Intangible assets with a definite life are amortized over their useful lives using the straight-line method and the amortization expense is recorded within cost of product revenue and selling, general and administrative expense in the consolidated statements of comprehensive income. 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 the Company's products or changes in the size of the market for the Company's products. If impairment indicators are present, the Company determines whether the underlying intangible asset is recoverable through estimated future undiscounted cash flows. If the asset is not found to be recoverable, it is written down to the estimated fair value of the asset based on the sum of the future discounted cash flows expected to result from the use and disposition 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 definite-lived intangible assets are recoverable at December 31, 2019.

Indefinite-lived intangible assets are tested for impairment at least annually. There has been no impairment of our intangible assets for the periods presented.

Goodwill

We test goodwill for impairment on an annual basis and between annual tests if events and circumstances indicate it is more likely than not that the fair value of a reporting unit is less than its carrying value. Events that would indicate impairment and trigger an interim impairment assessment include, but are not limited to, current economic and market conditions, including a decline in market capitalization, a significant adverse change in legal factors, business climate or operational performance of the business, and an adverse action or assessment by a regulator. Goodwill is tested for impairment as of December 31 st of each year, or more frequently as warranted

by events or changes in circumstances mentioned above. Accounting guidance also permits an optional qualitative assessment for goodwill to determine whether it is more likely than not that the carrying value of a reporting unit exceeds its fair value. If, after this qualitative assessment, we determine that it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, then no further quantitative testing would be necessary. A quantitative assessment is performed if the qualitative assessment results in a more likely than not determination or if a qualitative assessment is not performed. The quantitative assessment considers whether the carrying amount of a reporting unit exceeds its fair value, in which case an impairment charge is recorded to the extent the reporting unit's carrying value exceeds its fair value.

As of December 31, 2018, the Company concluded that it operated as two reporting units and performed the 2018 goodwill impairment test using two reporting units. In 2019, the Company reorganized its reporting structure and changed the way the Chief Operating Decision Maker ("CODM") views the Company's operations and allocates its resources. As a result of the change in reporting structure in 2019, the CODM reviews consolidated results to assist with decision making. Accordingly, the Company operates as one reporting unit as of the goodwill impairment measurement date of December 31, 2019. The fair value of the reporting unit is determined using both an income approach and market approach. Our income approach model used for our reporting unit valuation is consistent with that used for our December 31, 2018 goodwill impairment valuation noted above except that cash flows from the entire business enterprise are used for the reporting unit valuation. Our market approach model estimates the fair value of the reporting unit based on market prices paid in actual precedent transactions of similar businesses and market multiples of guideline public companies.

As a result of our 2019 quantitative assessment, we concluded that goodwill is not impaired as of December 31, 2019.

Accrued liabilities

We estimate accrued liabilities by identifying services performed on our behalf, estimating the level of service performed and determining the associated cost incurred for such service as of each balance sheet date. For example, we would accrue for professional and consulting fees incurred with law firms, audit and accounting service providers and other third-party consultants. These expenses are determined by either requesting those service providers to estimate unbilled services at each reporting date for services incurred or tracking costs incurred by service providers under fixed fee arrangements.

We have processes in place to estimate the appropriate amounts to record for accrued liabilities, which principally involve the applicable personnel reviewing the services provided. In the event that we do not identify certain costs that have begun to be incurred or we under or over-estimate the level of services performed or the costs of such services, the reported expenses for that period may be too low or too high. The date on which certain services commence, the level of services performed on or before a given date, and the cost of such services often require the exercise of judgment. We make these judgments based upon the facts and circumstances known at the date of the financial statements.

A change in the estimated cost or volume of services provided could result in additional accrued liabilities. Any significant unanticipated changes in such estimates could have a significant impact on our accrued liabilities and reported operating results. There have been no material adjustments to our accrued liabilities in any of the periods presented in the accompanying consolidated financial statements.

Debt accounting

Our long-term debt balance is related to our 0.375% Convertible Senior Notes due 2024 (the "2019 Notes"), which were issued in July 2019 and are carried at their principal amount less unamortized debt discount. We account for our convertible notes as separate liability and equity components. We estimate the carrying amount of the liability component by estimating the fair value of a similar liability that does not have an associated conversion feature. The Company allocates transaction costs related to the issuance of convertible notes to the liability and equity components using the same proportions as the initial carrying value of the convertible notes.

The carrying value of the equity component is calculated by deducting the carrying value of the liability component from the principal amount of the convertible notes as a whole. The difference represents a debt discount that is amortized to interest expense in our consolidated statement of comprehensive income over the term of the convertible notes using the effective interest rate method. We assess the equity classification of the cash conversion feature quarterly. We allocated transaction costs related to the issuance of the 2019 Notes to the liability and equity components using the same proportions as the initial carrying value of the 2019 Notes.

Stock-based compensation

We use the Black-Scholes option pricing model to calculate the fair value of stock option awards on the grant date. The expected term of options granted represents the period of time for which the options are expected to be outstanding and is derived from our historical stock option exercise experience and option expiration data. For purposes of estimating the expected term, we have aggregated all individual option awards into one group, as we do not expect substantial differences in exercise behavior among our employees. The expected volatility is a measure of the amount by which our stock price is expected to fluctuate during the expected term of options granted. We determined the expected volatility based upon the historical volatility of our common stock over a period commensurate with the option's expected term. The risk-free interest rate is the implied yield available on U.S. Treasury zero-coupon issues with a remaining term equal to the option's expected term on the grant date. We have never declared or paid any cash dividends on any of our capital stock and do not expect to do so in the foreseeable future. Accordingly, we use an expected dividend yield of zero to calculate the grant-date fair value of a stock option.

The fair value of stock units, which includes restricted stock units and performance stock units, is calculated using the closing price of the Company's common stock on the date of grant. We recognize compensation expense on awards that vest based on service conditions on a straight-line basis over the requisite service period based upon the number of options that are ultimately expected to vest, and accordingly, such compensation expense has been adjusted by an amount of estimated forfeitures. We recognize compensation expense on awards that vest based on performance conditions following our assessment of the probability that the performance condition will be achieved over the service period. Forfeitures represent only the unvested portion of a surrendered option. Forfeitures are estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates. Based on an analysis of historical data, we have calculated an 8% annual forfeiture rate for non-executive level employees, a 3% annual forfeiture rate for executive level employees, and a 0% forfeiture rate for non-employee members of the Board of Directors, which we believe are reasonable assumptions to estimate forfeitures. However, the estimation of forfeitures requires significant judgment and, to the extent actual results or updated estimates differ from our current estimates, such amounts will be recorded as a cumulative adjustment in the period estimates are revised.

For the years ended December 31, 2019, 2018 and 2017, we recorded stock-based compensation expense of $12.8 million, $10.2 million and $6.7 million, respectively, for share-based awards granted under all of the Company's stock plans.

As of December 31, 2019, there was $36.4 million 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 4.09 years. We expect 1,688,497 unvested options and stock units to vest over the next five years.

Income taxes

Deferred taxes are determined based on the difference between the financial statement and tax basis of assets and liabilities using enacted tax rates in effect in the years in which the differences are expected to reverse. Valuation allowances are provided, if, based upon the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. We account for uncertain tax positions using a "more-likely- than-not" threshold for recognizing and resolving uncertain tax positions. The evaluation of uncertain tax

positions is based on factors including, but not limited to, changes in tax law, the measurement of tax positions taken or expected to be taken in tax returns, the effective settlement of matters subject to audit, new audit activity and changes in facts or circumstances related to a tax position. We evaluate our tax position on a quarterly basis. We also accrue for potential interest and penalties related to unrecognized tax benefits in income tax expense.

In addition, we are subject to the continual examination of our income tax returns by the U.S. Internal Revenue Service ("IRS") and other domestic and foreign tax authorities. We expect future examinations to focus on our intercompany transfer pricing practices as well as other matters. We regularly assess the likelihood of outcomes resulting from these examinations to determine the adequacy of our provision for income taxes and have reserved for potential adjustments that may result from such examinations. We believe such estimates to be reasonable; however, the final determination of any of these examinations could significantly impact the amounts provided for income taxes in our consolidated financial statements.

Recent accounting standards update

See Note 2, *"Summary of Significant Accounting Policies – Recent Accounting Standards Updates,"* to our consolidated financial statements included in this report for more information.

Results of Operations

The following discussion of the financial condition and results of operations should be read in conjunction with the accompanying consolidated financial statements and the related footnotes thereto.

Revenues

Total revenues for years ended December 31, 2019, 2018, and 2017 were comprised of the following:

	For the Years Ended December 31,			2019 vs. 2018		2018 vs. 2017	
	2019	2018	2017	$ Change	% Change	$ Change	% Change
	(Amounts in thousands, except for percentage data)						
Revenue:							
Product	$270,097	$193,891	$141,089	$ 76,206	39.3%	$ 52,802	37.4%
Royalty and other	148	141	147	7	5.0%	(6)	(4.1%)
Total revenue	$270,245	$194,032	$141,236	$ 76,213	39.3%	$ 52,796	37.4%

Product revenues

Since 2016, we have been increasingly focused on selling our products directly to customers in the pharmaceutical industry and to our contract manufacturers. These direct sales have increased to approximately 76% of our product revenue during 2019. We expect that direct sales will continue to account for an increasing percentage of our product revenues, as the largest customer of our OEM products diversifies its supply chain starting in 2020. Sales of our bioprocessing products can be impacted by the timing of large-scale production orders and the regulatory approvals for such antibodies, which may result in significant quarterly fluctuations.

Product revenues were comprised of the following:

	For the Years Ended December 31,		
	2019 [1]	2018	2017 [2]
	(Amounts in thousands)		
Chromatography products	$ 64,635	$ 45,326	$ 36,309
Filtration products	119,534	90,586	49,050
Process analytics products	16,405	—	—
Proteins products	65,124	54,375	53,969
Other	4,399	3,604	1,761
Total product revenue	$270,097	$193,891	$141,089

(1) 2019 revenue includes process analytics revenue related to C Technologies from June 1, 2019 through December 31, 2019.
(2) 2017 revenue for filtration, chromatography and other products includes revenue related to Spectrum from August 1, 2017 through December 31, 2017.

Revenue from our chromatography products includes the sale of our OPUS chromatography columns, chromatography resins and ELISA test kits. Revenue from our filtration products includes the sale of our XCell ATF systems and consumables, KrosFlo filtration products and SIUS filtration products. Revenue from protein products includes the sale of our Protein A ligands and cell culture growth factors. Revenue from our Process Analytics products includes the sale of our SoloVPE and FlowVPE systems and consumables. Other revenue primarily consists of revenue from the sale of our operating room products to hospitals as well as freight revenue.

For 2019, product revenue increased by $76.2 million, or 39%, as compared to 2018. The increase is due to the continued adoption of our products by our key bioprocessing customers, particularly our chromatography and filtration products. 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. Additionally, there was a $16.4 million increase in the 2019 revenue compared to the 2018 revenue due to revenues generated by C Technologies.

For 2018, product revenue increased by $52.8 million, or 37%, as compared to 2017. The increase is due to the continued adoption of our products by our key bioprocessing customers and a full year of revenues derived from our acquisition of Spectrum in August 2017.

Royalty revenues

Royalty revenues in 2019 and 2018 relate to royalties received from a third-party systems manufacturer associated with our OPUS chromatography columns. Royalty revenues are variable and are dependent on sales generated by our partner.

Costs and operating expenses

Total costs and operating expenses for years ended December 31, 2019, 2018 and 2017 were comprised of the following:

	For the Years Ended December 31,			2019 vs. 2018		2018 vs. 2017	
	2019	2018	2017	$ Change	% Change	$ Change	% Change
	(Amounts in thousands, except for percentage data)						
Cost of product revenue	$119,099	$ 86,531	$ 67,050	$ 32,568	37.6%	$ 19,481	29.1%
Research and development	19,450	15,821	8,672	3,629	22.9%	7,149	82.4%
Selling, general and administrative	95,613	65,692	51,509	29,921	45.5%	14,183	27.5%
Total costs and operating expenses	$234,162	$168,044	$127,231	$ 66,118	39.3%	$ 40,813	32.1%

Cost of product revenue

For 2019 and 2018, cost of product revenue increased $32.6 million, or 38%, and $19.5 million, or 29%, respectively, as compared to 2018 and 2017, due primarily to the increase in revenue mentioned above. Gross margins may fluctuate in future quarters based on expected production volume and product mix.

Gross margins were 56%, 55%, and 53% for 2019, 2018 and 2017, respectively. The gross margin in 2019 includes $1.5 million of amortization on an inventory step-up recorded in purchase accounting related to the C Technologies Acquisition. The increase in gross margins is a result of higher product revenue mentioned above offset by an increase in costs associated with additional manufacturing headcount in 2019, as compared to 2018. Gross margins may fluctuate in future quarters based on expected production volume and product mix. During 2018, gross margins increased compared to 2017 primarily due to higher product revenue.

Research and development expenses

During 2019, 2018 and 2017, research and development ("R&D") expenses were related to bioprocessing products, including personnel, supplies and other research expenses. Due to the size of the Company and the fact that these various programs share personnel and fixed costs, we do not track all of our expenses or allocate any fixed costs by program, and therefore, have not provided historical costs incurred by project. In addition to the legacy product research and development, the current single-use XCell ATF technology incurs expenses related to product development, sterilization, validation testing, and other research related expenses.

R&D expenses increased $3.6 million in 2019, or 23%, compared to 2018. The increase is primarily due to an increase in costs associated with an increase in R&D headcount, an increase in stock-based compensation expense resulting from the increased headcount and the higher share price period over period, and to the addition of $1.7 million of R&D expenses related to C Technologies, which was acquired in May 2019.

The increase in 2019 was partially offset by a $1.4 million decrease in R&D expense for investments made to expand our proteins product offering through our development agreement with Navigo Proteins GmbH ("Navigo"). The Company invested $1.0 million in 2019 compared to $2.4 million in 2018.

For 2018, R&D expenses increased by $7.1 million, or 82%, as compared to 2017. This increase is primarily driven by investments made during 2018 to expand our proteins product offerings through our development agreement with Navigo. Additionally, the increase is related to product development activities acquired as part of the Spectrum acquisition and increased activity in our various bioprocessing development projects.

We expect our R&D expenses in the year ending December 31, 2020 to increase in order to support new product development.

Selling, general and administrative expenses

Selling, general and administrative ("SG&A") expenses include the costs associated with selling our commercial products and costs required to support our marketing efforts, including legal, accounting, patent, shareholder services, amortization of intangible assets and other administrative functions.

For 2019, SG&A costs increased by $29.9 million, or 46%, as compared to 2018. The increase is due to the addition of $10.9 million of SG&A costs from the acquisition of C Technologies in May 2019, as well as the continued expansion of our customer-facing activities to drive sales of our bioprocessing products, and to the continued buildout of our administrative infrastructure, primarily through increased headcount, to support expected future growth. In addition, during 2019, transaction fees related to the C Technologies Acquisition of $4.0 million were included in SG&A, for which there were no comparable costs for 2018. Sales commissions were higher in 2019 due to the increase in revenue. Stock compensation expense increased as compared to 2018 resulting from the increase in headcount and higher share prices period over period.

For 2018, SG&A costs increased by $14.2 million, or 28%, as compared to 2017. The 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 expected future growth and continued expansion of our customer-facing activities to drive sales of our bioprocessing products.

Other expenses, net

The table below provides detail regarding our other expenses, net:

	For the Years Ended December 31,			2019 vs. 2018		2018 vs. 2017	
	2019	2018	2017	$ Change	% Change	$ Change	% Change
	(Amounts in thousands, except for percentage data)						
Investment income	$ 5,324	$ 1,895	$ 371	$ 3,429	180.9%	$ 1,524	410.8%
Loss on extinguishment of debt	(5,650)	—	—	(5,650)	100.0%	—	N/A
Interest expense	(9,292)	(6,709)	(6,441)	(2,583)	38.5%	(268)	4.2%
Other (expenses) income	(314)	262	(687)	(576)	(219.8%)	949	(138.1%)
Total other expenses, net	$ (9,932)	$ (4,552)	$ (6,757)	$ (5,380)	118.2%	$ 2,205	(32.6%)

Investment income

Investment income includes income earned on invested cash balances. The increase of $3.4 million for 2019 and $1.5 million for 2018, as compared to 2018 and 2017 was attributable to higher average invested cash balances and higher interest rates on such invested cash balances. We expect investment income to vary based on changes in the amount of funds invested and fluctuation of interest rates.

Loss on extinguishment of debt

The $5.7 million loss on extinguishment of debt for the year ended December 31, 2019 resulted from the settlement of our outstanding 2.125% Convertible Senior Notes due 2021 (the "2016 Notes") in the third quarter of 2019. The loss represents the difference between (i) the fair value of the liability component and (ii) the sum of the carrying value of the debt component and any unamortized debt issuance costs at the time of settlement.

Interest expense

Interest expense primarily includes interest related to our issuance of the 2016 Notes in May 2016, which were settled during the third quarter of 2019, and our issuance of 0.375% Convertible Senior Notes due 2024 (the "2019 Notes"), which were issued in July 2019. Interest expense increased $2.6 million in 2019, as compared to

2018. Interest calculated based on the carrying value related to the 2016 Notes was $1.3 million in 2019, compared to $2.4 million in 2018. As aforementioned, the 2016 Notes were settled during July 2019. As a result, interest was no longer accrued on the 2016 Notes subsequent to their settlement. Interest calculated based on the carrying value related to the 2019 Notes for 2019 was $0.5 million and there was no comparable amount for 2018.

The amortization of the debt issuance costs on the 2016 Notes was $2.8 million for 2019, compared to $4.5 million for 2018. The decrease in this amortization is a result of the settlement of the 2016 Notes and subsequent write-off of the remaining debt issuance costs in July 2019. Amortization of debt issuance costs on the 2019 Notes was $4.7 million in 2019. There were no comparable amounts in 2018 as the 2019 Notes were issued in July 2019.

Other (expenses) income

Changes in other (expenses) income during 2019, compared to 2018, are primarily attributable to foreign currency losses related to amounts due from non-Swedish krona-based customers and cash balance denominated in U.S. dollars and British pounds held by Repligen Sweden AB. In addition, $0.5 million was included in other (expenses) income in 2019, which represents a bridge loan commitment fee incurred as part of the C Technologies Acquisition.

Provision for income taxes

Income tax provision for the years ended December 31, 2019, 2018 and 2017 was as follows:

	For the Years Ended December 31,			2019 vs. 2018		2018 vs. 2017	
	2019	2018	2017	$ Change	% Change	$ Change	% Change
	(Amounts in thousands, except for percentage data)						
Income tax provision	$ 4,740	$ 4,819	$(21,105)	$(79)	(1.6%)	$ 25,924	(122.8%)
Effective tax rate	18.1%	22.5%	(291.2%)				

For the year ended December 31, 2019, we recorded an income tax provision of approximately $4.7 million. The effective tax rate was an income tax provision of 18.1% and is based upon the estimated taxable income for the year ending December 31, 2019 and the composition of the taxable income in different jurisdictions. The effective tax rate was lower than the U.S. statutory rate of 21% due primarily to windfall benefits on stock option exercises and the vesting of restricted stock units and to deductions related to debt extinguishment.

For the year ended December 31, 2018, we recorded an income tax provision of $4.8 million. The effective tax rate was 22.5% in 2018 and is based upon the estimated income from the year and the composition of the income in different jurisdictions. The effective tax rate was higher than the U.S. statutory rate of 21% due to state tax effects and the impact of the Global Intangible Low-Taxed Income tax enacted as part of the Tax Cuts and Jobs Act (the “2017 Tax Act”) enacted in December 2017.

Non-GAAP Financial Measures

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

Non-GAAP adjusted income from operations

Non-GAAP adjusted income from operations is measured by taking income from operations as reported in accordance with GAAP and excluding acquisition and integration costs, inventory step-up charges, intangible amortization and contingent consideration expenses booked through our consolidated statements of comprehensive income. The following is a reconciliation of income from operations in accordance with GAAP to non-GAAP adjusted income from operations for the years ended December 31, 2019 and 2018:

	For the Years Ended December 31,	
	2019	2018
	(Amounts in thousands)	
GAAP income from operations	$ 36,083	$ 25,988
Non-GAAP adjustments to income from operations:		
Acquisition and integration costs	12,508	2,928
Inventory step-up charges	1,483	—
Intangible amortization	13,441	10,518
Non-GAAP adjusted income from operations	$ 63,515	$ 39,434

Non-GAAP adjusted net income

Non-GAAP 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, inventory step-up charges, contingent consideration expenses, intangible amortization and related tax effects, non-cash interest expense, the partial release of the valuation allowance on our deferred tax assets and the net impact of tax reform legislation booked through our consolidated statements of comprehensive income. The following is a reconciliation of net income in accordance with GAAP to non-GAAP adjusted net income for the years ended December 31, 2019 and 2018:

	For the Years Ended December 31,			
	2019		2018	
	Amount	Fully Diluted Earnings per Share*	Amount	Fully Diluted Earnings per Share*
	(Amounts in thousands, except per share data)			
GAAP net income	$ 21,411	$ 0.44	$16,617	$ 0.37
Non-GAAP adjustments to net income:				
Acquisition and integration costs	13,008	0.26	2,928	0.06
Inventory step-up charges	1,483	0.03	—	—
Intangible amortization	13,441	0.27	10,518	0.23
Loss on extinguishment of debt	5,650	0.11	—	—
Non-cash interest expense	7,536	0.15	4,248	0.09
Tax effect of intangible amortization and acquisition costs	(10,003)	(0.20)	(4,204)	(0.09)
Non-GAAP adjusted net income	$ 52,526	$ 1.07	$30,107	$ 0.66

* Note that earnings per share amounts 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 intangible amortization, and excluding acquisition and integration costs, inventory step-up charges and contingent consideration expenses booked through our consolidated statements of comprehensive income. The following is a reconciliation of net income in accordance with GAAP to adjusted EBITDA for years ended December 31, 2019 and 2018:

	For the Years Ended December 31,	
	2019	2018
	(Amounts in thousands)	
GAAP net income	$ 21,411	$ 16,617
Non-GAAP EBITDA adjustments to net income:		
Investment income	(5,324)	(1,895)
Interest expense	9,292	6,709
Tax provision	4,740	4,819
Depreciation	7,317	5,213
Intangible amortization	13,551	10,565
EBITDA	50,987	42,028
Other non-GAAP adjustments:		
Acquisition and integration costs	13,008	2,928
Loss on extinguishment of debt	5,650	—
Inventory step-up charges	1,483	—
Adjusted EBITDA	$ 71,128	$ 44,956

Liquidity and Capital Resources

We have financed our operations primarily through revenues derived from product sales, the issuance of the 2016 Notes in May 2016 and our 2019 Notes (defined below) in July 2019 and the issuance of common stock in our July 2019, May 2019 and July 2017 public offerings. Our revenue for the foreseeable future will primarily be limited to our bioprocessing product revenue.

At December 31, 2019, we had cash and cash equivalents of $528.4 million compared to cash and cash equivalents of $193.8 million at December 31, 2018. As a result of our acquisition of C Technologies in May 2019, we are holding $9.0 million in restricted cash for compensation expense for future employment of C Technologies employees as of December 31, 2019. There were no restrictions on cash for December 31, 2018.

We acquired C Technologies on May 31, 2019 for $239.9 million in cash and shares of our common stock. The C Technologies Acquisition was funded through payment of approximately $195.0 million in cash and 779,221 unregistered shares of the Company's common stock totaling $53.9 million.

On May 3, 2019, the Company completed a public offering in which 3,144,531 shares of its common stock, including the underwriters' full exercise of an option to purchase up to an additional 410,156 shares, were sold to the public at a price of $64.00 per share. The total proceeds received by the Company from this offering, net of underwriting discounts and commissions and other estimated offering expenses payable by the Company, totaled approximately $189.6 million. Proceeds from this public offering were partially used to fund the C Technologies Acquisition on May 31, 2019.

On July 19, 2019, the Company completed a public offering in which 1,587,000 shares of its common stock, including the underwriters' full exercise of an option to purchase an additional 207,000 shares, were sold to the public at a price of $87.00 per share for $131.1 million in net proceeds to the Company, after deducting underwriting discounts and commissions and other estimated offering expenses payable by the Company (the "July Stock Offering").

On July 19, 2019, the Company issued $287.5 million aggregate principal amount of 0.375% Convertible Senior Notes due 2024 ("2019 Notes"), which includes the underwriters' exercise in full of an option to purchase an additional $37.5 million aggregate principal amount of 2019 Notes (the "Notes Offering" and, together with the July Stock Offering, the "Offerings"). The net proceeds of the Notes Offering, after deducting underwriting discounts and commissions and other offering expenses payable by the Company, were $278.5 million. See Note 11, *"Convertible Senior Notes,"* included in this report for more information on this transaction. The Company utilized a portion of the proceeds from the Offerings to settle its outstanding 2016 Notes during the third quarter of 2019. On July 16, 2019, the Company entered into separate privately negotiated agreements with certain holders of the 2016 Notes to exchange an aggregate of $92.0 million principal aggregate amount of the 2016 Notes for shares of the Company's common stock, together with cash, in private placement transactions (the "Note Exchanges"). On July 19, 2019 and July 22, 2019, the Company used approximately $92.3 million (including $0.3 million of accrued interest) and 1,850,155 shares of its common stock valued at $161.0 million to settle the Note Exchanges for total consideration of $253.3 million, of which $163.6 million was allocated to the equity component of the 2016 Notes. The Company allocated the consideration transferred to the liability and equity components using the same proportions as the initial carrying value of the 2016 Notes. The transaction resulted in a loss on extinguishment of debt of $4.6 million in the Company's consolidated statements of comprehensive income as of December 31, 2019.

During the fourth quarter of 2019, the closing price of the Company's common stock did not exceed 130% of the conversion price of the 2019 Notes for more than 20 trading days of the last 30 consecutive trading days of the quarter. Therefore, the 2019 Notes are not convertible at the option of the holders of the 2019 Notes during the first quarter of 2020 per the First Supplemental Indenture underlying the 2019 Notes. The 2019 Notes have a face value of $287.5 million and a carrying value of $232.8 million and are classified as long-term liabilities on the Company's consolidated balance sheet as of December 31, 2019.

In July 2017, we completed a public offering in which 2,807,017 shares of our common stock were sold to the public at a price of $42.75 per share. The underwriters were granted an option, which they exercised in full, to purchase an additional 421,052 shares of our common stock. The total proceeds from this offering, net of underwriting discounts, commissions and other offering expenses, totaled $129.3 million.

On August 1, 2017, we completed our acquisition of Spectrum for $112.8 million in cash (net of cash received) and 6,153,995 unregistered shares of the Company's common stock.

Cash flows

	For the Years Ended December 31,			FY19 vs FY18	FY18 vs FY17
	2019	2018	2017	$ Change	$ Change
	(Amounts in thousands)				
Operating activities	$ 67,216	$ 32,770	$ 17,451	$ 34,446	$ 15,319
Investing activities	(205,308)	(14,037)	(98,696)	(191,271)	84,659
Financing activities	484,867	3,407	129,945	481,460	(126,538)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(3,190)	(2,077)	2,376	(1,113)	(4,453)
Net increase in cash, cash equivalents and restricted cash	$ 343,585	$ 20,063	$ 51,076	$ 323,522	$ (31,013)

Operating activities

For 2019, our operating activities provided cash of $67.2 million reflecting net income of $21.4 million and non-cash charges totaling $46.9 million primarily related to depreciation, amortization, non-cash interest expense, deferred taxes, loss on extinguishment of debt and stock-based compensation charges. An increase in accounts receivable consumed $7.7 million of cash and was primarily driven by the 39% year-to-date increase in

revenues and an increase in inventory consumed $9.3 million to support future revenue, due to the addition of C Technologies on May 31, 2019. These cash items provided by operating activities were offset by cash items used for operating activities that included an increase in accounts payable and accrued liabilities of $13.8 million due to the addition of C Technologies and a decrease in unbilled receivables of $2.1 million. The remaining cash used in operating activities resulted from unfavorable changes in various other working capital accounts.

For 2018, our operating activities provided cash of $32.8 million reflecting net income of $16.6 million and non-cash charges totaling $30.3 million primarily related to depreciation, amortization, non-cash interest expense, deferred tax expense and stock-based compensation charges. An increase in receivables consumed $8.7 million of cash and was primarily driven by the 37% year-to-date increase in revenues. An increase in inventory levels to accommodate future revenue growth consumed $4.0 million of cash, payment of accrued liabilities consumed $1.4 million of cash and an increase in other assets used $1.8 million. This utilization of cash is partially offset by $2.3 million of cash provided by an increase in accounts payable due to the timing of payments to vendors. The remaining cash flow used in operations resulted from net unfavorable changes in various other working capital accounts.

For 2017, our operating activities provided cash of $17.5 million, reflecting net income of $28.4 million offset by net non-cash charges totaling $3.4 million comprised mainly of depreciation, amortization, stock-based compensation charges and deferred tax benefits. Increases in accounts receivable consumed $6.9 million of cash, which is based on timing of revenues billed to and payments from customers. Decreases in accounts payable and accrued liabilities consumed $1.2 million of cash due to timing of payments to vendors.

Investing activities

Our investing activities consumed $205.3 million of cash during 2019. We used $182.2 million in cash (net of cash received) for the C Technologies Acquisition on May 31, 2019. Capital expenditures consumed $23.2 million as we continue to increase our manufacturing capacity worldwide. Of these expenditures, $4.7 million represented capitalized costs related to our internal-use software.

For 2018, our investing activities consumed $14.0 million of cash, including $12.8 million for capital expenditures. Of those expenditures, $2.1 million represented capitalized costs related to our internal-use software. In addition, a capitalized payment for developed technology of $1.3 million was paid to Navigo in 2018 to assist in expanding our proteins product offerings through a development agreement.

For 2017, our investing activities consumed $98.7 million of cash. We used $112.8 million in cash (net of cash received) for our acquisition of Spectrum. Fixed asset additions consumed $5.5 million, as we continued to increase our manufacturing capacity. Net redemptions of marketable securities provided $19.6 million of cash in 2017.

Financing activities

In 2019, cash provided by financing activities of $487.1 million included $320.7 million from the issuance of our common stock resulting from our public offerings completed in May and July 2019. In addition, in July 2019 the Company issued $287.5 million aggregate principal amount of the 2019 Notes for net proceeds of $278.5 million. Proceeds from stock option exercises during 2019 were $1.2 million. Offsetting these activities was $115.0 million of cash utilized by the Company in July 2019 to settle the 2016 Notes.

In 2018, our financing activities provided $3.4 million of cash. We received proceeds of $3.4 million from stock option exercises, partially offset by cash outlays of $11,000 related to the partial conversion of the 2016 Notes in the first quarter of 2018.

In July 2017, we received net proceeds of $129.3 million from the issuance of common stock. In May 2016, we received net proceeds of $111.1 million from the issuance of the 2016 Notes. Exercises of stock options provided

cash receipts of $2.4 million and $1.8 million in 2017 and 2016, respectively. Cash payments to Atoll and Refine in 2017 totaled $5.1 million, of which $1.7 million related to the fair value of these liabilities as of the respective acquisition dates and is included as part of financing activities. Cash payments to Refine and BioFlash in 2016 totaled $4.1 million, of which $0.8 million related to the fair value of these liabilities as of the respective acquisition dates and is included as part of financing activities. The remaining amounts are included as an offset to our cash provided by operating activities.

Off- Balance Sheet Arrangements

We do not have any special purpose entities or off-balance sheet financing arrangements.

Contractual Obligations

As of December 31, 2019, we had the following fixed obligations and commitments:

	Total	Less than one year	One to three years	Three to five years	Over five years
			(Amounts in thousands)		
Convertible senior notes	$287,500	$ —	$ —	$ —	$287,500
Operating lease obligations	33,469	5,175	10,139	6,939	11,216
Purchase obligations [1]	40,455	39,055	1,400	—	—
Total	$361,424	$ 44,230	$ 11,539	$ 6,939	$298,716

(1) Primarily represents purchase commitments with certain vendors and open purchase orders for the procurement of raw materials for manufacturing.

The table excludes a liability for uncertain tax positions totaling $3.4 million since we cannot currently make a reliable estimate of the period in which the liability will be payable, if ever. Please see Note 8, *"Income Taxes,"* to our consolidated financial statements included in this report for more information.

Capital Requirements

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

- the expansion of our bioprocessing business;
- the ability to sustain sales and profits of our bioprocessing products;
- our ability to acquire additional bioprocessing products;
- the scope of and progress made in our research and development activities;
- the extent of any share repurchase activity; and
- the success of any proposed financing efforts.

Absent acquisitions of additional products, product candidates or intellectual property, we believe our current cash balances are adequate to meet our cash needs for at least the next 24 months. We expect operating expenses in the year ending December 31, 2020 to increase as we continue to expand our bioprocessing business. We expect to incur continued spending related to the development and expansion of our bioprocessing product lines and expansion of 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, and continued investment in our intellectual property portfolio.

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 licensing or acquiring complementary products, technologies or businesses that would complement our existing portfolio. 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. If our available cash balances and anticipated cash flow from operations are insufficient to satisfy our liquidity requirements, including because of any such acquisition-related financing needs or lower demand for our products, we may seek to sell common or preferred equity or convertible debt securities, enter into a credit facility or another form of third-party funding, or seek other debt funding. The sale of equity and convertible debt securities may result in dilution to our stockholders, and those securities may have rights senior to those of our common shares. If we raise additional funds through the issuance of preferred stock, convertible debt securities or other debt financing, these securities or other debt could contain covenants that would restrict our operations. Any other third-party funding arrangement could require us to relinquish valuable rights. We may require additional capital beyond our currently anticipated amounts. Additional capital may not be available on reasonable terms, if at all.

Net Operating Loss Carryforwards

At December 31, 2019, we had net operating loss carryforwards of $0.2 million remaining. We had business tax credits carryforwards of $2.1 million available to reduce future federal income taxes, if any. The business tax credits carryforwards will continue to expire at various dates through December 2039. Net operating loss carryforwards and available tax credits are subject to review and possible adjustment by the Internal Revenue Service, state and foreign jurisdictions and may be limited in the event of certain changes in the ownership interest of significant stockholders.

Foreign Earnings

As of December 31, 2019, the Company has accumulated undistributed earnings generated by our foreign subsidiaries of approximately $93.5 million. Because $58.0 million of such earnings have previously been subject to the one-time transition tax on foreign earnings required by the 2017 Tax Act, any additional taxes due with respect to such earnings or the excess of the amount for financial reporting over the tax basis of our foreign investments would generally be limited to foreign and state taxes. At December 31, 2019, we have not provided for taxes on outside basis differences of our foreign subsidiaries, as we have the ability and intent to indefinitely reinvest the undistributed earnings of our foreign subsidiaries, and there are no needs for such earnings in the United States that would contradict our plan to indefinitely reinvest.

Effects of Inflation

Our assets are primarily monetary, consisting of cash and cash equivalents. Because of their liquidity, these assets are not directly affected by inflation. Since we intend to retain and continue to use our equipment, furniture, fixtures and office equipment, computer hardware and software and leasehold improvements, we believe that the incremental inflation related to replacement costs of such items will not materially affect our operations. However, the rate of inflation affects our expenses, such as those for employee compensation and contract services, which could increase our level of expenses and the rate at which we use our resources.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We are exposed to market risk in the ordinary course of our business. Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. Our market risk exposure is primarily a result of fluctuations in interest rates and foreign currency exchange rates.

Interest Rate Risk

We have historically held investments in commercial paper, U.S. Government and agency securities as well as corporate bonds and other debt 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. We do not have any such investments as of December 31, 2019. As a result, a hypothetical 100 basis point increase in interest rates would have no effect on our cash position as of December 31, 2019.

We generally place our marketable security investments in high quality credit instruments, as specified in our investment policy guidelines. We believe that the conservative nature of our investments mitigates our interest rate exposure, and our investment policy limits the amount of our credit exposure to any one issue, issuer (with the exception of U.S. agency obligations) and type of instrument. We do not expect any material loss from our marketable security investments and therefore believe that our potential interest rate exposure is limited.

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 krona, 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.

Although a majority of our contracts are denominated in U.S. dollars, 29% and 28% of total revenues during 2019 and 2018, respectively, were denominated in foreign currencies while 17% and 22% of our costs and expenses during 2019 and 2018, respectively, were denominated in foreign currencies, primarily operating expenses associated with cost of revenue, sales and marketing and general and administrative. In addition, 16% and 24% of our consolidated tangible assets were subject to foreign currency exchange fluctuations as of each of December 31, 2019 and 2018, respectively, while 5% and 6% of our consolidated liabilities were exposed to foreign currency exchange fluctuations as of each of December 31, 2019 and 2018, respectively.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Financial statements and supplementary data required by Item 8 are set forth at the pages indicated in Item 15(a) below and are incorporated herein by reference.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE.

None.

ITEM 9A. CONTROLS AND PROCEDURES

(a) Disclosure Controls and Procedures.

The Company's management, with the participation of our principal executive officer and 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 Exchange Act and as required by paragraph (b) of Rules 13a-15 or 15d-15 under the Exchange Act) as of the end of the period covered by this report. Based on such evaluation, our 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 at the reasonable assurance level.

(b) Report of Management on Internal Control Over Financial Reporting.

Management of the Company is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rule 13a-15(f) and 15d-15(f) under the

Exchange Act as a process designed by, or under the supervision of, the Company's principal executive and principal financial officers and effected by the Company's Board of Directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with U.S. generally accepted accounting principles and includes those policies and procedures that:

- pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the Company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Management assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2019. In making this assessment, management used the criteria established in *Internal Control – Integrated Framework* , issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (COSO).

We acquired C Technologies on May 31, 2019. The financial results of C Technologies are included in our audited consolidated financial statements as of December 31, 2019. The C Technologies business represented $261,848,000 of total assets as of December 31, 2019 and $16,410,000 of revenues for the year then ended. As this acquisition occurred in the second quarter of 2019, the scope of our assessment of our internal control over financial reporting does not include C Technologies. 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.

In connection with our initiative to integrate and enhance our global information technology systems and business processes, we initiated the phased implementation of a new enterprise resource planning ("ERP") system. The ERP system is being implemented in phases through 2020. The first phase was completed during the third quarter of 2019. As a result of this implementation, we modified certain existing internal controls over financial reporting as well as implemented new controls and procedures related to the new ERP system as of December 31, 2019.

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 December 31, 2019 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Subject to the foregoing, based on this assessment, our management concluded that, as of December 31, 2019, our internal control over financial reporting is effective based on those criteria. Ernst & Young LLP, the independent registered public accounting firm that audited our financial statements included in this Form 10-K, has issued an attestation report on our internal control over financial reporting as of December 31, 2019.

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

(c) Attestation Report of the Independent Registered Public Accounting Firm.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Repligen Corporation:

Opinion on Internal Control over Financial Reporting

We have audited Repligen Corporation's internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Repligen Corporation (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on the COSO criteria.

As indicated in the accompanying Management's Report Over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of C Technologies, Inc., which is included in the 2019 consolidated financial statements of the Company and constituted $261,848,000 of total assets as of December 31, 2019 and $16,410,000 of revenues for the year then ended. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of C Technologies, Inc.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2019 and 2018, the related consolidated statements of operations and comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2019, and the related notes and our report dated February 26, 2020 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Report of Management on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance

with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

/s/ Ernst & Young LLP

Boston, Massachusetts
February 26, 2020

(d) Changes in Internal Control Over Financial Reporting

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 December 31, 2019 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

PART III

Pursuant to General Instructions G to Form 10-K, the information required for Part III, Items 10, 11, 12, 13 and 14, is incorporated herein by reference from the Company's proxy statement for the 2019 Annual Meeting of Stockholders.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

The following documents are filed as part of this Form 10-K:

(a) (1) *Financial Statements* :

The financial statements required by this item are submitted in a separate section beginning on page 52 of this Report, as follows:

(a) (2) *Financial Statement Schedules* :

None.

(a) (3) *Exhibits* :

The Exhibits which are filed as part of this Form 10-K or which are incorporated by reference are set forth in the Exhibit Index hereto.

EXHIBIT INDEX

Exhibit Number	Document Description
2.1	Agreement and Plan of Merger and Reorganization, dated June 22, 2017, by and among Repligen Corporation, Top Hat, Inc., Swing Time, LLC, Spectrum, Inc., and Roy T. Eddleman (filed as Exhibit 2.1 to Repligen Corporation's Current Report on Form 8-K filed on June 23, 2017 and incorporated herein by reference).
2.2#	Stock Purchase Agreement, dated April 25, 2019, by and among Repligen Corporation, C Technologies and Craig Harrison (filed as Exhibit 2.1 to Repligen Corporation's Current Report on Form 8-K filed on April 26, 2019 and incorporated herein by reference).
3.1	Restated Certificate of Incorporation dated June 30, 1992, as 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).

Exhibit Number	Document Description
4.1	Specimen Stock Certificate (filed as Exhibit 4.1 to Repligen Corporation's Annual Report on Form 10-K for the year ended March 31, 2002 and incorporated herein by reference).
4.2	Base Indenture, dated as of July 19, 2019, by and between Repligen Corporation and Wilmington Trust, National Association (filed as Exhibit 4.1 to Repligen Corporation's Current Report on Form 8-K filed on July 22, 2019 and incorporated herein by reference).
4.3	First Supplemental Indenture, dated as of July 19, 2019, by and between Repligen Corporation and Wilmington Trust, National Association (filed as Exhibit 4.2 to Repligen Corporation's Current Report on Form 8-K filed on July 22, 2019 and incorporated herein by reference).
4.4	Form of 0.375% Convertible Senior Note due 2024 (included in Exhibit 4.2).
4.5+	Description of Certain Registrant's Securities.
10.1*	Repligen Executive Incentive Compensation Plan (filed as Exhibit 10.1 to Repligen Corporation's Current Report on form 8-K filed on December 14, 2005 and incorporated herein by reference).
10.2*	Second Amended and Restated 2001 Repligen Corporation Stock Plan (filed as Exhibit 10.1 to Repligen Corporation's Current Report on Form 8-K filed on September 18, 2008 and incorporated herein by reference).
10.3.1*	Amended and Restated 2001 Repligen Corporation Stock Option Plan, Form of Incentive Stock Option Agreement (filed as Exhibit 10.14 to Repligen Corporation's Annual Report on Form 10-K for the year ended March 31, 2005 and incorporated herein by reference).
10.3.2*	Amended and Restated 2001 Repligen Corporation Stock Plan, Form of Restricted Stock Agreement (filed as Exhibit 10.1 to Repligen Corporation's Current Report on Form 8-K filed on January 9, 2006 and incorporated herein by reference).
10.4+	Lease Between Repligen Corporation as Tenant and West Seyon LLC as Landlord, 35 Seyon Street, Waltham, MA (as amended to date).
10.5#	Strategic Supplier Alliance Agreement dated January 28, 2010 by and between Repligen Corporation and GE Healthcare Bio-Sciences AB) (as amended to date) (filed as Exhibit 10.1 to Repligen Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2016 and incorporated herein by reference).
10.6	Lease Between Repligen Sweden AB (as successor-in-interest to Novozymes Biopharma Sweden AB) as Tenant and i-parken i Lund AB as Landlord, St. Lars Vag 47, 220 09 Lund, Sweden (filed as Exhibit 10.18 to Repligen Corporation's Transition Report on Form 10-K for the year ended December 31, 2011 and incorporated herein by reference).
10.7*	Repligen Corporation Amended and Restated 2012 Stock Option and Incentive Plan (filed as Exhibit 99.1 to Repligen Corporation's Form S-8 filed on June 2, 2014 and incorporated herein by reference).
10.8*	Letter Agreement, dated as of June 10, 2014, by and between Repligen Corporation and Jon K. Snodgres (filed as Exhibit 10.1 to Repligen Corporation's Current Report on Form 8-K filed on July 15, 2014 and incorporated herein by reference).
10.9*	Repligen Corporation Amended and Restated Non-Employee Directors' Compensation Policy (filed as Exhibit 10.3 to Repligen Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 and incorporated herein by reference).
10.10	Form of Indemnification Agreement (filed as Exhibit 10.1 to Repligen Corporation's Current Report on Form 8-K filed on May 12, 2016 and incorporated herein by reference).
10.11	Lease Agreement, dated February 6, 2018, by and between Repligen Corporation and U.S. REIF 111 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).

Exhibit Number	Document Description
10.12*	2018 Repligen Corporation Stock Option and Incentive Plan (filed as Exhibit 10.1 to Repligen Corporation's Quarterly Report on Form 10-Q for the quarter ended June 30, 2018 and incorporated herein by reference).
10.13*	Letter Agreement, dated as of September 3, 2016 by and between Repligen Corporation and Ralf Kuriyel (filed as Exhibit 10.17 Repligen Corporation's Annual Report on Form 10-K for the year ended December 31, 2018 and incorporated herein by reference).
10.14*	Repligen Corporation Named Executive Officer Severance and Change in Control Plan, effective as of June 13, 2019 (filed as Exhibit 10.1 to Repligen Corporation's Current Report on Form 8-K filed on June 19, 2019 and incorporated herein by reference).
10.15*	Second Amended and Restated Employment Agreement, dated as of June 15, 2019, by and between Repligen Corporation and Tony J. Hunt (filed as Exhibit 10.2 to Repligen Corporation's Current Report on Form 8-K filed on June 19, 2019 and incorporated herein by reference).
21.1+	Subsidiaries of the Registrant.
23.1+	Consent of Ernst & Young LLP, Independent Registered Accounting Firm.
24.1+	Power of Attorney (included on signature page).
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.INS+	Inline XBRL Instance Document-the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH+	Inline XBRL Taxonomy Extension Schema Document.
101.CAL+	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF+	Inline XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB+	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.PRE+	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
104+	Cover Page Interactive Data File (formatted as Inline XBRL with applicable taxonomy extension information contained in Exhibits 101.*).

Confidential treatment obtained as to certain portions.
* Management contract or compensatory plan or arrangement.
+ Filed electronically herewith.

The exhibits listed above are not contained in the copy of the Form 10-K distributed to stockholders. Upon the request of any stockholder entitled to vote at the 2020 annual meeting, the Registrant will furnish that person without charge a copy of any exhibits listed above. Requests should be addressed to Repligen Corporation, 41 Seyon Street, Waltham, MA 02453.

ITEM 16. 10-K SUMMARY

We may voluntarily include a summary of information required by Form 10-K under this Item 16. We have elected not to include such summary information.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

REPLIGEN CORPORATION

Date: February 26, 2020

By: /s/ Tony J. Hunt
Tony J. Hunt
President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby makes, constitutes and appoints Tony J. Hunt and Jon K. Snodgres with full power to act without the other, his true and lawful attorney-in-fact and agent, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities to sign any or all amendments to this Form 10-K, and to file the same with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agents of any of them, or any substitute or substitutes, lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Tony J. Hunt **Tony J. Hunt**	President, Chief Executive Officer and Director (Principal executive officer)	February 26, 2020
/s/ Jon K. Snodgres **Jon K. Snodgres**	Chief Financial Officer (Principal financial and accounting officer)	February 26, 2020
/s/ Karen Dawes **Karen Dawes**	Chairperson of the Board	February 26, 2020
/s/ Nicolas M. Barthelemy **Nicolas M. Barthelemy**	Director	February 26, 2020
/s/ Glenn L. Cooper **Glenn L. Cooper, M.D.**	Director	February 26, 2020
/s/ J ohn G. Cox **John G. Cox**	Director	February 26, 2020
/s/ Glenn P. Muir **Glenn P. Muir**	Director	February 26, 2020
/s/ Thomas F. Ryan, Jr. **Thomas F. Ryan, Jr.**	Director	February 26, 2020

INDEX TO FINANCIAL STATEMENTS

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Repligen Corporation:

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Repligen Corporation (the Company) as of December 31, 2019 and 2018, and the related consolidated statements of operations and comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2019, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control-Integrated Framework issued by the Committee of the Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 26, 2020 expressed an unqualified opinion thereon.

Adoption of New Accounting Standard

As discussed in Note 2 to the consolidated financial statements, the Company changed its method for accounting for leases in 2019 due to the adoption of ASU No. 2016-02, Leases (Topic 842).

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the US federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or FRAUD . Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matters communicated below are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Accounting for acquisitions

Description of the Matter

During 2019, the Company completed its acquisition of C Technologies, Inc. for net consideration of $239.9 million, as disclosed in Note 3 to the consolidated financial statements. The transaction was accounted for as a business combination.

Auditing the Company's accounting for its acquisition of C Technologies was complex due to the significant estimation uncertainty in the Company's determination of the fair value of identified intangible assets of $90.8 million, which principally consisted of customer relationships and developed technology. The significant estimation uncertainty was primarily due to the sensitivity of the respective fair values to underlying assumptions about the future performance of the acquired business. The Company used a discounted cash flow model to measure the customer relationship and developed technology intangible assets. The significant assumptions used to estimate the value of the intangible assets included discount rates and certain assumptions that form the basis of the forecasted results (e.g., revenue growth rates and operating profit margin). These significant assumptions are forward looking and could be affected by future economic and market conditions.

How We Addressed the Matter in Our Audit

We tested the Company's controls over its accounting for acquisitions. Our tests included controls over the process supporting the recognition and measurement of consideration transferred, customer relationship, and developed technology intangible assets. We also tested management's review of assumptions used in the valuation models.

To test the estimated fair value of the customer relationship and developed technology intangible assets, we performed audit procedures that included, among others, evaluating the Company's selection of the valuation methodology, evaluating the methods and significant assumptions used by the Company, and evaluating the completeness and accuracy of the underlying data supporting the significant assumptions and estimates. This includes comparing the significant assumptions to current industry, market and economic trends, to the assumptions used to value similar assets in other acquisitions, to the historical results of the acquired business and to other guidelines used by companies within the same industry. We involved our valuation professionals to assist in our evaluation of the methodology used by the Company and significant assumptions included in the fair value estimates.

Issuance of Convertible Senior Notes due 2024

Description of the Matter

As described in Note 11 to the consolidated financial statements, the Company issued $287.5 million aggregate principal amount of 0.375% Convertible Senior Notes due in 2024 ("2019 Notes"). The Company accounted for the 2019 Notes as separate liability and equity components. The equity component represents an embedded conversion feature valued at issuance of the 2019 Notes at $52.1 million.

Auditing the Company's accounting for the issuance of the 2019 Notes was complex due to the inherent estimation uncertainty in the Company's valuation of the liability and equity components of the 2019 Notes. Management used a discounted cash flow model to estimate the value of the liability component. The inherent estimation uncertainty was primarily attributed to sensitivity of the discounted cash flow model to changes in the estimated effective yield given the quantitative significance of the transaction. Valuation of the liability component impacted the debt discount recorded at issuance, which is being amortized using the effective interest rate over the term of the 2019 Notes.

How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's process to assess and value attributed to the liability and equity components of the 2019 Notes issuance. To test the estimated fair value of the liability and equity components, we performed audit procedures that included, among others, evaluating the Company's selection of the valuation methodology, evaluating the methods and significant assumptions used by the Company's valuation professional, and evaluating the completeness and accuracy of the underlying data contained in the discounted cash flow model compared to terms contained in the 2019 Notes. These audit procedures included engaging our valuation professionals to assist in our evaluation of the methodology used by the Company and assumptions included in determination of the discount rate and discounted cash flow model. This included evaluating individual assumptions used by management and also developing an independent model. We assessed the sensitivity of the discounted cash flow model to changes in the discount rate, and resulting changes in value of the liability and equity components. We also assessed the Company's selection of the valuation methodology, evaluated the methods and significant assumptions used by the Company's valuation professional, and evaluated the completeness and accuracy of the underlying data supporting the significant assumptions and estimates.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2002
Boston, Massachusetts
February 26, 2020

REPLIGEN CORPORATION
CONSOLIDATED BALANCE SHEETS
(Amounts in thousands, except share data)

	December 31, 2019	December 31, 2018
Assets		
Current assets:		
Cash and cash equivalents	$ 528,392	$ 193,822
Restricted cash	9,015	—
Accounts receivables, less reserve for doubtful accounts of $ 525 and $ 227 at December 31, 2019 and December 31, 2018, respectively	43,068	33,015
Royalties and other receivables	148	136
Unbilled receivables	456	2,602
Inventories, net	54,832	42,263
Prepaid expenses and other current assets	5,917	3,901
Total current assets	641,828	275,739
Property, plant and equipment, net	48,455	32,180
Intangible assets, net	212,552	135,438
Goodwill	468,413	326,735
Deferred tax assets	2,920	4,355
Operating lease right of use assets	25,707	—
Other assets	238	174
Total assets	$ 1,400,113	$ 774,621
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 11,425	$ 10,489
Operating lease liability	3,557	—
Accrued liabilities	33,331	15,865
Convertible senior notes, current portion	—	103,488
Total current liabilities	48,313	129,842
Convertible senior notes, net	232,767	—
Deferred tax liabilities	29,944	25,086
Operating lease liability, long-term	26,995	—
Other liabilities, long-term	2,326	4,125
Total liabilities	340,345	159,053
Commitments and contingencies (Note 10)		
Stockholders' equity:		
Preferred stock, $ 0.01 par value, 5,000,000 shares authorized, no shares issued or outstanding	—	—
Common stock, $ 0.01 par value; 80,000,000 shares authorized; 52,078,258 shares at December 31, 2019 and 43,917,378 shares at December 31, 2018 issued and outstanding	521	439
Additional paid-in capital	1,068,431	642,590
Accumulated other comprehensive loss	(15,027)	(11,893)
Accumulated earnings (deficit)	5,843	(15,568)
Total stockholders' equity	1,059,768	615,568
Total liabilities and stockholders' equity	$ 1,400,113	$ 774,621

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

REPLIGEN CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(Amounts in thousands, except per share data)

	For the Years Ended December 31,		
	2019	2018	2017
Revenue:			
Products	$270,097	$193,891	$141,089
Royalty and other revenue	148	141	147
Total revenue	270,245	194,032	141,236
Costs and operating expenses:			
Cost of product revenue	119,099	86,531	67,050
Research and development	19,450	15,821	8,672
Selling, general and administrative	95,613	65,692	51,509
Total costs and operating expenses	234,162	168,044	127,231
Income from operations	36,083	25,988	14,005
Other (expenses) income :			
Investment income	5,324	1,895	371
Loss on extinguishment of debt	(5,650)	—	—
Interest expense	(9,292)	(6,709)	(6,441)
Other (expenses) incom e	(314)	262	(687)
Other expenses, net	(9,932)	(4,552)	(6,757)
Income before income taxes	26,151	21,436	7,248
Income tax provision (benefit)	4,740	4,819	(21,105)
Net income	$ 21,411	$ 16,617	$ 28,353
Earnings per share:			
Basic	$ 0.44	$ 0.38	$ 0.74
Diluted	$ 0.44	$ 0.37	$ 0.72
Weighted average common shares outstanding:			
Basic	48,343	43,767	38,234
Diluted	49,206	45,471	39,150
Net income	$ 21,411	$ 16,617	$ 28,353
Other comprehensive income (loss):			
Foreign currency translation adjustment	(3,134)	(5,530)	7,381
Unrealized gain on marketable securities	—	—	5
Comprehensive income	$ 18,277	$ 11,087	$ 35,739

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

REPLIGEN CORPORATION
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(Amounts in thousands, except share data)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Earnings/(Deficit)	Total Stockholders' Equity
	Number of Shares(#)	Par Value				
Balance at December 31, 2016	33,844,074	$ 338	$ 242,036	$ (13,749)	$ (59,861)	$ 168,764
Net income	—	—	—	—	28,353	28,353
Exercise of stock options and releases of restricted stock	330,185	3	2,348	—	—	2,351
Unrealized gain on investments	—	—	—	5	—	5
Issuance of common stock pursuant to the acquisition of Spectrum Lifesciences, LLC	6,153,995	62	247,513	—	—	247,575
Payment of contingent consideration in stock	30,756	1	1,062	—	—	1,063
Proceeds from issuance of common stock, net of issuance costs of $ 8,691	3,228,069	32	129,277	—	—	129,309
Stock-based compensation expense	—	—	6,747	—	—	6,747
Translation adjustment	—	—	—	7,381	—	7,381
Balance at December 31, 2017	43,587,079	436	628,983	(6,363)	(31,508)	591,548
Net income	—	—	—	—	16,617	16,617
Issuance of common stock for debt conversion	2	0	0	—	—	0
Exercise of stock options and releases of restricted stock	330,297	3	3,415	—	—	3,418
Stock-based compensation expense	—	—	10,192	—	—	10,192
Cumulative effect of accounting changes	—	—	—	—	(677)	(677)
Translation adjustment	—	—	—	(5,530)	—	(5,530)
Balance at December 31, 2018	43,917,378	439	642,590	(11,893)	(15,568)	615,568
Net income	—	—	—	—	21,411	21,411
Issuance of common stock for debt conversion	2,316,229	23	198,734	—	—	198,757
Reduction of equity component from debt conversion, net of tax	—	—	(200,079)	—	—	(200,079)
Exercise of stock options and releases of restricted stock	339,329	3	1,164	—	—	1,167
Issuance of common stock pursuant to the acquisition of C Technologies, Inc.	779,221	8	53,930	—	—	53,938
Tax withholding on vesting of restricted stock	(5,430)	(0)	(490)	—	—	(490)
Equity component of 0.375 % senior convertible notes, net of tax	—	—	39,070	—	—	39,070
Proceeds from issuance of common stock, net of issuance costs of $ 18,607	4,731,531	48	320,665	—	—	320,713
Stock-based compensation expense	—	—	12,847	—	—	12,847
Translation adjustment	—	—	—	(3,134)	—	(3,134)
Balance at December 31, 2019	52,078,258	$ 521	$ 1,068,431	$ (15,027)	$ 5,843	$ 1,059,768

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

REPLIGEN CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Amounts in thousands)

	For the Years Ended December 31,		
	2019	**2018**	**2017**
Cash flows from operating activities:			
Net income	$ 21,411	$ 16,617	$ 28,353
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	20,868	15,778	10,507
Non-cash interest expense	7,536	4,248	3,977
Stock-based compensation expense	12,847	10,192	6,747
Deferred tax expense	(624)	71	(24,679)
Loss on extinguishment of debt	5,650	—	—
Other	663	(3)	64
Changes in operating assets and liabilities, excluding impact of acquisitions:			
Accounts receivable	(7,726)	(6,101)	(6,888)
Royalties and other receivables	(104)	7	644
Unbilled receivables	2,146	(2,602)	—
Inventories	(9,314)	(4,042)	605
Prepaid expenses and other assets	(661)	(1,769)	(1,304)
Operating lease right of use assets	(4,662)	—	—
Accounts payable	662	2,266	807
Accrued expenses	13,096	(1,398)	(1,993)
Operating lease liability	5,447	—	—
Long-term liabilities	(19)	(494)	611
Total cash provided by operating activities	67,216	32,770	17,451
Cash flows from investing activities:			
Purchases of marketable securities	—	—	(47)
Redemption of marketable securities	—	—	19,600
Additions to capitalized software costs	(4,650)	(2,147)	—
Developed technology intangible asset payment	—	(1,255)	—
Acquisition of Spectrum Lifesciences, Inc., net of cash acquired	—	—	(112,795)
Acquisition of C Technologies, Inc. net of cash acquired	(182,154)	—	—
Purchases of property, plant and equipment	(18,504)	(10,635)	(5,454)
Total cash used in investing activities	(205,308)	(14,037)	(98,696)
Cash flows from financing activities:			
Proceeds from issuance of senior convertible notes, net of issuance costs	278,466	—	—
Proceeds from issuance of common stock, net of issuance costs	320,713	—	129,309
Exercise of stock options	1,167	3,418	2,351
Repayment of senior convertible notes	(114,989)	(11)	—
Payment of tax withholding obligation on vesting of restricted stock	(490)	—	(1,715)
Total cash provided by financing activities	484,867	3,407	129,945
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(3,190)	(2,077)	2,376
Net increase in cash, cash equivalents and restricted cash	343,585	20,063	51,076
Cash, cash equivalents and restricted cash, beginning of period	193,822	173,759	122,683
Cash, cash equivalents and restricted cash, end of period	$ 537,407	$ 193,822	$ 173,759
Supplemental disclosure of cash flow information:			
Income taxes paid	$ 6,505	$ 4,046	$ 4,021
Interest paid	$ 1,484	$ 2,444	$ 2,444
Supplemental disclosure of non-cash investing and financing activities:			
Assets ac quired under operating leases	8,663	—	—
Fair value of 2,316,229 shares of common stock issued for conversion of convertible notes	$ 198,757	$ —	$ —
Fair value of common stock issued for acquisition of C Technologies, Inc.	$ 53,938	$ —	$ —
Non-cash effect of adoption of ASU 2016-16	$ —	$ 5,609	$ —
Property, plant and equipment related to lease incentives	$ —	$ 2,270	$ —
Fair value of common stock issued for acquisition of Spectrum, Inc.	$ —	$ —	$ 247,575
Payment of contingent consideration in common stock	$ —	$ —	$ 1,063
Business Acquisitions:			
Fair value of tangible assets acquired	$ 30,756	$ —	$ 19,709
Fair value of accounts receivable	3,044	—	5,075
Fair value of other assets	3,929	—	1,718
Deferred tax assets, net	895	—	—
Liabilities assumed	(35,383)	—	(7,698)
Fair value of stock issued	(53,938)	—	(247,575)
Cost in excess of fair value of assets acquired (Goodwill)	142,021	—	265,519
Acquired identifiable intangible assets	90,830	—	120,080
Deferred tax liabilities, net	—	—	(43,608)
	182,154	—	113,220
Less working capital adjustment	—	—	(425)
Net cash paid for business acquisitions	$ 182,154	$ —	$ 112,795

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

REPLIGEN CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Organization and Nature of Business

Repligen Corporation (NASDAQ:RGEN) is a global life sciences company that develops and commercializes highly innovative bioprocessing technologies and systems that increase efficiencies and flexibility in the process of manufacturing biological drugs. The Company's franchises include Chromatography (OPUS ® Columns, chromatography resins, ELISA kits), Filtration (XCell ATF ™ systems, TangenX ™ SIUS ™ flat sheet cassettes, Spectrum ® Hollow Fibers, KrosFlo ® Systems and ProConnex ® single-use flow path assemblies), Process Analytics (SoloVPE ® and FlowVPE ®), and Proteins (Protein A affinity ligands and cell culture growth factors). The Company's bioprocessing products are sold to major life sciences companies, biopharmaceutical development companies and contract manufacturing organizations worldwide. The Company operates under one reportable segment. The Company's chief operating decision maker ("CODM") reviews financial information presented on a consolidated basis for purposes of allocating resources and evaluating financial performance. See Note 2, *"Summary of Significant Accounting Policies – Segment Reporting,"* for more information on the Company's segment.

Repligen's corporate headquarters is in Waltham, Massachusetts (USA) and its manufacturing facilities are located in Waltham, Massachusetts; Marlborough, Massachusetts, Rancho Dominguez, California; Irving, Texas; Bridgewater, New Jersey; Lund, Sweden; and Weingarten, Germany.

The Company is subject to a number of risks typically associated with companies in the biotechnology industry. These risks principally include the Company's dependence on key customers, development by the Company or its competitors of new technological innovations, dependence on key personnel, protection of proprietary technology, compliance with the FDA and other governmental regulations and approval requirements, as well as the ability to grow the Company's business and obtain adequate funding to finance this growth.

2. Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States ("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 periods.

Significant estimates and assumptions by management affect the Company's revenue recognition for multiple element arrangements, allowance for doubtful accounts, the net realizable value of inventory, valuations and purchase price allocations related to business combinations, expected future cash flows including growth rates, discount rates, terminal values and other assumptions and estimates used to evaluate the recoverability of long-lived assets, estimated fair values of intangible assets and goodwill, amortization methods and periods, warranty reserves, certain accrued expenses, stock-based compensation, tax reserves and recoverability of the Company's net deferred tax assets and related valuation allowance.

Although the Company regularly assesses these estimates, actual results could differ materially from these estimates. Changes in estimates are recorded in the period in which they become known. The Company bases its estimates on historical experience and various other assumptions that it believes to be reasonable under the circumstances.

Basis of Presentation

The consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries, Repligen Sweden AB, Repligen GmbH, Spectrum ® LifeSciences LLC and its subsidiaries ("Spectrum," acquired on August 1, 2017), C Technologies, Inc. ("C Technologies," acquired on May 31, 2019), and Repligen

Singapore Pte. Ltd. All significant intercompany accounts and transactions have been eliminated in consolidation. Certain prior year balances have changed to reflect current year presentation.

Foreign Currency

The Company translates the assets and liabilities of its foreign subsidiary at rates in effect at the end of the reporting period. Revenues and expenses are translated at average rates in effect during the reporting period. Translation adjustments, including adjustments related to the Company's intercompany loan with Repligen Sweden AB and Repligen Sweden AB's intercompany loan with Repligen GmbH, are remeasured at each period end and included in accumulated other comprehensive loss.

R evenue Recognition

We generate revenue from the sale of bioprocessing products, equipment devices, and related consumables used with these equipment devices to customers in the life science and biopharmaceutical industries. Under Accounting Standard Codification No. ("ASC") 606, " *Revenue from Contracts with Customers,"* 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 December 31, 2019.

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.

Shipping and handling fees are recorded as a component of product revenue, with the associated costs recorded as a component of cost of product revenue.

Risks and Uncertainties

The Company evaluates its operations periodically to determine if any risks and uncertainties exist that could impact its operations in the near term. The Company does not believe that there are any significant risks which

have not already been disclosed in the consolidated financial statements. A loss of certain suppliers could temporarily disrupt operations, although alternate sources of supply exist for these items. The Company has mitigated these risks by working closely with key suppliers, identifying alternate sources and developing contingency plans.

Cash, Cash Equivalents and Restricted Cas h

Cash and cash equivalents include cash on hand and on deposit. Highly liquid investments in money market mutual funds with an original maturity of three months or less are classified as cash equivalents. All cash equivalents are carried at cost, which approximates fair value. Restricted cash represents cash that is restricted as to withdrawal or usage. In connection with the Company's acquisition of C Technologies on May 31, 2019, cash is being held and is due to employees based on their continued employment with the Company one year after the date of the close of the acquisition. As of December 31, 2019, $9.0 million, which represents this amount due to employees, is being carried as restricted cash on the Company's consolidated balance sheet .

The Company adopted Accounting Standard Update No. ("ASU") 2016-18, *"Statement of Cash Flows (Topic 230): Restricted Cash,"* on January 1, 2018, which changed the presentation of the Company's consolidated statements of cash flows and related disclosures for all periods presented. Accordingly, the following is a summary of the Company's cash, cash equivalents, and restricted cash total as presented in the Company's consolidated statements of cash flows for the years ended December 31, 2019, 2018 and 2017:

	For the Years Ended December 31,		
	2019	2018	2017
	(Amounts in thousands)		
Cash and cash equivalents	$528,392	$193,822	$173,759
Restricted cash	9,015	—	—
Total cash, cash equivalents, and restricted cash	$537,407	$193,822	$173,759

There were no realized gains or losses on investments for the years ended December 31, 2019, 2018 and 2017.

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.

As of December 31, 2019 and 2018, cash and cash equivalents on the Company's consolidated balance sheets included $ 415.6 million and $126.6 million, respectively, in money market account s . These funds are valued on a recurring basis using Level 1 inputs.

In July 2019, the Company issued $287.5 million aggregate principal amount of the Company's 0.375% Convertible Senior Notes due July 15, 2024 (the "2019 Notes"). Interest is payable semi-annually in arrears on January 15 and July 15 of each year. The 2019 Notes will mature on July 15, 2024 unless earlier converted or repurchased in accordance with their terms. As of December 31, 2019, the carrying value of the 2019 Notes was $232.8 million, net of unamortized discount, and the fair value of the 2019 Notes was $296.1 million. The fair value of the 2019 Notes is a Level 1 valuation and was determined based on the most recent trade activity of the 2019 Notes as of December 31, 2019. The 2019 Notes are discussed in more detail in Note 11, *"Convertible Senior Notes , "* to these consolidated financial statements.

There were no remeasurements to fair value during the year ended December 31, 2019 of financial assets and liabilities that are not measured at fair value on a recurring basis.

Inventories

Inventories relate to the Company's bioprocessing business. The Company values inventory at cost or, if lower, net realizable 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.

Lease Accounting

The Company adopted ASU 2016-02, *"Leases (Topic 842)* " ("ASC 842") as of January 1, 2019. Under ASC 842, the Company determines whether the arrangement contains a lease at the inception of an arrangement. If a lease is identified in an arrangement, the Company recognizes a right-of-use asset and liability on its consolidated balance sheet and determines whether the lease should be classified as a finance or operating lease. The Company does not recognize assets or liabilities for leases with lease terms of less than 12 months.

A lease qualifies as a finance lease if any of the following criteria are met at the inception of the lease: (i) there is a transfer of ownership of the leased asset to the Company by the end of the lease term, (ii) the Company holds

an option to purchase the leased asset that it is reasonably certain to exercise, (iii) the lease term is for a major part of the remaining economic life of the leased asset, (iv) the present value of the sum of lease payments equals or exceeds substantially all of the fair value of the leased asset, or (v) the nature of the leased asset is specialized to the point that it is expected to provide the lessor no alternative use at the end of the lease term. All other leases are recorded as operating leases.

Finance and operating lease assets and liabilities are recognized at the lease commencement date based on the present value of the lease payments over the lease term using the discount rate implicit in the lease. If the rate implicit is not readily determinable, the Company utilizes its incremental borrowing rate at the lease commencement date. Operating lease assets are further adjusted for prepaid or accrued lease payments. Operating lease payments are expensed using the straight-line method as an operating expense over the lease term. Finance lease assets are amortized to depreciation expense using the straight-line method over the shorter of the useful life of the related asset or the lease term. Finance lease payments are bifurcated into (i) a portion that is recorded as imputed interest expense and (ii) a portion that reduces the finance liability associated with the lease.

The Company does not separate lease and non-lease components when determining which lease payments to include in the calculation of its lease assets and liabilities. Variable lease payments are expensed as incurred. If a lease includes an option to extend or terminate the lease, the Company reflects the option in the lease term if it is reasonably certain it will exercise the option.

Finance leases are recorded in property, plant and equipment, net, other current liabilities and long-term finance lease liabilities and operating leases are recorded in operating lease right of use assets, operating lease liability and operating lease liability, long-term on the Company’s consolidated balance sheet.

Certain of the Company’s operating leases where the Company is the lessee provide for minimum annual payments that increase over the life of the lease. Some of these leases include obligations to pay for other services, such as operations and maintenance. For leases of property, the Company accounts for these other services as a component of the lease. The aggregate minimum annual payments are expensed on the straight-lined basis beginning when the Company takes possession of the property and extending over the term of the related lease, including renewal options when the exercise of the option is reasonably assured as an economic penalty may be incurred if the option is not exercised. The Company also accounts in its straight-line computation for the effect of any “rental holidays.”

Operating lease assets represent the Company’s right to use an underlying asset for the lease term and lease liabilities represent the Company’s obligation to make lease payments arising from the lease. Operating lease assets and liabilities are recognized at the lease commencement date based on the estimated present value of the fixed lease payments, reduced by landlord incentives using a discount rate based on similarly secured borrowings available to the Company. Most of the leases do not provide implicit interest rates and therefore the Company determines the discount rate based on its incremental borrowing rate. The incremental borrowing rate for the Company’s leases is determined based on lease term and currency in which the lease payments are made.

Accrued Liabilities

The Company estimates accrued liabilities by identifying services performed on the Company’s behalf, estimating the level of service performed and determining the associated cost incurred for such service as of each balance sheet date. For example, the Company would accrue for professional and consulting fees incurred with law firms, audit and accounting service providers and other third-party consultants. These expenses are determined by either requesting those service providers to estimate unbilled services at each reporting date for services incurred or tracking costs incurred by service providers under fixed fee arrangements.

The Company has processes in place to estimate the appropriate amounts to record for accrued liabilities, which principally involve the applicable personnel reviewing the services provided. In the event that the Company does

not identify certain costs that have begun to be incurred or the Company under or over-estimates the level of services performed or the costs of such services, the reported expenses for that period may be too low or too high. The date on which certain services commence, the level of services performed on or before a given date, and the cost of such services often require the exercise of judgment. The Company makes these judgments based upon the facts and circumstances known at the date of the financial statements.

Income Taxes

Deferred taxes are determined based on the difference between the financial statement and tax basis of assets and liabilities using enacted tax rates in effect in the years in which the differences are expected to reverse. Valuation allowances are provided, if, based upon the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. The Company accounts for uncertain tax positions using a "more-likely-than-not" threshold for recognizing and resolving uncertain tax positions. The evaluation of uncertain tax positions is based on factors including, but not limited to, changes in tax law, the measurement of tax positions taken or expected to be taken in tax returns, the effective settlement of matters subject to audit, new audit activity and changes in facts or circumstances related to a tax position. The Company evaluates this tax position on a quarterly basis. The Company also accrues for potential interest and penalties related to unrecognized tax benefits in income tax expense.

Property, Plant & Equipment

Property, plant & equipment is recorded at cost less allowances for depreciation. Depreciation is calculated using the straight-line method over the estimated useful life of the asset as follows :

Classification	Estimated Useful Life
Buildings	Thirty years
Leasehold improvements	Shorter of the term of the lease or estimated useful life
Equipment	Three to twelve years
Furniture, fixtures and office equipment	Three to eight years
Computer hardware and software	Three to five years or estimated useful life

Upon disposal of Property, plant & equipment, the cost of the asset and the accumulated depreciation are removed from the accounts and the resulting gain or loss is reflected in earnings. Fully depreciated assets are not removed from the accounts until they are physically disposed of.

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 and warrants. Under the treasury stock method, unexercised "in-the-money" stock options 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. In periods when the Company has a net loss, stock awards are excluded from the calculation of earnings per share as their inclusion would have an antidilutive effect.

A reconciliation of basic and diluted share amounts is as follows:

	For the Years Ended December 31,		
	2019	2018	2017
	(Amounts in thousands, except per share data)		
Net income	$ 21,411	$ 16,617	$ 28,353
Weighted average shares used in computing net income per share - basic	48,343	43,767	38,234
Effect of dilutive shares:			
Stock options and restricted stock awards	864	581	441
Convertible senior notes	—	1,123	475
Dilutive potential common shares	864	1,704	916
Weighted average shares used in computing net income per share - diluted	49,206	45,471	39,150
Earnings per share:			
Basic	$ 0.44	$ 0.38	$ 0.74
Diluted	$ 0.44	$ 0.37	$ 0.72

At December 31, 2019, there were outstanding options to purchase 957,559 shares of the Company's common stock at a weighted average exercise price of $30.81 per share and 734,984 shares of common stock issuable upon the vesting of stock units which include restricted stock units and performance stock units. For the year ended December 31 , 2019 , 104,316 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 December 31, 2018, there were outstanding options to purchase 998,226 shares of the Company's common stock at a weighted average exercise price of $27.54 per share and 705,413 shares of common stock issuable upon the vesting of stock units. For the year ended December 31, 2018, 479,854 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 December 31, 2017, there were outstanding options to purchase 734,940 shares of the Company's common stock at a weighted average exercise price of $20.80 per share and 505,235 shares of common stock issuable upon the vesting of stock units. For the year ended December 31, 2017, 317,923 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 senior convertible notes, the Company has a choice to settle the conversion obligation for the Convertible Notes in cash, shares or any combination of the two. The Company currently intends to settle the par value of the Convertible 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 Convertible Notes is not included in the calculation of diluted income per share, but the dilutive effect of the conversion premium is considered in the calculation of diluted net income per share using the treasury stock method. The dilutive impact of the 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 Conver tible Notes. The dilutive effect of the conversion premium included in the calculation of diluted earnings per share was 0 shares , 1,123,139 shares and 474,923 shares for the years ended December 31, 2019, 2018 and 2017 , respectively .

Segment Reporting

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

The following table represents product revenues by product line:

	For the Years Ended December 31,		
	2019 [1]	2018	2017 [2]
	(Amounts in thousands)		
Chromatography products	$ 64,635	$ 45,326	$ 36,309
Filtration products	119,534	90,586	49,050
Process analytics products	16,405	—	—
Protein s products	65,124	54,375	53,969
Other	4,399	3,604	1,761
Total product revenue	$270,097	$193,891	$141,089

(1) 2019 revenue for process analytics products includes revenue related to C Technologies from May 31, 2019 through December 31, 2019.
(2) 2017 revenue for filtration, chromatography and other products includes revenue related to Spectrum from August 1, 2017 through December 31, 2017.

Revenue from chromatography products includes the OPUS chromatography PPCs, chromatography resins and ELISA test kits. Revenue from filtration products includes the XCell ATF systems and consumables as well as the KrosFlo and SIUS filtration products. Revenue from process analytics products includes the SoloVPE and FlowVPE devices. Revenue from protein products includes the Protein A affinity ligands and cell culture growth factors. Other revenue primarily consists of revenue from the sale of operating room products to hospitals as well as freight revenue.

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

	For the Years Ended December 31,		
	2019	2018	2017
Revenue by customers' geographic locations:			
North America	51%	48%	43%
Europe	37%	40%	46%
APAC	12%	12%	11%
Other	0%	0%	0%
Total revenue	100%	100%	100%

The following table represents the Company's total assets by geographic area:

	December 31,	
	2019	2018
	(Amounts in thousands)	
Total assets by geographic locations:		
North America	$ 1,260,217	$665,833
Europe	133,599	104,750
APAC	6,297	4,038
Total assets by geographic location	$1,400,113	$774,621

The following table represents the Company's long-lived assets by geographic area:

	December 31,	
	2019	2018
	(Amounts in thousands)	
Long-lived assets by geographic locations:		
North America	$ 66,756	$ 26,344
Europe	6,775	5,162
APAC	869	848
Total long-lived assets by geographic location	$ 74,400	$ 32,354

Concentrations of Credit Risk and Significant Customers

Financial instruments that subject the Company to significant concentrations of credit risk primarily consist of cash and cash equivalents, marketable securities and accounts receivable. Per the Company's investment policy, cash equivalents and marketable securities are invested in financial instruments with high credit ratings and credit exposure to any one issue, issuer (with the exception of U.S. treasury obligations) and type of instrument is limited. At December 31, 2019 and 2018, the Company had no investments associated with foreign exchange contracts, options contracts or other foreign hedging arrangements.

Concentration of credit risk with respect to accounts receivable is limited to customers to whom the Company makes significant sales. While a reserve for the potential write-off of accounts receivable is maintained, the Company has not written off any significant accounts to date. To control credit risk, the Company performs regular credit evaluations of its customers' financial condition .

Revenue from significant customers that represent 10% or more of the Company's total revenue is as follows:

	For the Years Ended December 31,		
	2019	2018	2017
MilliporeSigma	13%	15%	18%
GE Healthcare	12%	15%	21%

Significant accounts receivable balances representing 10% or more of the Company's total trade accounts receivable and royalties and other receivable balances are as follows:

	December 31,	
	2019	2018
GE Healthcare	18%	17%
MilliporeSigma	N/A	11%

Business Combinations, Goodwill and Intangible Assets

Business Combinations

Total consideration transferred for acquisitions is allocated to the assets acquired and liabilities assumed, if any, based on their fair values at the dates of acquisition. This purchase price allocation process requires management to make significant estimates and assumptions with respect to intangible assets and deferred revenue. The fair value of identifiable intangible assets is based on detailed valuations that use information and assumptions determined by management. Any excess of purchase price over the fair value of the net tangible and intangible assets acquired is allocated to goodwill. While the Company uses its best estimates and assumptions to accurately value assets acquired and liabilities assumed at the acquisition date as well as any contingent consideration, where applicable, that the Company's estimates are inherently uncertain and subject to refinement. As a result,

during the measurement period, which may be up to one year from the acquisition date, the Company records adjustments to the assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to the Company's consolidated statements of comprehensive income. Any excess of the fair value of the net tangible and intangible assets acquired over the purchase price is recognized in the consolidated statements of comprehensive income. The fair value of contingent consideration includes estimates and judgments made by management regarding the probability that future contingent payments will be made and the extent of royalties to be earned in excess of the defined minimum royalties. Management updates these estimates and the related fair value of contingent consideration at each reporting period. Changes in the fair value of contingent consideration are recorded in the consolidated statements of comprehensive income.

The Company uses the income approach to determine the fair value of certain identifiable intangible assets including customer relationships and developed technology. This approach determines fair value by estimating after-tax cash flows attributable to these assets over their respective useful lives and then discounting these after-tax cash flows back to a present value. The Company bases its assumptions on estimates of future cash flows, expected growth rates, expected trends in technology, etc. Discount rates used to arrive at a present value as of the date of acquisition are based on the time value of money and certain industry-specific risk factors.

Goodwill

Goodwill is not amortized and is reviewed for impairment at least annually at the reporting unit level. As of December 31, 2018, the Company concluded that it operated as two reporting units and performed the 2018 goodwill impairment test using two reporting units. In 2019, the Company reorganized its reporting structure and changed the way the CODM views the Company's operations and allocates its resources. Accordingly, the Company operates as one reporting unit as of the goodwill impairment measurement date of December 31, 2019. There was no impairment to goodwill at December 31, 2019 and 2018. There were no goodwill impairment charges during the years ended December 31, 2019, 2018 and 2017.

Intangible Assets

Intangible assets with a definite life are amortized over their useful lives using the straight-line method and the amortization expense is recorded within cost of product revenue and selling, general and administrative expense in the consolidated statements of comprehensive income. 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 the Company's products or changes in the size of the market for the Company's products. If impairment indicators are present, the Company determines whether the underlying intangible asset is recoverable through estimated future undiscounted cash flows. If the asset is not found to be recoverable, it is written down to the estimated fair value of the asset based on the sum of the future discounted cash flows expected to result from the use and disposition 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 definitive-lived intangible assets are recoverable at December 31, 2019.

Indefinite-lived intangible assets are reviewed for impairment at least annually. There has been no impairment of our intangible assets for the periods presented.

Stock Based Compensation

The Company measures stock-based compensation cost at the grant date based on the estimated fair value of the award and recognizes it as expense over the employee's requisite service period on a straight-line basis. The

Company records the expense for share-based awards subject to performance-based milestone vesting over the remaining service period when management determines that achievement of the milestone is probable. Management evaluates whether the achievement of a performance-based milestone is probable as of the reporting date. The Company has no awards that are subject to market conditions. The Company recognizes stock-based compensation expense based upon options that are ultimately expected to vest, and accordingly, such compensation expense has been adjusted by an amount of estimated forfeitures.

The Company uses the Black-Scholes option pricing model to calculate the fair value of share-based awards on the grant date. The following assumptions are used in calculating the fair value of share-based awards:

Expected term – The expected term of options granted represents the period of time for which the options are expected to be outstanding. For purposes of estimating the expected term, the Company has aggregated all individual option awards into one group as the Company does not expect substantial differences in exercise behavior among its employees.

Expected volatility – The expected volatility is a measure of the amount by which the Company's stock price is expected to fluctuate during the expected term of options granted. The Company determines the expected volatility based primarily upon the historical volatility of the Company's common stock over a period commensurate with the option's expected term.

Risk-free interest rate – The risk-free interest rate is the implied yield available on U.S. Treasury zero-coupon issues with a remaining term equal to the option's expected term on the grant date.

Expected dividend yield – The Company has never declared or paid any cash dividends on any of its capital stock and does not expect to do so in the foreseeable future. Accordingly, the Company uses an expected dividend yield of zero to calculate the grant-date fair value of a stock option.

Estimated forfeiture rates – The Company has applied, based on an analysis of its historical forfeitures, annual forfeiture rates of 8% for awards granted to non-executive level employees, 3% for awards granted to executive level employees and 0% for awards granted to non-employee members of the Board of Directors to all unvested stock options as of December 31, 2019. The Company reevaluates this analysis periodically and adjusts these estimated forfeiture rates as necessary. Ultimately, the Company will only recognize expense for those shares that vest.

Advertising Costs

The Company expenses advertising costs as they are incurred. Advertising expense for the years ended December 31, 2019, 2018 and 2017 was $0.1 million, $0.2 million and $0.2 million, respectively.

Recent Accounting Standards Updates

The Company considers the applicability and impact of all Accounting Standards Updates on its consolidated financial statements. Updates not listed below were assessed and determined to be either not applicable or are expected to have minimal impact on the Company's consolidated financial position or results of operations. Recently issued Accounting Standards Updates which the Company believes may be applicable are as follows:

Recently Issued Accounting Standard Updates – Not Yet Adopted

In August 2018, the Financial Accounting Standards Board ("FASB") issued ASU 2018-13, *"Fair Value Measurement (Topic 820): Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement."* ASU 2018-13 includes amendments that aim to improve the effectiveness of fair value measurement disclosures. The amendments in this guidance modify the disclosure requirements on fair value

measurements based on the concepts in FASB Concepts Statement, *"Conceptual Framework for Financial Reporting—Chapter 8: Notes to Financial Statements , "* including the consideration of costs and benefits. The amendments become effective for the Company in the year ending December 31, 2020 and early adoption is permitted. The Company will adopt this guidance in the first quarter of 2020 and expects there to be no material impact on its consolidated financial statements.

In August 2018, the FASB issued ASU 2018-15, *"Intangibles – Goodwill and Other – Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract."* ASU 2018-15 aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software (and hosting arrangements that include an internal-use software license). The guidance also requires the entity to expense the capitalized implementation costs of a hosting arrangement that is a service contract over the term of the hosting arrangement, which includes reasonably certain renewals. The guidance becomes effective for the Company in the year ending December 31, 2020 and early adoption is permitted. The Company will adopt this guidance in the first quarter of 2020 and expects there to be no material impact on its consolidated financial statements.

In June 2016, the FASB issued ASU 2016-13, " *Financial Instruments-Credit Losses (Topic 326)."* ASU 2016-13 significantly changes how entities will account for credit losses for most financial assets and certain other instruments that are not measured at fair value through net income. ASU 2016-13 replaces the existing incurred loss model with an expected credit loss model that requires entities to estimate an expected lifetime credit loss on most financial assets and certain other instruments, including short-term trade receivables and contract assets, and expands disclosure requirements for credit quality of financial assets. ASU 2016-13 becomes effective for the Company in the year ending December 31 , 2020 , including interim periods. Early adoption is permitted. The Company will adopt this guidance in the first quarter of 2020 . The Company continues to assess all potential impacts that the adoption of this guidance will have on its consolidated financial statements and is continuing to finalize its calculations for credit losses. Based on the composition of the Company's investment portfolio, accounts receivable, current market conditions and historical credit loss activity, the Company does not expect there to be a material impact on its consolidated financial position, results of operations or cash flows.

In December 2019, the FASB issued ASU 2019-12, " *Income Taxes (Topic 740) – Simplifying the Accounting for Income Taxes."* ASU 2019-12 simplifies the accounting for income taxes by removing certain exceptions to the general principles in Topic 740, including, but not limited to, the exception to the incremental approach for intraperiod tax allocation when there is a loss from continuing operations and income or a gain from other items, the exceptions related to the recognition of a deferred tax liability related to an equity method investment and the exception to methodology for calculating income taxes in an interim period when a year-to-date loss exceeds the anticipated loss for the year. ASU 2019-12 becomes effective for the Company in the year ended December 31, 2021, including interim periods. Early adoption is permitted. The Company is currently assessing the potential impact of the adoption of ASU 2019-12 on its consolidated financial statements.

Recently Issued Accounting Standard Updates – Adopted During the Period

In February 2016, the FASB issued ASU 2016-02, *"Leases (Topic 842)."* ASU 2016-02, along with subsequent ASUs issued to clarify certain provisions of ASU 2016-02 (collectively known as "ASC 842"), establishes a right-of-use ("ROU") model that requires a lessee to record a ROU asset and a lease liability on the consolidated balance sheet for all leases with terms longer than 12 months. Certain qualitative and quantitative disclosures are also required. The Company adopted ASU 2016-02 and related amendments on January 1, 2019 using an optional transition method allowed with the issuance of ASU 2018-11, *"Leases – Targeted Improvements (Topic 842),"* in July 2018. ASU 2018-11 gives entities the option to not provide comparative period financial statements and instead apply the transition requirements as of the effective date of the new standard. Pursuant to additional guidance under ASC 842, the Company also elected the optional package of practical expedients, which allowed the Company to not reassess: (i) whether expired or existing contracts contain leases; (ii) lease

classification for any expired or existing leases; and (iii) initial direct costs for any existing leases. As a result, the consolidated balance sheet prior to January 1, 2019 was not restated, continues to be reported under ASC 840, *"Leases",* which did not require the recognition of operating lease liabilities on the consolidated balance sheet, and is not comparative. Under ASC 842, all leases are required to be recorded on the balance sheet and are classified as either operating leases or finance leases, which is determined at the inception of the lease. The lease classification affects the expense recognition in the consolidated statements of comprehensive income. The expense recognition for operating leases and finance leases under ASC 842 is substantially consistent with ASC 840. Therefore, there is no significant difference in the Company's results of operations presented in its consolidated statements of comprehensive income for each period presented. The Company also elected under the package of practical expedients, to combine lease and non-lease components and not to record leases with an initial term of 12 months or less on the consolidated balance sheet. The Company adopted ASC 842 using the optional transition method for all leases existing at January 1, 2019. The adoption had a substantial impact on the Company's consolidated balance sheet. The most significant impact was the recognition of the operating lease ROU assets and lease liabilities for operating leases. Upon adoption, leases that were classified as operating leases under ASC 840 were classified as operating leases under ASC 842, and the Company recorded ROU assets of $17.0 million and lease liabilities of $21.0 million, before considering deferred taxes. The lease liability is based on the present value of the remaining minimum lease payments, determined under ASC 840, discounted using the Company's incremental borrowing rate at the effective date January 1, 2019. The difference between the ROU assets and the lease liabilities is due to $4.0 million of unamortized lease incentives and deferred rent at the Company's Marlborough and Waltham facilities as of December 31, 2018. There was no impact to the Company's beginning retained earnings upon adoption of ASC 842. See Note 4, *"Leases,"* below for more information on the Company's adoption of ASC 842.

3. Acquisitions

C Technologies

On April 25, 2019, Repligen agreed to acquire C Technologies, pursuant to the terms of a Stock Purchase Agreement (the "Agreement"), by and among Repligen, C Technologies and Craig Harrison, an individual and sole stockholder of C Technologies (such acquisition, the "C Technologies Acquisition").

C Technologies' business consists of two major product categories (i) biotechnology, or Biotech, and (ii) Legacy and Other. Through its Biotech category, C Technologies sells instruments, consumables and accessories that are designed to allow bioprocessing technicians to measure the protein concentration of a liquid sample using C Technologies' Slope Spectroscopy ® method, which eliminates the need for manual sample dilution. C Technologies' lead product, the SoloVPE instrument platform, was launched in 2008 for off-line and at-line protein concentration measurements conducted in quality control, process development and manufacturing labs in the production of biological therapeutics. C Technologies' FlowVPE platform, an extension of the SoloVPE technology, was designed to allow end users to make in-line protein concentration measurements in filtration, chromatography and fill-finish applications, designed to allow for real-time process monitoring.

Consideration Transferred

The C Technologies Acquisition was accounted for as a purchase of a business under ASC 805, *"Business Combinations"* . The C Technologies Acquisition was funded through payment of $195.0 million in cash, $186.0 million of which is consideration transferred pursuant to ASC 805, $9.0 million of which will be compensation expense for future employment, and t he issuance of 779,221 unregistered shares of the Company's common stock totaling $53.9 million for a total purchase price of $239.9 million. Under the acquisition method of accounting, the assets of C Technologies were recorded as of the acquisition date, at their respective fair values, and consolidated with those of Repligen. The fair value of the net tangible assets acquired was $7.1 million, the fair value of the intangible assets acquired was $90.8 million, and the residual goodwill was $142.0 million.

The consideration and purchase price information has been prepared using a valuation that required the use of significant assumptions and estimates. 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 Repligen believes to be reasonable ; however, actual results may differ from these estimates.

Total consideration transferred is as follows (amounts in thousands):

Cash consideration	$185,949
Equity consideration	53,938
Fair value of net assets acquired	**$239,887**

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 incurred $4.0 million in transaction costs in 2019. The transaction costs are included in selling, general and administrative expenses in the consolidated statements of comprehensive income. In connection with the transaction, an additional $9.0 million in cash will be due to employees based on their continued employment with the Company one year after the date of the close of the C Technologies Acquisition. For the year ended December 31, 2019, the Company recognized $5.2 million of compensation expense associated with this amount due to employees.

Fair Value of Net Assets Acquired

The allocation of purchase price is based on the fair value of assets acquired and liabilities assumed as of the acquisition date, based on the preliminary valuation. The Company obtains this information during due diligence and through other sources. In the months after closing, the Company may obtain additional information about these assets and liabilities as it learns more about C Technologies and will refine the estimates of fair value to more accurately allocate the purchase price. Only items identified as of the acquisition date are considered for subsequent adjustment. We will make appropriate adjustments to the purchase price allocation, if any, prior to the completion of the measurement period, which is up to one year from the acquisition date. The components and allocation of the purchase price consists of the following amounts (amounts in thousands):

Cash and cash equivalents	$ 3,795
Restricted cash	26,933
Accounts receivable	3,044
Inventory	3,783
Prepaid expenses and other current assets	93
Fixed assets	40
Operating lease right of use asset	3,836
Customer relationships	59,680
Developed technology	28,920
Trademark and tradename	1,570
Non-competition agreements	660
Goodwill	142,021
Deferred taxes	895
Accounts payable	(436)
Accrued liabilities	(2,474)
Accrued bonus	(26,928)
Deferred revenue	(1,709)
Operating lease liability	(51)
Operating lease liability, long-term	(3,785)
Fair value of net assets acquired	**$239,887**

Acquired Goodwill

The goodwill of $142.0 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. Substantially all of the goodwill recorded is expected to be deductible for income tax purposes. Pursuant to the Company's business combination accounting policy included in Note 2, *"Summary of Significant Accounting Policies – Business Combinations, Goodwill and Intangible Assets,"* the Company recorded goodwill adjustments for the effects on goodwill of changes to net assets acquired during the period that such change is identified, provided that any such change is within the measurement period (up to one year from the date of the acquisition). In December 2019, the Company recorded a deferred tax asset for the C Technologies Acquisition of $0.9 million as an adjustment to goodwill.

Intangible Assets

The following table sets forth the components of the identified intangible assets associated with the C Technologies Acquisition and their estimated useful lives:

	Useful life	Fair Value (Amounts in thousands)
Customer relationships	17 years	$ 59,680
Developed technology	18 years	28,920
Trademark and tradename	20 years	1,570
Non-competition agreements	4 years	660
Total		$ 90,830

Revenue, Net Income and Pro Forma Presentation

The Company recorded revenue from C Technologies of $ 16.4 million and a net loss of $7.4 million from May 31, 2019, the date of acquisition, to December 31, 2019. The Company has included the operating results of C Technologies in its consolidated statements of comprehensive income since the May 31, 2019 acquisition date. The following pro forma financial information presents the combined results of operations of Repligen and C Technologies as if the acquisition had occurred on January 1, 2018 after giving effect to certain pro forma adjustments. These pro forma adjustments include amortization expense on the acquired identifiable intangible assets, adjustments to stock-based compensation expense for equity compensation issued to C Technologies employees and the income tax effect of the adjustments made. In addition, acquisition-related transaction costs and an accounting adjustment to record inventory at fair value were excluded from pro forma net income in 2019.

The following pro forma financial information does not reflect any adjustments for anticipated expense savings resulting from the acquisition and is not necessarily indicative of the operating results that would have actually occurred had the transaction been consummated on January 1, 2018 or of future results:

	December 31,	
	2019	2018
	(Amounts in thousands, except per share data)	
Total revenue	$279,434	$217,739
Net income	$ 23,394	$ 21,195
Earnings per share:		
Basic	$ 0.48	$ 0.44
Diluted	$ 0.48	$ 0.43

Prior to the C Technologies Acquisition, C Technologies did not generate monthly or quarterly financial statements that were prepared in accordance with U.S. GAAP.

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 ("HF") cartridges, benchtop 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, TFF systems and single-use flow path consumables, as well as its Spectra/Por ® portfolio of laboratory dialysis products and its ProConnex single-use hollow fiber Module-Bag-Tubing sets. Outside of filtration, Spectrum products include 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 $122.9 million in cash, the issuance of 6,153,995 unregistered shares of the Company's common stock totaling $ 247.6 million and a working capital adjustment of $ 0.4 million 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 $ 370.9 million.

The consideration and 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 (amounts 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 incurred $2.9 million and $7.1 million in integration costs related to the Spectrum Acquisition in 2018 and 2017, respectively. These costs are primarily included in selling, general and administrative expenses in the consolidated statements of comprehensive income.

Revenue, Net Income and Pro Forma Presentation

The Company recorded revenue from Spectrum of $19.4 million from August 1, 2017 through December 31, 2017. The Company has included the operating results of Spectrum in its consolidated statements of comprehensive income 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 (amounts in thousands, except per share data):

	December 31, 2017
Total revenue	$ 162,913
Net income (loss)	$ 17,220
Earnings (loss) per share:	
Basic	$ 0.41
Diluted	$ 0.40

The unaudited pro forma information for the years ended December 31, 2017 was calculated after applying the Company's accounting policies and the impact of acquisition date fair value adjustments. Unaudited pro forma net income for year ended December 31, 2017 was adjusted to exclude acquisition-related transaction costs, nonrecurring expenses related to the fair value adjustments associated with the acquisition and income tax benefits resulting from the acquisition. In addition, the unaudited pro forma net income for the year ended December 31, 2017 was adjusted to include incremental amortization of intangible assets. These items have been factored to the unaudited pro forma net income for the year ended December 31, 2017.

These pro forma condensed consolidated financial results have been prepared for comparative purposes only and include certain adjustments to reflect the pro forma results of operations as if the acquisition had occurred as of the beginning of the periods presented, such as fair value adjustments to inventory and increased amortization for the fair value of acquired intangible assets. 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 combination occurred at the beginning of each period presented, or of future results of the consolidated entities.

4. Leases

On January 1, 2019, the Company adopted ASC 842 using the optional transition method which allows entities to initially apply the lease accounting transition requirements at the adoption date and recognize a cumulative effect adjustment to the opening balance sheet of retained earnings in the period of adoption without restating comparative prior periods presented. The Company recorded operating lease right of use assets of $17.0 million and operating lease liabilities of $21.0 million as of January 1, 2019. The difference between the right of use assets and the lease liabilities was due to $4.0 million of unamortized lease incentives and deferred rent at the Company's Waltham and Marlborough facilities as of December 31, 2018.

The Company is a lessee under leases of manufacturing facilities, office spaces, machinery, certain office equipment, vehicles and information technology equipment. A majority of the Company's leases are operating leases with remaining lease terms between two months and 11 years. Finance leases are immaterial to the Company's consolidated financial statements. The Company determines if an arrangement qualifies as a lease and what type of lease it is at inception. The Company elected the package of practical expedients permitted under the transition guidance within the new lease standard, which among other things, allowed it to continue to account for existing leases based on the historical lease classification. The Company also elected the practical expedients to combine lease and non-lease components and to exclude right of use assets and lease liabilities for leases with an initial term of 12 months or less from the balance sheet.

Some of the lease agreements the Company enters into include Company options to either extend and/or early terminate the lease, the costs of which are included in the Company's operating lease liabilities to the extent that such options are reasonably certain of being exercised. Leases with renewal options allow the Company to extend the lease term typically between 1 and 5 years per option, some of its leases have multiple options to extend.

When determining if a renewal option is reasonably certain of being exercised, the Company considers several economic factors, including but not limited to, the significance of leasehold improvements incurred on the property, whether the asset is difficult to replace, underlying contractual obligations, or specific characteristics unique to that particular lease that would make it reasonably certain that the Company would exercise such options.

As of December 31, 2019, operating lease right of use assets were $25.7 million and operating lease liabilities were $30.6 million. Two material leases, as defined under ASC 842, to expand the Company's facility in Waltham, Massachusetts commenced during the third quarter of 2019. As a result, the operating right of use asset and operating lease liability balances increased by a total of $6.1 million on their commencement dates. Amounts related to financing leases were immaterial. The maturity of the Company's operating lease liabilities as of December 31, 2019 are as follows (amounts in thousands):

As of December 31, 2019	Amount
2020	$ 3,692
2021	5,812
2022	4,830
2023	3,911
2024	3,514
2025 and thereafter	16,511
Total future minimum lease payments	38,270
Less: amount of lease payment representing interest	7,718
Total operating lease liabilities	$30,552

Total operating lease liabilities is included on the Company's consolidated balance sheet is as follows (amounts in thousands):

	As of December 31, 2019
Operating lease liability	$ 3,557
Operating lease liability, long-term	26,995
Minimum operating lease payments	$ 30,552

Lease expense for these leases is recognized on a straight-line basis over the lease term, with variable lease payments recognized in the period those payments are incurred. For the year ended December 31, 2019, total lease cost is comprised of the following:

Lease Cost	Year Ended December 3 1 , 2019 (Amounts in thousands)
Operating lease cost	$ 4,480
Variable operating lease cost	1,480
Lease cost	$ 5,960

The following information represents supplemental disclosure for the consolidated statements of cash flows related to operating leases (amounts in thousands):

	Year Ended December 31, 2019
Operating cash flows from operating leases	$ (4,004)

Most of the leases do not provide implicit interest rates and therefore the Company determines the discount rate based on its incremental borrowing rate. The incremental borrowing rate for the Company's leases is determined based on lease term and currency in which the lease payments are made.

The weighted average remaining lease term and the weighted average discount rate used to measure the Company's operating lease liabilities as of December 31, 2019 were:

Weighted average remaining lease term (years)	8.05
Weighted average discount rate	4.91%

5. 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 sheets.

Disaggregation of Revenue

Revenue for the years ended December 31, 2019, 2018 and 2017 was as follows (amounts in thousands, except percentages):

	For the Years Ended December 31,		
	2019	2018	2017
	(Amounts in thousands)		
Product r evenue	$270,097	$193,891	$141,089
Royalty and other income	148	141	147
Total revenue	$270,245	$194,032	$141,236

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.

Disaggregated revenue from contracts with customers by geographic region can be found in Note 2., *"Summary of Significant Accounting Policies – Segment Reporting,"* above.

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

	For the Years Ended December 31,		
	2019	2018	2017
MilliporeSigma	$36,190	$29,843	$25,061
GE Healthcare	$31,441	$29,616	$30,150

Chromatography Products

The Company's chromatography products include 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 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.

Filtration Products

The Company's filtration products generate revenue through the sale of KrosFlo HF TFF membranes and modules, ProConnex single-use flow path assemblies, flat sheet TFF cassettes and hardware, and XCell ATF devices and related consumables.

The Company markets its portfolio of HF filtration solutions, including our KrosFlo TFF Systems with Konduit monitor and the ProConnex line of single-use flow path assemblies which were acquired as part of the acquisition of Spectrum LifeSciences, LLC (the "Spectrum Acquisition"). 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.

The Company's other filtration 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. 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 SIUS TFF cassettes and hardware are not highly interdependent of one another and are therefore considered distinct products that represent separate performance obligations. Product revenue from the sale off SIUS TFF Cassettes and hardware 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. XCell 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 XCell ATF system and therefore represent a distinct performance obligation. XCell 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. XCell 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.

Process Analytics Products

On May 31, 2019, the Company consummated its acquisition of C Technologies and added a fourth franchise, Process Analytics, to its bioprocessing business. The Process Analytics franchise generates revenue primarily through the sale of the SoloVPE and FlowVPE Slope Spectroscopy systems. These products will complement and support the Company's existing Filtration, Chromatography and Proteins franchises as they allow end users to make in-line protein concentration measurements in filtration, chromatography and fill-finish applications, designed to allow for real-time process monitoring.

Protein Products

The Company's Protein franchise generates revenue through the sale of Protein A affinity ligands and growth factors. Protein A ligands are 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). The Company also manufactures growth factors for sale under long-term supply agreements with certain life sciences companies as well as direct sales to its customers. 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 .

Other Products

The Company's other products include operating room products sold to hospitals. 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 December 31, 2019 (amounts in thousands):

	2019
Balances from contracts with customers only:	
Accounts receivable	$43,068
Deferred revenue (included in accrued liabilities in the consolidated balance sheets)	5,005
Revenue recognized during 2019 relating to:	
The beginning deferred revenue balance	$ 833
Changes in pricing related to products or services satisfied in previous periods	—

The timing of revenue recognition, billings and cash collections results in the accounts receivables and deferred revenue balances on the Company's consolidated balance sheets. There were no impairment losses on receivables during the year ending December 31, 2019.

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.

6. Goodwill and Intangible Assets

Goodwill

Goodwill represents the difference between the purchase price and the estimated fair value of identifiable assets acquired and liabilities assumed. Goodwill acquired in a business combination and determined to have an indefinite useful life is not amortized, but instead is tested for impairment at least annually in accordance with ASC 350. The following table represents the changes in the carrying value of goodwill for the years ended December 31, 2019 and 2018 (amounts in thousands):

Balance as of December 31, 2017	$327,333
Goodwill adjustment related to Spectrum Lifesciences, LLC acquisition	203
Cumulative translation adjustment	(801)
Balance as of December 31, 2018	$326,735
Acquisition of C Technologies, Inc.	142,021
Cumulative translation adjustment	(343)
Balance as of December 31, 2019	$468,413

(1) I n December 2019, the Company recorded a deferred tax asset for the C Technologies acquisition of $0.9 million as an adjustment to goodwill.

During each of the fourth quarters of 2019, 2018 and 2017, the Company completed its annual impairment assessments and concluded that goodwill was not impaired in any of those years.

Intangible Assets

Intangible assets with a definitive life are amortized over their useful lives using the straight-line method and the amortization expense is recorded within cost of product revenue and selling, general and administrative expense in the Company's cons o li dated statements of comprehensive income. 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 the Company's products or changes in the size of the market for the Company's products. If impairment indicators are present, the Company determines whether the underlying intangible asset is recoverable through estimated future undiscounted cash flows. If the asset is not found to be recoverable, it is written down to the estimated fair value of the asset based on the sum of the future discounted cash flows expected to result from the use and disposition 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 definite-lived intangible assets are recoverable at December 31, 2019.

Indefinite-lived intangible assets are tested for impairment at least annually. There has been no impairment of our intangible assets for the periods presented.

Intangible assets, net consisted of the following at December 31, 2019:

	December 31, 2019			
	Gross Carrying Value	Accumulated Amortization	Net Carrying Value	Weighted Average Useful Life (in years)
	(Amounts in thousands)			
Finite-lived intangible assets:				
Technology - developed	$ 82,169	$ (9,669)	$ 72,500	19
Patents	240	(240)	—	8
Customer relationships	160,825	(25,642)	135,183	15
Trademarks	3,752	(333)	3,419	20
Other intangibles	1,697	(947)	750	3
Total finite-lived intangible assets	248,683	(36,831)	211,852	16
Indefinite-lived intangible asset:				
Trademarks	700	—	700	—
Total intangible assets	$249,383	$ (36,831)	$212,552	

Intangible assets consisted of t h e following at December 31, 2018:

	December 31, 2018			
	Gross Carrying Value	Accumulated Amortization	Net Carrying Value	Weighted Average Useful Life (in years)
	(Amounts in thousands)			
Finite-lived intangible assets:				
Technology - developed	$ 53,315	$ (5,942)	$ 47,373	19
Patents	240	(240)	—	8
Customer relationships	101,460	(16,609)	84,851	14
Trademarks	2,160	(159)	2,001	20
Other intangibles	1,061	(548)	513	3
Total finite-lived intangible assets	158,236	(23,498)	134,738	16
Indefinite-lived intangible asset:				
Trademarks	700	—	700	—
Total intangible assets	$158,936	$ (23,498)	$135,438	

Amortization expense for finite-lived intangible assets was $13.6 million, $10.6 million and $6.2 million for the years ended December 31, 2019, 2018 and 2017, respectively. As of December 31, 2019, the Company expects to record the following amortization expense (amounts in thousands):

For the Years Ended December 31,	Estimated Amortization Expense
2020	$ 15,288
2021	14,813
2022	14,811
2023	14,715
2024	14,273
2025 and thereafter	137,952
Total	$ 211,852

7. Consolidated Balance Sheet Detail

Inventories, net

Inventories, net consists of the following:

	December 31,	
	2019	2018
	(Amounts in thousands)	
Raw materials	$ 29,328	$ 24,937
Work-in-process	8,360	5,185
Finished products	17,144	12,141
Total inventories, net	$ 54,832	$ 42,263

Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets consist of the following:

	December 31,	
	2019	2018
	(Amounts in thousands)	
Equipment maintenance and services	$ 1,662	$ 1,677
Prepaid taxes	2,719	843
Prepaid insuran c e	80	629
Deferred costs	—	55
Other	1,456	697
Total prepaid expenses and other current assets	$ 5,917	$ 3,901

Property, Plant and Equipment

Property, plant and equipment consist of the following:

	December 31,	
	2019	2018
	(Amounts in thousands)	
Land	$ 1,023	$ 1,023
Buildings	764	764
Leasehold improvements	23,905	16,259
Equipment	36,257	24,092
Furniture, fixtures and office equipment	6,312	4,914
Computer hardware and software	8,810	534
Construction in progress [(1)]	6,707	12,906
Other	56	—
Total property, plant and equipment	83,834	60,492
Less - Accumulated depreciation	(35,379)	(28,312)
Total property, plant and equipment, net	$ 48,455	$ 32,180

(1) Construction in progress as of December 31, 2019 primarily includes $4.2 million for the buildout of the Company's Waltham and Marlborough, Massachusetts facilities, $1.1 million of other manufacturing improvements in Waltham and Marlboro, $0.6 million in manufacturing improvements at the Company's Rancho Dominguez, California facility and $0.4 million for a buildout at the Company's Bridgewater, New Jersey facility. Construction in progress as of December 31, 2018 includes $7.3 million for the buildout of the Company's Marlborough facility, $2.1 million in capitalized internal-use software development costs and $2.1 million for a casting machine, among other projects.

Depreciation expense totaled $7.3 million, $5.2 million and $4.2 million in the fiscal years ended December 31, 2019, 2018 and 2017, respectively.

Accrued Liabilities

Accrued liabilities consist of the following:

	December 31,	
	2019	2018
	(Amounts in thousands)	
Employee compensation	$ 19,850	$ 9,953
Taxes	3,874	1,024
Royalty and license fees	123	242
Warranties	1,500	546
Professional fees	1,081	942
Deferred revenue	5,005	1,290
Other	1,898	1,868
Total accrued liabilities	$ 33,331	$ 15,865

8. Income Taxes

The components of income before income taxes are as follows:

	For the Years Ended December 31,		
	2019	2018	2017
	(Amounts in thousands)		
Domestic	$ (5,432)	$ (73)	$ (6,709)
Foreign	31,583	21,509	13,957
Income before income taxes	$ 26,151	$ 21,436	$ 7,248

The components of the income tax provision (benefit) are as follows:

	For the Years Ended December 31,		
	2019	2018	2017
	(Amounts in thousands)		
Components of the income tax provision (benefit):			
Current	$ 8,290	$ 4,354	$ 3,624
Deferred	(5,287)	465	(24,729)
Equity	1,737	—	—
Total	$ 4,740	$ 4,819	$ (21,105)
Jurisdictional components of the income tax provision (benefit):			
Federal	$ (965)	$ (393)	$ (24,012)
State	(1,764)	718	(438)
Foreign	7,469	4,494	3,345
Total	$ 4,740	$ 4,819	$ (21,105)

During 2019 , the Company generated $0.1 million in foreign net operating losses and $0.2 million in state net operating losses. During 2018, the Company utilized its remaining U.S. net operating loss carryforwards of $ 19.5 million. At December 31, 201 9 , the Company had federal business tax credit carryforwards of $1.2 million and state business tax credit carryforwards of $ 0.9 million available to reduce future domestic income taxes. The business tax credits carryforwards will expire at various dates through December 2039. The business tax credit carryforwards are subject to review and possible adjustment by the Internal Revenue Service and may be limited in the event of certain changes in the ownership interest of significant stockholders.

The components of deferred income taxes are as follows:

	December 31,	
	2019	2018
	(Amounts in thousands)	
Deferred tax assets:		
Temporary timing differences:		
Stock-based compensation expense	$ 2,922	$ 2,874
Contingent consideration	2,206	2,263
Operating leases	7,295	—
Accrued bonus	1,379	3
Other	4,994	3,585
Total temporary timing differences	18,796	8,725
Net operating loss carryforwards	221	—
Tax business credits carryforwards	924	2,004
Total deferred tax assets	19,941	10,729
Less: valuation allowance	(6)	(131)
Net deferred tax assets	19,935	10,598
Deferred tax liabilities:		
Goodwill	(1,288)	(1,076)
Fixed assets	(1,650)	(956)
Acquired intangible assets	(26,811)	(26,903)
Operating lease right of use assets	(6,144)	—
Conversion option on convertible notes	(11,066)	(2,394)
Total deferred tax liabilities	(46,959)	(31,329)
Total net deferred tax liabilities	$(27,024)	$(20,731)

The net change in the total valuation allowance for the year ended December 31, 2019 and 2018 was a decrease of $0.1 million and an increase of $0.1 million, respectively.

The reconciliation of the federal statutory rate to the effective income tax rate for the years ended December 31, 2019, 2018 and 2017 is as follows:

	For the Years Ended December 31,					
	2019		2018		2017	
	Amount	%	Amount	%	Amount	%
	(Amounts in thousands, except percentages)					
Income before income taxes	$26,151		$21,436		$ 7,248	
Expected tax at statutory rate	5,492	21.0%	4,502	21.0%	2,537	35.0%
Adjustments due to:						
Difference between U.S. and foreign tax	436	1.7%	345	1.6%	(1,797)	(24.8%)
State income and franchise tax	(179)	(0.7%)	91	0.4%	(307)	(4.2%)
Business tax credits	(2,746)	(10.5%)	(1,760)	(8.2%)	(708)	(9.8%)
Permanent differences:						
Stock-based compensation expense	(1,877)	(7.2%)	(1,213)	(5.7%)	(946)	(13.1%)
Transaction costs	—	0.0%	—	0.0%	1,232	17.0%
U.S. taxation of foreign earnings	2,227	8.5%	2,190	10.2%	—	0.0%
Executive compensation	841	3.2%	367	1.7%	265	3.7%
Other	92	0.4%	97	0.5%	205	2.8%
Change in U.S. federal tax rates	—	0.0%	—	0.0%	(12,839)	(177.1%)
Change in U.S. state tax rates	—	0.0%	748	3.5%	(151)	(2.1%)
Change in Netherlands tax rate	(193)	(0.7%)	(388)	(1.8%)	—	0.0%
Transition tax	—	0.0%	(1,338)	(6.2%)	3,266	45.1%
Uncertain tax provisions	1,069	4.1%	1,021	4.8%	241	3.3%
Change in valuation allowance	(125)	(0.5%)	125	0.6%	(12,164)	(167.8%)
Return to provision adjustments	(79)	(0.3%)	33	0.2%	(161)	(2.2%)
Other	(218)	(0.8%)	(1)	(0.1%)	222	3.0%
Income tax provision (benefit)	$ 4,740	18.1%	$ 4,819	22.5%	$(21,105)	(291.2%)

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	2016 - 2019
Sweden	2012 - 2019
Germany	2017 - 2019
Netherlands	2013 - 2019

The following is a tabular reconciliation of the total amounts of unrecognized tax benefits:

	For the Years Ended December 31,	
	2019	2018
	(Amounts in thousands)	
Balance of gross unrecognized tax benefits, beginning of period	$ 2,852	$ 1,806
Gross amounts of increases in unrecognized tax benefits as a result of tax positions taken in the current period	602	1,062
Gross amounts of decreases in unrecognized tax benefits as a result of tax positions taken in the prior period	(16)	—
Gross amounts of decrease due to release	(16)	(16)
Balance of gross unrecognized tax benefits, end of period	$ 3,422	$ 2,852

Included in the balance of unrecognized tax benefits as of December 31, 2019 are $ 3.4 million of tax benefits that, if recognized, would affect the effective tax rate. The Company classifies interest and penalties related to income taxes as components of its income tax provision. The amount of interest and penalties recorded in the accompanying consolidated statements of comprehensive income was approximately $5,000 for the year ended December 31, 2019 and approximately $1,000 for the years ended December 31, 2018 and 2017, respectively. The amount of interest and penalties recorded in the accompanying consolidated balance sheets was approximately $41,000 and $46,000 as of December 31, 2019 and 2018, respectively. The Company does not anticipate the amount of unrecognized tax benefits to change over the next twelve months.

As of December 31, 201 9 , the Company has accumulated undistributed earnings generated by its foreign subsidiaries of approximately $ 93.5 million. Because $ 58.0 million of such earnings have previously been subject to the one-time transition tax on foreign earnings required by the 2017 Tax Act, any additional taxes due with respect to such earnings or the excess of the amount for financial reporting over the tax basis of the Company's foreign investments would generally be limited to foreign and state taxes. At December 31, 2019, the Company has not provided for taxes on outside basis differences of its foreign subsidiaries, as the Company has the ability and intent to indefinitely reinvest the undistributed earnings of its foreign subsidiaries, and there are no needs for such earnings in the United States that would contradict its plan to indefinitely reinvest.

ASU 2016-16, *"Intra-Entity Transfers of Assets Other Than Inventory,"* 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 $ 5.7 million to other assets, a decrease of $ 5.0 million to deferred tax liabilities and a decrease of $ 0.7 million to accumulated deficit at January 1, 2018.

On December 22, 2017, President Trump signed into law H.R. 1/Public Law No. 115-97, the tax legislation commonly known as the Tax Cuts and Jobs Act (the "2017 Tax Act"). 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.

In December 2017, the SEC staff issued Staff Accounting Bulletin No. 118 ("SAB 118") to address the application of GAAP in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of H.R.1. The Company recognized the provisional tax impacts related to deemed repatriated earnings and the revaluation of deferred tax assets and liabilities and included these amounts in its consolidated financial statements for the year ended December 31, 2017. During 2018, final adjustments noted below have been made to the provisional amounts recorded during 2017, and the Company has now completed its accounting for various tax impacts of the Act.

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 $ 12.8 million in the year ended December 31, 2017 for the reduction in its US deferred tax assets and liabilities resulting from the rate change. The accounting for this item is complete and no adjustments were made to this amount during 2018.

The Act included 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 Company's provisional amount recorded at December 31, 2017 increased its tax provision by $ 3.3 million. As of December 31, 2018, the accounting for this item was complete.

The Company is subject to a territorial tax system under the Act, in which the Company is required to provide for tax on Global Intangible Low-Taxed Income ("GILTI") earned by certain foreign subsidiaries. The Company has adopted an accounting policy to provide for the tax expense related to GILTI in the year the tax is incurred as a period expense.

9. Stockholders' Equity

Public Offerings of Common Stock

On July 19, 2019, the Company completed a public offering in which 1,587,000 shares of its common stock, including the underwriters' exercise in full of an option to purchase an additional 207,000 shares, were sold to the public at a price of $87.00 per share (the " July Stock Offering"). The net proceeds of the Stock Offering, after deducting underwriting discounts and commissions and other estimated offering expenses payable by the Company, were approximately $131.1 million.

On May 3, 2019, the Company completed a public offering in which 3,144,531 shares of its common stock, including the underwriters' f ull exercise of an option to purchase up to an additional 410,156 shares, were sold to the public at a price of $64.00 per share. The total proceeds received by the Company from this offering, net of underwriting discounts and commissions and other estimated offering expenses payable by the Company, totaled approximately $189.6 million.

On July 3, 2017, the Company completed a public offering in which 2,807,017 shares of its common stock were sold to the public at a price of $42.75 per share. The underwriters were granted an option, which they exercised in full, to purchase an additional 421,052 shares of the Company's common stock. The total proceeds from this offering, net of underwriting discounts, commissions and other offering expenses, totaled $129.3 million.

Stock Option and Incentive Plans

At the Company's 2018 A nnual M eeting of Stockholders held on May 16, 2018, the Company's shareholders approved the 2018 Stock Option and Incentive Plan (the "2018 Plan"). Under the 2018 Plan the number of shares of the Company's common stock that are reserved and available for issuance shall be 2,778,000 plus the number of shares of common stock available for issuance under the Company's Amended and Restated 2012 Stock Option and Incentive Plan (the "2012 Plan"). The shares of common stock underlying any awards under the 2018 Plan, 2012 Plan and the Second Amended and Restated 2001 Repligen Corporation Stock Plan (the "2001 Plan," and together with the 2018 Plan and 2012 Plan, the "Plans") that are forfeited, canceled or otherwise terminated (other than by exercise) shall be added back to the shares of stock available for issuance under the 2018 Plan. At December 31, 2019, 2,555,281 shares were available for future grant under the 2018 Plan.

Stock-Based Compensation

The Company recorded stock-based compensation expense of $12.8 million, $10.2 million and $6.7 million for the years ended December 31, 2019, 2018 and 2017, respectively, for share-based awards granted under the Plans. The following table presents stock-based compensation expense in the Company's consolidated statements of comprehensive income:

	For the Years Ended December 31,		
	2019	2018	2017
	(Amounts in thousands)		
Cost of product revenue	$ 1,368	$ 1,019	$ 704
Research and development	1,373	917	481
Selling, general and administrative	10,106	8,256	5,562
Total stock-based compensation	$12,847	$10,192	$6,747

The 2018 Plan allows for the granting of incentive and nonqualified options to purchase shares of common stock, restricted stock and other equity awards. Except for the grant to the Company's Chief Executive Officer ("CEO") in 2018 mentioned below, 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 and consultants 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 CEO which consisted 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 December 31, 2019, options to purchase 957,559 shares and 734,984 stock unit s were outstanding under the Plans.

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 stock unit s . 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 employees related to the Spectrum Acquisition which were tied to the achievement of certain 2018 revenue and gross margin metrics and the passage of time. Additionally, in the first quarter of 2018 and again in the first quarter of 2019, the Company issued performance stock units to certain individuals which are tied to the achievement of certain annual revenue and return on invested capital metrics. 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.

The fair value of share-based awards granted during the years ended December 31, 2019, 2018 and 2017 were calculated using the following estimated assumptions:

	For the Years Ended December 31,		
	2019	2018	2017
Expected term (in years)	5.5 - 6.5	5.5 - 7.5	6.1
Expected volatility (range)	45.14 – 50.87 %	45.14 – 50.87 %	51.48%
Risk-free interest rate	1.55 – 2.56 %	2.63 – 2.96 %	1.88 – 1.99 %
Expected dividend yield	0%	0%	0%

Information regarding option activity for the year ended December 31, 2019 under the Plans is summarized below:

	Shares	Weighted average exercise price	Weighted-Average Remaining Contractual Term (in Years)	Aggregate Intrinsic Value (in Thousands)
Options outstanding at December 31, 2018	998,226	$ 27.54		
Granted	54,996	$ 64.14		
Exercised	(87,663)	$ 13.30		
Forfeited/expired/cancelled	(8,000)	$ 43.60		
Options outstanding at December 31, 2019	957,559	$ 30.81	6.69	$ 59,073
Options exercisable at December 31, 2019	513,577	$ 24.44	5.39	$ 34,954
Vested and expected to vest at December 31, 2019 [1]	923,355		6.63	$ 57,235

(1) Represents the number of vested options as of December 31, 2019 plus the number of unvested options expected to vest as of December 31, 2019 based on the unvested outstanding options at December 31, 2019 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 December 31, 2019, the last business day of 2019, of $92.50 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 December 31, 2019. The aggregate intrinsic value of stock options exercised during the years ended December 31, 2019, 2018 and 2017 was $5.5 million, $5.3 million and $5.3 million, respectively.

The weighted average grant date fair value of options granted during the years ended December 31, 2019, 2018 and 2017 was $31.27, $18.90 and $16.94, respectively. The total fair value of stock options that vested during the years ended December 31, 2019, 2018 and 2017 was $3.1 million, $2.3 million and $2.2 million, respectively.

The fair value of stock units is calculated using the closing price of the Company's common stock on the date of grant. Information regarding stock unit activity , which includes activity for restricted stock units and performance stock units, for the year ended December 31 , 2019 under the Plans is summarized below:

	Shares	Weighted-Average Remaining Contractual Term (in Years)	Aggregate Intrinsic Value (in Thousands)
Unvested at December 31, 2018	705,413		
Awarded	328,812		
Vested	(251,776)		
Forfeited/expired/cancelled	(47,465)		
Unvested at December 31, 2019	734,984	3.81	$ 67,986
Vested and expected to vest at December 31, 2019 (1)	675,618	3.34	$ 62,495

(1) Represents the number of vested stock units as of December 31, 2019 plus the number of unvested stock units expected to vest as of December 31, 2019 based on the unvested outstanding stock units at December 31, 2019 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 December 31, 2019, the last business day of 2019, of $92.50 per share, as stock units do not have an exercise price) that would have been received by the stock unit holders had all holders exercised on December 31, 2019. The aggregate intrinsic value of stock units vested during the years ended December 31, 2019, 2018 and 2017 was $17.5 million, $6.2 million and $4.0 million, respectively.

The weighted average grant date fair value of stock units granted during the years ended December 31, 2019, 2018 and 2017 was $49.68, $30.30 and $26.03, respectively. The total fair value of stock units that vested during the years ended December 31, 2019, 2018 and 2017 was $8.5 million, $4.6 million and $4.0 million, respectively.

As of December 31, 2019, there was $36.4 million 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 4.09 years. The Company expects 1,688,497 unvested options and stock units to vest over the next five years.

10. Commitments and Contingencies

Licensing and Research Agreements

The Company licenses certain technologies that are, or may be, incorporated into its technology under several agreements and also has entered into several clinical research agreements which require the Company to fund certain research projects. Generally, the license agreements require the Company to pay annual maintenance fees and royalties on product sales once a product has been established using the technologies. Research and development expenses associated with license agreements were immaterial amounts for the years ended December 31, 2019, 2018 and 2017.

In September 2018, the Company entered into a collaboration agreement with Sartorius Stedim Biotech ("SSB"), a leading international supplier for the biopharmaceutical industry, to integrate our XCell ATF cell retention control technology into Sartorius's BIOSTAT ® STR large-scale, single-use bioreactors to create novel perfusion-enabled bioreactors. As a result of this collaboration, end-users will stand to benefit from a single control system for 50 L to 2,000 L bioreactors used in perfusion cell culture applications. The single interface is designed to control cell growth, fluid management and cell retention in continuous and intensified bioprocessing and, ultimately, simplify the development and manufacture of biotechnological drugs under current good manufacturing practices.

In June 2018, the Company secured an agreement with Navigo for the exclusive co-development of multiple affinity ligands for which Repligen holds commercialization rights. The Company is manufacturing and has agreed to supply the first of these ligands, NGL-Impact ™ A, exclusively to Purolite Life Sciences ("Purolite"), who will pair the Company's high-performance ligand with Purolite's agarose jetting base bead technology used in their Jetted A50 Protein A resin product. We also signed a long-term supply agreement with Purolite for NGL-Impact A and other potential additional affinity ligands that may advance from the Company's Navigo collaboration. The Navigo and Purolite agreements are supportive of the Company's strategy to secure and reinforce the Company's proteins business. The Company made payments to Navigo of $ 1.0 million and $ 2.4 million in the years ended December 31 , 2019 and 2018 , respectively, in connection with this program, which are recorded to research and development expenses in the Company's consolidated statement s of comprehensive income.

Purchase Orders, Supply Agreements and Other Contractual Obligations

In the normal course of business, the Company has entered into purchase orders and other agreement with manufacturers, distributors and others. Outstanding obligations at December 31, 2019 of $39.1 million are expected to be completed within one year.

Legal Proceedings

From time to time , in the normal course of its operations, the Company is subject to litigation matters and claims relating to employee relations, business practices and patent infringement. Litigation can be expensive and disruptive to normal business operations. Moreover, the results of complex legal proceedings are difficult to predict and the Company's view of these matters may change in the future as the litigation and events related thereto unfold. The Company expenses legal fees as incurred. The Company records a provision for contingent losses when it is both probable that a liability has been incurred and the amount of the loss can be reasonably estimated. An unfavorable outcome to any legal matter, if material, could have an adverse effect on the Company's operations or its financial results.

11. Convertible Senior Notes

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

	December 31,	
	2019	2018
	(Amounts in thousands)	
0.375% convertible senior notes due 2024:		
Principal amount	$ 287,500	$ —
Unamortized debt discount	(47,921)	—
Unamortized debt issuance costs	(6,812)	—
2.125% convertible senior notes due 2021:		
Principal amount	—	114,989
Unamortized debt discount	—	(9,781)
Unamortized debt issuance costs	—	(1,720)
Total convertible senior notes	$ 232,767	$ 103,488

0.375% Convertible Senior Notes due 2024

On July 19, 2019, the Company issued $287.5 million aggregate principal amount of 0.375% Convertible Senior Notes due 2024 ("2019 Notes"), which includes the underwriters' exercise in full of an option to purchase an additional $37.5 million aggregate principal amount of 2019 Notes (the "Notes Offering"). The net proceeds of the Notes Offering, after deducting underwriting discounts and commissions and other related offering expenses payable by the Company, were approximately $278.5 million.

The 2019 Notes are senior, unsecured obligations of the Company, and bear interest at a rate of 0.375% per year. Interest is payable semi-annually in arrears on January 15 and July 15 of each year, beginning on January 15, 2020. The 2019 Notes will mature on July 15, 2024, unless earlier repurchased or converted in accordance with their terms. The initial conversion rate for the 2019 Notes is 8.6749 shares of the Company's common stock per $1,000 principal amount of 2019 Notes (which is equivalent to an initial conversion price of approximately $115.28 per share). Prior to the close of business on the business day immediately preceding April 15, 2024, the 2019 Notes will be convertible at the option of the holders of 2019 Notes only upon the satisfaction of specified conditions and during certain periods. Thereafter until the close of business on the second scheduled trading day immediately preceding the maturity date, the 2019 Notes will be convertible at the options of the holders of 2019 Notes at any time regardless of these conditions. Conversion of the 2019 Notes will be settled in cash, shares of the Company's common stock or a combination thereof, at the Company's election. The 2019 Notes are not redeemable by the Company prior to maturity.

Holders of 2019 Notes may require the Company to repurchase their 2019 Notes upon the occurrence of a fundamental change prior to maturity at a repurchase price equal to 100% of the principal amount thereof, plus accrued and unpaid interest to, but excluding, the date of repurchase. In connection with certain corporate events, the Company will, under certain circumstances, increase the conversion rate for holders of 2019 Notes who elect to convert their 2019 Notes in connection with such corporate events.

As of December 31, 2019, the conditions allowing holders of the 2019 Notes to convert have not been met and therefore the 2019 Notes are not yet convertible and are recorded as a long-term liability in the Company's consolidated balance sheet at December 31, 2019. As of the date of this filing, no 2019 Notes were converted by the holders of such notes in the first quarter of 2020. In the event the closing price conditions are met in the first quarter of 2020 or a future fiscal quarter, the 2019 Notes will be convertible at a holder's option during the immediately following fiscal quarter.

The Company accounts for the 2019 Notes as separate liability and equity components. The Company determined the carrying amount of the liability component as the present value of its cash flows using a discount

rate of 4.5% based on comparative convertible transactions for similar companies. The proceeds allocated to the debt conversion feature were $52.1 million. This amount was calculated by deducting the carrying value of the liability component from the principal amount of the 2019 Notes as a whole. The difference represents a debt discount that is amortized to interest expense on the Company's consolidated statements of comprehensive income over the term of the 2019 Notes using the effective interest rate method. The Company will assess 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.

The net carrying value of the equity component of the 2019 Notes is as follows (amounts in thousands):

	December 31, 2019
Proceeds allocated to the conversion feature	$ 52,062
Less: transaction costs allocated to the conversion feature	(1,621)
Less: deferred taxes	(11,371)
Net carrying value	$ 39,070

The Company a llocates transaction costs related to the issuance of the 2019 Notes to the liability and equity components using the same proportions as the initial carrying value of the 2019 Notes. Transaction costs related to the liability component were $7.4 million and are being amortized to interest expense using the effective interest method over the term of the 2019 Notes. Transaction costs attributable to the equity component were $1.6 million and are netted with the equity component of the 2019 Notes in stockholders' equity of the Company's consolidated balance sheet at December 31, 2019.

Interest expense recognized on the 2019 Notes in 2019 was $0.5 million, $4.1 million and $0.6 million 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 2019 Notes is 5.1%, which included the interest on the 2019 Notes, amortization of the debt discount and debt issuance costs. As of December 31, 2019, the carrying value of the 2019 Notes was $232.8 million and the fair value of the principal was $296.1 million. The fair value of the 2019 Notes was determined based on the most recent trade activity of the 2019 Notes as of December 31, 2019.

The 2019 Notes agreement contains 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 2019 Notes may declare 100% of the principal of, and any accrued and unpaid interest on, all of the 2019 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 2019 Notes will become due and payable automatically. Notwithstanding the foregoing, the 2019 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 2019 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 2019 Notes as of December 31, 2019.

Conversion of the 2.125% Convertible Senior Notes due 2021

The Company utilized a portion of the proceeds from the issuance of the 2019 Notes to settle its outstanding 2.125% Convertible Senior Notes due 2021 (the "2016 Notes") during the third quarter of 2019. On July 16, 2019, the Company entered into separate privately negotiated agreements with certain holders of the 2016 Notes to exchange an aggregate of $92.0 million principal aggregate amount of the 2016 Notes for shares of the Company's common stock, together with cash, in private placement transactions (the "Note Exchanges"). On July 19, 2019 and July 22, 2019, the Company used approximately $92.3 million (including $0.3 million of

accrued interest) and 1,850,155 shares of its common stock valued at $161.0 million to settle the Note Exchanges for total consideration of $253.3 million, of which $163.6 million was allocated to reacquiring the equity component of the 2016 Notes. The Company allocated the consideration transferred to the liability and equity components using the same proportions as the initial carrying value of the 2016 Notes. The transaction resulted in a loss on extinguishment of debt of $4.6 million in the Company's consolidated statement s of comprehensive income in 2019.

On July 19, 2019, the Company issued a Notice of Redemption in respect of the 2016 Notes, which provided that, on September 23, 2019, the Company would redeem all 2016 Notes that had not been converted, repurchased or exchanged prior to such date at a redemption price in cash equal to 100% of the principal amount thereof plus accrued and unpaid interest. On September 23, 2019, the Company used $23.0 million and 466,045 shares of its common stock valued at $37.8 million to settle the remaining 2016 Notes for a total of $60.8 million, of which $38.3 million was allocated to reacquiring the equity component of the 2016 Notes. This transaction resulted in a loss on extinguishment of debt of $1.1 million recorded on the Company's consolidated statement s of comprehensive income. The total loss in 2019 of $5.7 million represents the difference between the fair value of the liability component of the 2016 Notes and its related carrying value immediately before the exchange.

The fair value of the liability component was calculated using a discounted cash flow technique with an effective interest rate of 3.9%, representing the estimated nonconvertible debt borrowing rate with a maturity as of the measurement date consistent with the 2016 Notes maturity date of June 1, 2021. In addition, in accordance with this guidance, a portion of the fair value of the consideration transferred is allocated to the reacquisition of the equity component, which is the difference between the fair value of the consideration transferred and the fair value of the liability component immediately before the exchange. As a result, on a gross basis, $200.1 million was allocated to the reacquisition of the equity component of the original instrument, which is recorded net of deferred taxes within additional paid-in capital on the Company's consolidated balance sheet .

The cash conversion feature of the 2016 Notes required bifurcation from the 2016 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 2016 Notes, which resulted in a fair value of the liability component of $96.3 million upon issuance, calculated as the present value of implied future payments based on the $115.0 million aggregate principal amount. The equity component of the 2016 Notes was recognized as a debt discount, recorded in additional paid-in capital, and represents the difference between the aggregate principal of the 2016 Notes and the fair value of the 2016 Notes without conversion option on their issuance date. The debt discount was amortized to interest expense using the effective interest method over five years, or the life of the 2016 Notes.

Interest expense recognized on the 2016 Notes in 2019 prior to conversion was $1.3 million, $2.4 million and $0.4 million 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 2016 Notes was 6.6%, which included the interest on the 2016 Notes, amortization of the debt discount and debt issuance costs.

12. Accumulated Other Comprehensive Loss

Changes in accumulated other comprehensive loss consisted of the following for the years ended December 31, 2019 and 2018:

	Foreign Currency Translation Adjustment
Balance as of December 31, 2017	$ (6,363)
Other comprehensive loss	(5,530)
Balance as of December 31, 2018	(11,893)
Other comprehensive loss	(3,134)
Balance as of December 31, 2019	$ (15,027)

13. Employee Benefit Plans

In the United States, the Repligen Corporation 401(k) Savings and Retirement Plan (the "401(k) Plan") is a qualified defined contribution plan in accordance with Section 401(k) of the Internal Revenue Code. All U.S. employees over the age of 21 are eligible to make pre-tax contributions up to a specified percentage of their compensation. Under the 401(k) Plan, the Company may, but is not obligated to match a portion of the employees' contributions up to a defined maximum. The match is calculated on a calendar year basis. The Company matched $1.0 million, $0.7 million and $0.5 million in the years ended December 31, 2019, 2018 and 2017, respectively.

In Sweden, the Company contributes to a government-mandated occupational pension plan that is a qualified defined contribution plan. All employees in Sweden are eligible for this pension plan. The Company pays premiums to a third-party occupational pension specialist who administers the pension plan. These premiums are based on various factors including each employee's age, salary, employment history and selected benefits in the pension plan. When an employee terminates or retires, these premium payments cease for that employee and the Company has no further pension-related obligations for that employee. For the years ended December 31, 2019, 2018 and 2017, the Company contributed $0.6 million, $0.6 million and $0.5 million, respectively, to the pension plan.

14. Related Party Transactions

In July 2017, in conjunction with the Spectrum Acquisition, the Board of Directors engaged one of the Company's independent directors to serve as the chairperson of the Spectrum Integration Committee. In this role, this Director worked directly with the Company's executive team on general integration strategy and focused on the integration of Spectrum's operations and commercial organization with the Company. The Company recorded $0.2 million of expense for the year ended December 31, 2017 related to this director's services.

Additionally, certain facilities leased by Spectrum are owned by Roy Eddleman, the former owner of Spectrum. As of December 31, 2019, Mr. Eddleman owned greater than 5 % of the Company's outstanding shares and the Company considers him to be a related party. The lease amounts paid to this shareholder prior to the public offering were negotiated in connection with the Spectrum Acquisition. The Company incurred rent expense totaling $ 0.7 million for the year ended December 31, 2019 related to these leases.

As part of the Spectrum Acquisition, the Company was responsible for filing all tax returns for Spectrum for the period from January 1, 2017 through July 31, 2017, the day before the Spectrum Acquisition. The Company was responsible for collecting any tax refunds from federal and state authorities and remitting these refunds to the former shareholders of Spectrum, including the former owner of Spectrum who held more than 5% of the

Company's outstanding common stock prior to May 3, 2019. During 2018, the Company collected $1.7 million of these tax refunds, which the Company paid to the Spectrum shareholders during the fourth quarter of 2018, net of $0.2 million of expenses paid by the Company on behalf of Spectrum for tax preparation and other fees.

15. Selected Quarterly Financial Data (Unaudited)

The following table sets forth certain unaudited quarterly results of operations for 2019 and 2018. In the opinion of management, this information has been prepared on the same basis as the audited consolidated financial statements and all necessary adjustments, consisting only of normal recurring adjustments, have been included in the amounts stated below to present fairly the quarterly information when read in conjunction with the audited consolidated financial statements and notes thereto included elsewhere in this Form 10-K. The quarterly operating results are not necessarily indicative of future results of operations.

	For the Years Ended December 31, 2019			
	Q1	Q2	Q3	Q4
	(Amounts in thousands, except per share data)			
Revenue	$60,634	$70,692	$69,445	$69,474
Gross profit	33,789	39,984	38,020	39,353
Operating expenses	49,463	59,638	61,481	63,580
Net income	8,053	8,095	1,659	3,604
Earnings per share:				
Basic	$ 0.18	$ 0.17	$ 0.03	$ 0.07
Diluted	$ 0.17	$ 0.17	$ 0.03	$ 0.07

	For the Years Ended December 31, 2018			
	Q1	Q2	Q3	Q4
	(Amounts in thousands, except per share data)			
Revenue	$44,830	$47,731	$49,529	$51,942
Gross profit	25,162	26,643	27,346	28,350
Operating expenses	38,854	43,458	41,643	44,089
Net income	3,448	2,738	4,794	5,638
Earnings per share:				
Basic	$ 0.08	$ 0.06	$ 0.11	$ 0.13
Diluted	$ 0.08	$ 0.06	$ 0.10	$ 0.12

Exhibit 4.5

DESCRIPTION OF THE REGISTRANT'S SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

As of December 31, 2019, Repligen Corporation (the "Company," "we," "us," and "our") has one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended: our common stock.

Description of Common Stock

The following description of our common stock is a summary and does not purport to be complete. It is subject to and qualified in its entirety by reference to our Amended and Restated Certificate of Incorporation ("Certificate of Incorporation") and our Amended and Restated Bylaws ("Bylaws"), each of which are incorporated by reference as an exhibit to the Annual Report on Form 10-K of which this Exhibit 4.5 is a part, and by applicable law. We encourage you to read our Certificate of Incorporation, our Bylaws and the applicable provisions of the Delaware General Corporation Law for additional information.

Authorized Capital Stock

Our authorized capital stock consists of 80,000,000 shares of common stock, par value $0.01 per share (the "common stock"), and 5,000,000 shares of preferred stock, par value $0.01 per share (the "preferred stock"), all of which shares of preferred stock are undesignated.

Common Stock

We may issue shares of our common stock from time to time. The holders of shares of our common stock are entitled to one vote for each share held of record on all matters to be voted on by stockholders and do not have cumulative voting rights. Subject to the rights of holders of any future series of undesignated preferred stock which may be designated, each share of the outstanding common stock is entitled to participate ratably in any distribution of net assets made to the stockholders in the event of our liquidation, dissolution or winding up and is entitled to participate equally in dividends if and when declared by our board of directors. There are no redemption, sinking fund, conversion or preemptive rights with respect to shares of common stock. All shares of common stock have equal rights and preferences.

Our common stock is listed on the Nasdaq Global Select Market under the trading symbol "RGEN."

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company, LLC.

Preferred Stock - Limitations on Rights of Holders of Common Stock

We may issue shares of preferred stock in one or more series. Our board of directors will determine the rights, preferences and privileges of the shares of each wholly unissued series, and any qualifications, limitations or restrictions thereon, including dividend rights, conversion rights, preemptive rights, voting rights, terms of redemption or repurchase, liquidation preferences, sinking fund terms and the number of shares constituting any series or the designation of any series. Convertible preferred stock will be convertible into our common stock or exchangeable for other securities. Conversion may be mandatory or at the holder's option and would be at prescribed conversion rates. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences, sinking fund terms and the number of shares constituting, or the designation of, such series, any or all of which may be greater than the rights of common stock. The issuance of our preferred stock could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon our liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change in control of our company or other corporate action.

Anti-Takeover Effects of Our Certificate of Incorporation and Our Bylaws

Our certificate of incorporation and our by-laws include a number of provisions that may have the effect of delaying, deferring or preventing another party from acquiring control of us and encouraging persons considering unsolicited tender offers or other unilateral takeover proposals to negotiate with our board of directors rather than pursue non-negotiated takeover attempts. These provisions include the items described below.

Meetings of Stockholders.

Our by-laws provide that a special meeting of the stockholders may be called by the President, the Chairman, the board of directors, or upon the written request of one or more stockholders holding in the aggregate at least 30% of the outstanding shares of our stock entitled to vote at such meeting; and only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders. Our by-laws limit the business that may be conducted at an annual meeting of stockholders to those matters properly brought before the meeting.

Advance Notice Requirements.

Our by-laws establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of our stockholders. These procedures provide that notice of stockholder proposals must be timely given in writing to our corporate secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at our principal executive offices not less than 60 days nor more than 90 days prior to the first anniversary date of the annual meeting for the preceding year. Our by-laws specify the requirements as to form and content of all stockholders' notices. These requirements may preclude stockholders from bringing matters before the stockholders at an annual or special meeting.

Amendment to Certificate of Incorporation and Bylaws.

Any amendment of our certificate of incorporation must first be approved by a majority of our board of directors, and if required by law, must thereafter be approved by a majority of the outstanding shares entitled to vote on the amendment and a majority of the outstanding shares of each class entitled to vote thereon as a class. Our by-laws may be amended by the affirmative vote of a majority of the directors then in office, subject to any limitations set forth in the by-laws; and may also be amended by the affirmative vote of the holders of a majority of the outstanding shares entitled to vote at any regular meeting of stockholders, or at any special meeting of stockholders provided notice of such alteration, amendment, repeal or adoption of new by-laws must have been stated in the notice of such special meeting.

Undesignated Preferred Stock.

Our certificate of incorporation provides for 5,000,000 authorized shares of preferred stock. The existence of authorized but unissued shares of preferred stock may enable our board of directors to render more difficult or to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, our board of directors were to determine that a takeover proposal is not in the best interests of us or our stockholders, our board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, our certificate of incorporation grants our board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring or preventing a change in control of us.

Section 203 of the Delaware General Corporation Law

We are subject to the provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless the business combination is approved in a prescribed manner. Under Section 203, a business combination between a corporation and an interested stockholder is prohibited unless it satisfies one of the following conditions:

- before the stockholder became interested, our board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, shares owned by persons who are directors and also officers, and employee stock plans, in some instances, but not the outstanding voting stock owned by the interested stockholder; or
- at or after the time the stockholder became interested, the business combination was approved by our board of directors and authorized at an annual or special meeting of the stockholders by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, lease, pledge or other disposition involving the interested stockholder of 10% or more of the assets of the corporation;
- subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- subject to exceptions, any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; and
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person

Exhibit 10.4

LEASE

BETWEEN

REPLIGEN CORPORATION, AS TENANT

AND

WEST SEYON LLC, AS LANDLORD

35 SEYON STREET, WALTHAM, MASSACHUSETTS

The submission of an unsigned copy of this document to Tenant for Tenant's consideration does not constitute an offer to lease the Premises or an option to or for the Premises. This document shall become effective and binding only upon the execution and delivery of this Lease by both Landlord and Tenant.

TABLE OF CONTENTS

L E A S E

THIS LEASE is dated as of October 10, 2001, between the Landlord and the Tenant named below, and is of space in the Building described below.

ARTICLE 1
BASIC DATA; DEFINITIONS

1.1 Basic Data. Each reference in this Lease to any of the following terms shall be construed to incorporate the data for that term set forth in this Section:

Landlord: West Seyon LLC, a Delaware limited liability company

Landlord's Address: c/o Saracen Development, 7 Wells Avenue, Newton, MA 02459

Tenant: Repligen Corporation, a Delaware Corporation

Tenant's Address: Prior to the Commencement Date, 117 Fourth Avenue, Needham, Massachusetts, 02494, and from and after the Commencement Date, at the Premises.

Guarantor: N/A

Property: The land located in Waltham, Massachusetts on the west side of Seyon Street, together with the Building and other improvements thereon, along with the South Parking Lot, constituting a portion of the mixed-use complex known as iPark, all as shown on the site plan attached hereto as **Exhibit B**.

Property Rentable Area: Agreed to be 600,000 square feet.

Building: The one-story building commonly known and numbered as 35 Seyon Street, shown on the site plan attached hereto as **Exhibit B**.

Building Rentable Area: Agreed to be 250,000 square feet.

Premises: The portion of the Building shown on the location plan attached hereto as **Exhibit A**.

Premises Rentable Area: Agreed to be 24,468 square feet.

Basic Rent: The Basic Rent is as follows:

RENTAL PERIOD	ANNUAL BASIC RENT	MONTHLY PAYMENT
From the Rent Commencement Date through the end of Lease Year 2	$ 330,318.00	$27,526.50
Lease Years 3 through 5	$ 379,254.00	$31,604.50
Lease Years 6 through 7	$ 403,722.00	$33,643.50
Lease Years 8 through 10	$ 428,190.00	$35,682.50

Tenant's Proportionate Share: 4.1% (which is based on the ratio of (a) Premises Rentable Area to (b) Property Rentable Area).

Security Deposit: $ 500,000.00, to be held, reduced and disposed of as provided in **Section 14.8**.

Rent Commencement Date: One hundred twenty days after the Commencement Date.

Term: The period of time commencing on the Commencement Date and expiring at the close of the day immediately preceding the tenth anniversary of the Rent Commencement Date, except that if the Rent Commencement Date is other than the first day of a calendar month, the expiration of the Term shall be at the close of the last day of the calendar month in which such anniversary falls. The Term shall include any extension thereof that is expressly provided for by this Lease and that is effected strictly in accordance with this Lease; if no extension of the Term is expressly provided for by this Lease, no right to extend the Term shall be implied by this provision.

Initial General Liability Insurance: $3,000,000 per occurrence/$5,000,000 aggregate (combined single limit) for property damage, bodily injury or death.

Permitted Uses: Executive and general offices, and laboratory and manufacturing space in connection with Tenant's business.

Landlord's Contribution: $100,000.00 to be used by Tenant for interior improvements to the Premises. Landlord shall also contribute the lesser of (i) $10,000.00, or (ii) the cost for Tenant to perform the slab preparation being requested by Resicon USA.

Landlord's Construction Representative: Joseph Mazzola

Tenant's Construction Representative: H. Randolph Lewis, AIA of Olson, Lewis & Dioli Architects and Planners, Inc.

Tenant's Estimated Contribution: $1,400,000.00

1.2 Definitions. When used in Lease, the capitalized terms set forth below shall bear the meanings set forth below.

Adequate Assurance: As defined in Section 14.1.

Adequate Assurance of Future Performance: As defined in Section 14.1.

Additional Rent: All charges and sums payable by Tenant as set forth in this Lease, other than and in addition to Basic Rent.

Alterations: As defined in Section 5.2.

Bankruptcy Code: As defined in Section 14.1.

Base Building Plans: As defined in Section 4.1.

Base Building Work: As defined in Section 4.1.

Base Building Substantial Completion Date: As defined in Section 4.1.

Basic Rent: As defined in Section 1.1.

Broker: Landlord's Broker and Tenant's Broker.

Building: As defined in Section 1.1.

Building Rentable Area: As defined in Section 1.1.

Business Day: All days except Saturdays, Sundays, New Year's Day, Martin Luther King Day, Memorial Day, Presidents Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day (and the following day when any such day occurs on Sunday).

Commencement Date: As defined in Section 4.1.

Common Facilities: As defined in Section 2.2.

Common Facilities Base Building Work: As defined in Section 4.1.

Environmental Condition: Any disposal, release or threat of release of Hazardous Materials on, from or about the Building or the Property or storage of Hazardous Materials on, from or about the Building or the Property.

Environmental Laws: Any federal, state and/or local statute, ordinance, bylaw, code, rule and/or regulation now or hereafter enacted, pertaining to any aspect of the environment or human health, including, without limitation, Chapter 21C, Chapter 21D, and Chapter 2IE of the General Laws of Massachusetts and the regulations promulgated by the Massachusetts Department of Environmental Protection, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. § 9601 *et seq.,* the Resource Conservation and Recovery Act of 1976, 42 U.S.C. § 6901 *et seq.,* the Toxic Substances Control Act, 15 U.S.C. §2061 *et seq.,* the Federal Clean Water Act, 33 U.S.C. §1251, and the Federal Clean Air Act, 42 U.S.C. §7401 *et seq.*

Escalation Charges: The Additional Rent arising pursuant to Article 8 and Article 9 of this Lease.

Essential Services: As defined in Section 7.6.

Event of Bankruptcy: As defined in Section 14.1.

Event of Default: As defined in Section 14.1.

Force Majeure: Collectively and individually, strikes or other labor trouble (other than any such strikes or labor trouble caused by or arising as a result of Landlord's labor practices at the Property), fire or other casualty, acts of God, govemmental preemption of priorities or other controls in connection with a national or other public emergency or shortages of fuel, supplies or labor resulting therefrom, or any other cause, whether similar or dissimilar, beyond the reasonable control of the party required to perform an obligation.

Guarantor: As defined in Section 1.1.

Holder: As defined in Section 13.1.

Hazardous Materials: Shall mean each and every element, compound, chemical mixture, contaminant, pollutant, material, waste or other substance which is defined, determined or identified as hazardous or toxic under any Environmental Law, including, without limitation, any "oil," "hazardous material," "hazardous waste," "hazardous substance" or "chemical substance or mixture", as the foregoing terms (in quotations) are defined in any Environmental Laws.

Initial General Liability Insurance: As defined in Section 1.1.

Land: The land that constitutes the Property.

Landlord: As defined in Section 1.1.

Landlord's Broker: Insignia/ESG.

Landlord's Construction Representative: As defined in Section 1.1.

Landlord's Contribution: As defined in Section 1.1.

Landlord's Address: As defined in Section 1.1.

Lease Year: Means each period of one (1) year during the Term commencing on the Commencement Date or on any anniversary thereof, except that the first Lease Year shall consist of the period from the Commencement Date to the Rent Commencement Date, and any remaining partial calendar month following the Rent Commencement Date, and the succeeding twelve (12) full calendar months, and each succeeding Lease Year shall consist of each succeeding twelve (12) month period thereafter.

Management Fee: $.70 per rentable square foot.

Mortgage: As defined in Section 13.1.

Operating Expenses: As defined in Section 9.1.

Operating Year: As defined in Section 9.1.

Permitted Uses: As defined in Section 1.1.

Plans: As defined in Section 4.2.

Premises: As defined in Section 1.1.

Premises Base Building Work: As defined in Section 4.1.

Premises Rentable Area: As defined in Section 1.1.

Property: As defined in Section 1.1.

Recapture Date: As defined in Section 6.4.

Rent Commencement Date: As defined in Section 1.1.

Rules and Regulations : As defined in Section 2.2.

Security Deposit: As defined in Section 1.1.

Service Interruption: As defined in Section 7.6.

Substantial Completion Date: As defined in Section 4.2.

Successor: As defined in Section 13.1.

Taxes: As defined in Section 8.1.

Tax Year: As defined in Section 8.1.

Tenant: As defined in Section 1.1.

Tenant's Address: As defined in Section 1.1.

Tenant's Broker: Insignia/ESG

Tenant's Building Proportionate Share: As defined in Section 1.1.

Tenant's Construction Representative: As defined in Section 1.1.

Tenant's Delay: As defined in Section 4.4.

Tenant's Plans: As defined in Section 4.2.

Tenant's Property Proportionate Share: As defined in Section 1.1.

Tenant's Removable Property: As defined in Section 5.2.

Tenant's Work: As defined in Section 4.2.

Term: As defined in Section 1.1.

1.3 Enumeration of Exhibits. The following Exhibits are a part of this Lease, are incorporated herein by reference attached hereto, and are to be treated as a part of this Lease for all purposes. Undertakings contained in such Exhibits are agreements on the part of Landlord and Tenant, as the case may be, to perform the obligations stated therein.

Exhibit A - Location Plan of the Premises
Exhibit B - Site Plan of Buildings
Exhibit C - Commencement Date Letter
Exhibit D - Operating Expenses
Exhibit E - Rules and Regulations
Exhibit F – Parking Areas
Exhibit G – Base Building Plans
Exhibit H – Form Letter of Credit
Exhibit I – Tenant's Approved Hazardous Materials
Exhibit J – Notice of Lease
Exhibit K – Alterations to be Retained by Tenant
Exhibit L - Environmental Reports

Exhibit M – Tenant's Exterior Signage
Exhibit N – Tenant's Layout Plan

ARTICLE 2
PREMISES AND APPURTENANT RIGHTS

2.1 Lease of Premises. Landlord hereby leases to Tenant and Tenant hereby leases from Landlord the Premises for the Term and upon the terms and conditions hereinafter set forth.

2.2 Appurtenant Rights and Reservations.

(a) Tenant shall have, as appurtenant to the Premises, the non-exclusive right to use, and permit its invitees to use in common with Landlord and others, public or common lobbies, restrooms, hallways, stairways, elevators and walkways within the Building, as well as the access roads, driveways, parking areas, loading areas, pedestrian sidewalks, landscaped areas, trash enclosures, recreation areas and other areas or facilities, if any, which are located in or on the Property and designated by Landlord from time to time for the non-exclusive use of tenants and other occupants of the Building (the "**Common Facilities**"); but such rights shall always be subject to reasonable rules and regulations from time to time established by Landlord pursuant to **Section 15.7** (the "**Rules and Regulations**") and to the right of Landlord to designate and change from time to time areas and facilities so to be used, provided Tenant always has at least one reasonable means of access to the Premises.

(b) Excepted and excluded from the Premises and the Common Facilities are the ceiling, floor, perimeter walls and exterior windows (except the inner surface of each thereof), and any space in the Premises used for shafts, stacks, pipes, conduits, fan rooms, ducts, electric or other utilities, sinks or other Building facilities, but the entry doors (and related glass and finish work) to the Premises are a part thereof. Landlord shall have the right to place in the Premises (but in such manner and location as to reduce to a minimum interference with Tenant's use of the Premises and provided such placement shall not reduce the usable area of the Premises) utility lines, equipment, stacks, pipes, conduits, ducts and the like. In the event that Tenant shall install any hung ceilings or walls in the Premises, Tenant shall install and maintain, as Landlord may reasonably require, proper access panels therein to afford access to any facilities above the ceiling or within or behind the walls. Tenant shall be entitled to install any such ceilings or walls only in compliance with the other terms and conditions of this Lease.

2.3 Tenant's Parking Areas. Tenant shall have the right to use, subject to the Rules and Regulations and on a non-exclusive, unreserved basis, sixty (60) parking spaces in the parking area shown on the plan attached hereto as **Exhibit F** (the "Parking Area"). Landlord shall have the right to install a key-card or other system of identification limiting access to the parking areas on the Property, and Tenant shall be issued key-cards for Tenant's parking spaces at Landlord's cost. Tenant shall be responsible to return to Landlord all key-cards for Tenant's parking spaces at the expiration or earlier termination of the Term. In the event Tenant exercises the right to lease the Space under Section 2.5 below, Tenant shall be provided with an additional twelve (12) parking spaces in the Parking Area.

2.4 Option to Extend.

(a) Provided that, at the time of each such exercise, (i) this Lease is in full force and effect, and (ii) no Event of Default shall have occurred and be continuing (either at the time of exercise or at the commencement of an Extended Term), Tenant shall have the right and option to extend the Term of this Lease for two (2) extended terms (collectively, the "Extended Terms") of five (5) years each by giving written notice to Landlord not later that twelve (12) months (nor earlier than eighteen (18) months) prior to the expiration date of the Term then in effect. The effective giving of such notice of extension by Tenant shall automatically extend the Term of this Lease for the applicable Extended Term, and no instrument of renewal or extension need be executed. In the event that Tenant fails timely to give such notice to Landlord, this Lease shall automatically terminate at the end of the Term then in effect, and Tenant shall have no further option to extend the Term of this Lease. Each Extended Term shall commence on the date immediately succeeding the expiration date of the original Term of the preceding Extended Term, as the case may be, and shall end on the day immediately preceding the fifth anniversary of the first day of such Extended Term. The Extended Term shall be on all the terms and conditions of this Lease, except: (i) during the second Extended Term, Tenant shall have no further option to extend the Term, and (ii) the Basic rent for the Extended Terms shall be the Fair Market Rental Value of the Premises as of the commencement of the Extended Term in question, taking into account all relevant factors, determined pursuant to **paragraph (b),** but in no event shall the Basic Rent for the Extended Term be less than the Basic Rent at the expiration of the original or Extended Term immediately preceding the commencement of the Extended Term in question.

(b) Within thirty (30) days after receiving Tenant's notice extending the Term of this Lease pursuant to **paragraph (a)** above, Landlord shall provide Tenant with Landlord's good faith estimate of the Fair Market Rental Value of the Premises for the upcoming Extended Term based upon rents being paid by tenants entering into leases for comparable space similar in size, build-out, amenities and term in the Waltham area, not including the value of any improvements made to the Premises by Tenant at Tenant's sole cost and expense. If Tenant is unwilling to accept Landlord's estimate of the Fair Market Rental Value as set forth in Landlord's notice referred to above, and the parties are unable to reach agreement thereon within thirty (30) days after the delivery of such notice by Landlord, then Tenant may rescind its exercise of the option to extend by written notice delivered to Landlord within ten (10) days after the expiration of such thirty (30)-day period. If Tenant does not so exercise its right to rescind, then either party may submit the determination of the Fair Market Rental Value of the Premises to arbitration by giving notice to the other party naming the initiation party's arbitrator within ten (10) days after the expiration of such ten (10)-day period. Within fifteen (15) days after receiving a notice of initiation of arbitration, the responding party shall appoint its own arbitrator by notifying the initiating party of the responding party's arbitrator. If the second arbitrator shall

not have been so appointed within such fifteen (15) day period, the Fair Market Rental Value of the Premises shall be determined by the initiating party's arbitrator. If the second arbitrator shall have been so appointed, the two arbitrators thus appointed shall, within fifteen (15) days after the responding party's notice of appointment of the second arbitrator, appoint a third arbitrator. If the two initial arbitrators are unable timely to agree on the third arbitrator, then either may, on behalf of both, request such appointment by the Boston office of JAMS/ENDISPUTE, or its successor, or, on its failure, refusal or inability to act, by a court of competent jurisdiction. Within fifteen (15) days after the appointment of the third arbitrator, the three arbitrators shall determine the Fair Market Rental Value of the Premises and give notice thereof to the parties hereto, and the arbitrators' determination shall be binding upon the parties. All arbitrators shall be appraisers or other qualified real estate professionals who are independent from the parties who have had at least ten (10) years commercial real estate experience in the greater Boston area. Each party shall pay the fees of its own arbitrator, and the fees of the third arbitrator shall be shared equally by the parties.

2.5 Right of First Offer.

(a) Tenant shall have a "Right of First Offer" to lease the five thousand (5,000) square feet of space that is contiguous to the Premises as shown on **Exhibit A** (the "**Space**") such right to apply during the period from the date of this Lease through the first anniversary of the Rent Commencement Date (the "Right of First Offer Period").

(b) Landlord will notify Tenant during Right of First Offer Period of its plans to lease any portion of the Space to any unrelated third party ("Landlord's Notice"). Landlord's Notice shall specify the square footage of the Space available and its location, and the date of availability. The Space shall be leased to Tenant on the same terms and conditions as contained in this Lease. Tenant will notify Landlord within seven (7) Business Days of Landlord's notice if Tenant wishes to lease such Space from Landlord on such terms and conditions. If Tenant notifies Landlord that it wishes to lease the Space, Landlord and Tenant shall execute an amendment to this Lease (incorporating therein the terms contained in Landlord's notice and the other terms and conditions contained in this Lease) within seven (7) Business Days. If Tenant fails to notify Landlord within said seven (7) Business Day period that Tenant intends to lease such Space, or if Landlord and Tenant fail, using commercially reasonable efforts, to execute a lease agreement for such Space within seven (7) Business Days of Tenant's notice of intent to Landlord, Landlord shall be entitled to lease such space to any third party on such terms and conditions and for such rent as Landlord determines in its sole discretion. If Tenant fails to notify Landlord that Tenant intends to lease such Space and Landlord does not execute a lease for the Space on the terms contained in Landlord Notice, Tenant's Right of First Offer shall continue to apply to any further proposals to lease the Space during the Right of First Offer Period only.

(c) Notwithstanding any contrary provision of this Section 2.5 or any other provision of this Lease, any Right of First Offer and any exercise by Tenant of any Right of First

Offer shall be void and of no effect unless on the date Tenant notifies Landlord that it is exercising the Right of First Offer and on the commencement date of the lease agreement for such Space (i) this Lease is in full force and effect and (ii) no Event of Default has occurred under this Lease which remains continuing and uncured, and (iii) the Tenant named herein is occupying the entire Premises for the conduct of its business.

ARTICLE 3
BASIC RENT

3.1 Payment.

(a) Tenant agrees to pay the Basic Rent and Additional Rent to Landlord, or as directed by Landlord, commencing on the Rent Commencement Date, without offset, abatement (except as provided in **Section 11.4**), deduction or demand. Basic Rent shall be payable in equal monthly installments, in advance, on the first day of each and every calendar month during the Term of this Lease, to Landlord at Landlord's Address or at such other place as Landlord shall from time to time designate by notice, in lawful money of the United States. In the event that any installment of Basic Rent or any regularly scheduled payment of Additional Rent is not paid within five (5) days of when due, Tenant shall pay, in addition to any charges under **Section 14.4,** at Landlord's request an administrative fee equal to 5% of the overdue payment. Landlord and Tenant agree that all amounts due from Tenant under or in respect of this Lease, whether labeled Basic Rent, Escalation Charges, Additional Rent or otherwise, shall be considered as rental reserved under this Lease for all purposes, including without limitation regulations promulgated pursuant to the Bankruptcy Code, and including further without limitation Section 502(b) thereof.

(b) Basic Rent for any partial month shall be pro-rated on a daily basis, and if the first day on which Tenant must pay Basic Rent shall be other than the first day of a calendar month, the first payment which Tenant shall make to Landlord shall be equal to a proportionate part of the monthly installment of Basic Rent for the partial month from the first day on which Tenant must pay Basic Rent to the last day of the month in which such day occurs.

ARTICLE 4
COMMENCEMENT AND CONDITION

4.1 Base Building Work; Commencement Date.

(a) Landlord has prepared plans and specifications (the "**Base Building Plans**") for the work to be performed by Landlord in the Premises (the **"Premises Base Building Work"**) and to the Common Facilities (the "**Common Facilities Base Building Work**") in the Building prior to Tenant's occupancy (collectively, the "**Base Building Work**") a copy of which plans are attached hereto as Exhibit G. Landlord agrees to commence the Base Building Work promptly after execution of this Lease. The Base Building Work shall be deemed substantially completed on the first day as of which Landlord's architect delivers a certificate of substantial

completion to both Landlord and Tenant, indicating that the Base Building Work has been completed in accordance with the Base Building Plans, except for minor items of work (and, if applicable, adjustment of equipment and fixtures) which can be completed after Tenant commences Tenant's Work with minimum interference with Tenant's ability to proceed with Tenant's Work (i.e., so-called "**Base Building Punch List**" items) and Tenant has been given notice thereof. Such date is hereinafter called the "**Premises Base Building Substantial Completion Date**,**"** and the "**Common Facilities Base Building Substantial Completion Date**,**"** respectively (collectively, the "**Base Building Substantial Completion Date**"). Landlord agrees to use commercially reasonable efforts to complete the Premises Base Building Work by December 1, 2001 and the Common Facilities Base Building Work by March 1, 2002. Such work shall be performed in a good and workmanlike manner and in compliance with all applicable laws, regulations and ordinances. Tenant and/or its designated representative shall have the right to enter the Premises and inspect the performance of such work on a regular basis. Landlord shall keep Tenant apprised of the status of construction of the Base Building Work and shall endeavor to give Tenant at least twenty (20) days' advance notice of the date on which Landlord expects to substantially complete the Premises Base Building Work and the Common Facilities Base Building Work. Following Tenant's receipt of such notices of the applicable Base Building Substantial Completion Date, Tenant shall have the right to inspect the Premises. If such inspection reveals that the Base Building Work has not been completed in accordance herewith, Landlord and Tenant shall identify those items that remain to be completed or repaired on a punch list. Landlord shall complete all Base Building Punch List items within thirty (30) days, and Tenant shall afford Landlord access to the Premises for such purposes. If, in Landlord's commercially reasonable judgment, any items contained on the Base Building Punch List would delay or materially interfere with Tenant's ability to perform Tenant's Work, the Base Building Substantial Completion Date shall be delayed until such item(s) is/are completed.

(b) The "**Commencement Date**" shall be the later to occur of (i) December 1, 2001, or (ii) the Premises Base Building Substantial Completion Date. Promptly upon the occurrence of the Commencement Date, Landlord and Tenant shall execute and deliver a letter designating the Commencement Date substantially in the form attached hereto as **Exhibit C**, but the failure by either party to execute and deliver such a letter shall have no effect on the Commencement Date, as hereinabove determined.

4.2 Tenant's Work.

(a) Tenant is currently preparing plans and specifications for the layout of the Premises (such plans and specifications are collectively referred to as the "**Layout Plan**") and architectural and mechanical, electrical and plumbing engineering plans and specifications for the Premises. Such plans and specifications, when fully complete and approved by Landlord, are hereinafter called "**Tenant's Plans**." Landlord shall not unreasonably withhold or delay its approval of the Tenant's Plans or any components thereof. Landlord shall approve or disapprove Tenant's Plans within five (5) Business Days after submission of such Plans by Tenant to Landlord. Any disapproval shall be accompanied by a reasonably specific statement of reasons

therefore. Landlord shall cooperate with Tenant in Tenant's efforts to address Landlord's basis for such disapproval. In the event of such disapproval, Tenant shall promptly cause the Tenant's Plans to be revised in a manner sufficient to remedy the Landlord's reasonable objections and/or respond to the Landlord's concerns and shall deliver such revised plans to Landlord, and Landlord shall either approve (which approval shall not be unreasonably withheld, conditioned or delayed) or disapprove Tenant's revised plans (such disapproval to be on a reasonable basis) within five (5) Business Days following the date of submission. The work specified in Tenant's Plans shall be called "**Tenant's Work**.**"** Tenant estimates that it will expend the amount set forth in Section 1.1 hereof ("**Tenant's Estimated Contribution**") in the completion of Tenant's Work. Tenant's Plans shall be stamped by a Massachusetts-registered architect and engineer, such architect and engineer being subject to Landlord's reasonable approval. Tenant covenants that the improvements shown on Tenant's Plans, if constructed in accordance with such Plans, shall comply with all applicable laws, ordinances and regulations (including, without limitation, the applicable requirements of the Americans with Disabilities Act of 1990, and the regulations promulgated thereunder) and the requirements of the Rules and Regulations, and shall be in a form satisfactory to appropriate governmental authorities responsible for issuing permits, approvals and licenses required for construction. Landlord shall cooperate with Tenant in obtaining, at Tenants' sole cost and expense, all permits and approvals necessary for Tenant to perform Tenant's Work. In the event a governmental authority will not issue a permanent certificate of occupancy for the Premises or such authority orders Tenant to stop the performance of Tenant's Work, in whole or in part, due to a deficiency or defect in the Base Building Work or any other defect or deficiency in the Building, the Rent Commencement Date shall be delayed one (1) day for each day of delay until such defect or deficiency is remedied by Landlord, at its cost, and approved by the governmental authority.

(b) From and after the earlier to occur of (i) the Premises Base Building Substantial Completion Date, or (ii) November 15, 2001, Tenant shall have access to the Premises and to the Building for purposes of performing Tenant's Work. In no event, shall a Tenant Delay (as defined in Section 4.4) delay the Rent Commencement Date. Tenant's Work shall be completed in accordance with the requirements set forth in the Rules and Regulations. Landlord shall reimburse Tenant for the costs incurred by Tenant with respect to the performance of Tenant's Work (the "**Cost of Tenant's Work**") up to the amount of Landlord's Contribution. Tenant shall be entirely responsible for any excess. Landlord's Contribution shall be payable by Landlord to Tenant upon written requisition to Landlord in monthly installments, as provided below, according to reasonable construction disbursement procedures and as Tenant's Work progresses. In any case, prior to payment of any such installment Tenant shall deliver to Landlord a written request, which request shall be given no more frequently than once every thirty (30) days, for such disbursement, which shall be accompanied by: (i) invoices for Tenant's Work covered by any previous requisition; (ii) copies of partial lien waivers or final lien waivers (in the case of a final installment); and (iii) a certificate signed by the Tenant's architect certifying that Tenant's Work represented by the aforementioned invoices has been completed substantially in accordance with Tenant's Plans. Landlord shall pay each required installment within thirty (30) days of receiving the materials enumerated in the previous sentence.

4.3 Condition; Landlord's Warranty. Landlord represents and warrants **("Landlord's Warranty")** that the Base Building Work shall be free from material defects in workmanship and materials for a period of one (1) year (the "**Warranty Period**") from the Commencement Date. Landlord's Warranty shall not apply to any defects in workmanship or materials that arise due to the negligence or willful misconduct of Tenant, it's agents, employees, contractors, invitees or sublessees. During the Warranty Period, Landlord agrees to promptly replace and/or repair, at its expense, items of the Base Building Work which do not conform to the Base Building Plans, or which are defective. Except for the Base Building Work, any warranties that Landlord may receive (which landlord shall make available to Tenant), or which Landlord may provide pursuant hereto, the Premises are being leased in their present condition, AS IS, WITHOUT REPRESENTATION OR WARRANTY by Landlord. Tenant acknowledges that it has inspected the Premises and Common Facilities and, except for the Base Building Work, has found the same satisfactory.

4.4 Rent Credit.

(a) Subject to Tenant Delay (as defined below) and Force Majeure, if Landlord shall have failed to substantially complete the Premises Base Building Work by December 15, 2001 (the "**Premises Rent Credit Commencement Date**") and if such failure materially interferes with or prohibits Tenant from performing Tenant's Work, or from obtaining any permits or approvals necessary for performing or completing Tenant's Work, Tenant shall receive a credit equal to one (1) days' worth of Basic Rent for each day beyond the Premises Rent Credit Commencement Date that substantial completion of the Premises Base Building Work is delayed. Subject to Tenant Delay and Force Majeure, if Landlord shall have failed to substantially complete the Premises Base Building Work by January 1, 2002 and if such failure materially interferes with or prohibits Tenant from performing Tenant's Work, or from obtaining any permits or approvals necessary for performing or completing Tenant's Work, Tenant shall receive a credit equal to two (2) days' worth of Basic Rent for each day beyond January 1, 2002 that substantial completion of the Premises Base Building Work is delayed. For purposes of this Lease, "Tenant Delay" shall mean (i) any request by Tenant that Landlord delay in the commencement or completion of the Premises Base Building Work, or the Common Facilities Base Building Work, as applicable, for any reason; (ii) any delay in the Base Building Substantial Completion Date caused by Tenant's contractors, agents and employee's interference with Landlord and Landlord's contractor's, agents, and employees; or (iii) any other act or omission of Tenant or its officers, agents, servants or contractors which causes a delay in the Premises Base Building Work, or the Common Facilities Base Building Work, as applicable. If a delay shall occur in the Base Building Work as a result of Tenant Delay, then Tenant shall, within thirty (30) days after determination of the Rent Commencement Date, and only to the extent that such amount exceeds the rent credit, if any, due to Tenant, pay to Landlord for each day of Tenant's Delay the amount of Basic Rent, Additional Rent and other charges that would

have been payable hereunder had Tenant's Delay not occurred to the extent that such Tenant Delay caused the Rent Commencement Date to be later than the date such date would have occurred had such Tenant Delay not occurred. Landlord shall give Tenant written notice of a Tenant Delay under clauses (ii) and (iii) above within twenty-four (24) hours after Landlord learns of such Tenant Delay. Subject to Tenant Delay and Force Majeure, if Landlord shall have failed to substantially complete the Premises Base Building Work on or before March 1, 2002, Tenant shall have the right to terminate the Lease by written notice to Landlord prior to March 15, 2002, whereupon this Lease shall terminate and be of no further force or effect thirty (30) days after the date of such notice unless Landlord shall have substantially completed the Premises Base Building Work prior to, or within such period.

(b) Subject to Tenant Delay (as defined in Section 4.1(a) above) and Force Majeure, if Landlord shall have failed to substantially complete the Common Facilities Base Building Work by March 1, 2002 (the "**Common Facilities Rent Credit Commencement Date**") and if such failure materially interferes with or prohibits Tenant from performing Tenant's Work, or from obtaining any permits or approvals necessary for performing or completing Tenant's Work, Tenant shall receive a credit equal to one (1) days' worth of Basic Rent for each day beyond the Common Facilities Rent Credit Commencement Date that substantial completion of the Common Facilities Base Building Work is delayed. Subject to Tenant Delay and Force Majeure, if Landlord shall have failed to substantially complete the Common Facilities Base Building Work on or before April 1, 2002, Tenant shall have the right to terminate the Lease by written notice to Landlord prior to April 15, 2002, whereupon this Lease shall terminate and be of no further force or effect thirty (30) days after the date of such notice unless Landlord shall have substantially completed the Common Facilities Base Building Work prior to, or within such period.

ARTICLE 5
USE OF PREMISES

5.1 Permitted Use.

(a) Tenant agrees that the Premises shall be used and occupied by Tenant only for Permitted Uses and for no other use without Landlord's express written consent.

(b) Tenant agrees to conform to the following provisions during the Term of this Lease:

(i) Tenant shall cause all freight to be delivered to or removed from the Building and the Premises in accordance with the Rules and Regulations established by Landlord therefore;

(ii) Tenant will not place on the exterior of the Premises (including both interior and exterior surfaces of doors and interior surfaces of windows) or on any part of the Building outside the Premises, any sign, symbol, advertisement or the like visible to

public view outside of the Premises. Landlord will not withhold consent for signs or lettering on the entry doors to the Premises provided such signs conform to sign standards for the Building adopted by Landlord in its sole discretion and Tenant has submitted to Landlord a plan or sketch in reasonable detail (showing, without limitation, size, color, location, materials and method of affixation) of the sign to be placed on such entry doors. Landlord agrees, however, to maintain a tenant directory in the lobby of the Building (and, in the case of multi-tenant floors, in that floor's elevator lobby) in which will be placed Tenant's name (or any approved assignee's name) and the location of the Premises in the Building. Notwithstanding the foregoing, Tenant shall have the right to place Tenant's name on the Building or on a sign next to the Building, at Tenant's sole cost and expense, provided Tenant obtains Landlord's consent, which shall not be unreasonably withheld, conditioned or delayed and the consent of any applicable governmental authorities, and Tenant delivers to Landlord plans for installation of such sign, which shall be subject to Landlord's prior approval, which approval shall not be unreasonably withheld, conditioned or delayed. Landlord hereby consents to Tenant's exterior signage, as set forth in **Exhibit M** attached hereto and incorporated herein;

(iii) Tenant shall not perform any act or carry on any practice which may injure the Premises, or any other part of the Building, or cause any offensive odors or loud noise or constitute a nuisance or a menace to any other tenant or tenants or other persons in the Building;

(iv) Tenant shall, in its use of the Premises, comply with the requirements of all applicable governmental laws, rules and regulations, including, without limitation, the Americans With Disabilities Act of 1990 and the regulations of the Massachusetts Architectural Access Board. Landlord warrants and represents that the Base Building Work will comply with the Title III of the Americans with Disabilities Act of 1990 and any regulations or accessibility guidelines promulgated thereunder and with any other federal, state or municipal laws, regulations or building codes concerning handicapped access (collectively, **"Access Requirements"**). To the extent that any alterations to the Building are required as a result of the Base Building Work, and are not due to Tenants' use of the Premises or Tenant's Work, in order to come into compliance with the Access Requirements, Landlord shall make such alterations. The costs thereof and any other costs of complying with any Access Requirements shall be borne by Landlord and shall not be included in Operating Expenses; and

(v) Tenant shall not abandon the Premises. For purposes of the foregoing, the term "**abandonment**" shall mean vacating the Premises and failing to perform Tenant's obligations hereunder.

5.2 Installations and Alterations by Tenant.

(a) Tenant shall make no alterations, additions (including, for the purposes hereof, wall-to-wall carpeting), or improvements (collectively, "**Alterations**") in or to the Premises (including Tenant's Work) without Landlord's prior written consent, which consent shall not be unreasonably withheld, conditioned or delayed, except that if the Alterations affect or involve the Building's electrical, plumbing or mechanical systems or any other Building systems, or the roof of the Building, and such Alterations affect other tenants of the Building or the Property, or the Common Facilities, then Landlord's consent shall be granted or withheld in its sole discretion. Notwithstanding the foregoing, Tenant may, without the necessity of acquiring Landlord's consent, perform non-structural Alterations that do not affect or involve the Building's electrical, plumbing or mechanical systems or any other Building systems, or the roof of the Building, and such Alterations do not affect other tenants of the Building or the Property, or the Common Facilities, and do not exceed $20,000.00 in cost in each instance. Any Alterations shall be in accordance with the Rules and Regulations in effect with respect thereto and with plans and specifications meeting the requirements set forth in the Rules and Regulations and approved in advance by Landlord, which approval shall not be unreasonably withheld, conditioned or delayed. All work shall (i) be performed in a good and workmanlike manner and in compliance with all applicable laws, ordinances and regulations; (ii) be made at Tenant's sole cost and expense (subject to Landlord's Contribution with respect to Tenant's Work only); (iii) become part of the Premises and the property of Landlord, except for those items specified on **Exhibit K** attached hereto and incorporated herein; and (iv) be coordinated with any work being performed by Landlord in such a manner as not to damage the Building or unreasonably interfere with the construction or operation of the Building. At Landlord's request, Tenant shall, before its work is started, secure assurances satisfactory to Landlord in its reasonable discretion protecting Landlord against claims arising out of the furnishing of labor and materials for the Alterations. If any Alterations shall involve the removal of fixtures, equipment or other property in the Premises which are not Tenant's Removable Property, such fixtures, equipment or property shall be promptly replaced by Tenant at its expense with new fixtures, equipment or property of like utility and of at least equal quality. Except with respect to Tenant's Work, Tenant shall promptly reimburse Landlord for all reasonable costs, including attorneys', architects', engineers', and consultants' fees, incurred by Landlord in connection with any request from Tenant pursuant to this **Section 5.2.** Notwithstanding the foregoing, Tenant has the right to install an acid neutralization tank (the "**Tank**"), as well as all associated piping, provided that such Tank and piping be not more than six (6) feet below the finished floor of the Building. Such installation shall be subject to Landlord's prior approval, which approval shall not be unreasonably withheld, and the provisions of this **Section 5.2**.

(b) All articles of personal property and all business fixtures, machinery and equipment and furniture owned or installed by Tenant solely at its expense in the Premises ("**Tenant's Removable Property**") shall remain the property of Tenant and may be removed by Tenant at any time prior to the expiration or earlier termination of the Term, provided that Tenant, at its expense, shall repair any damage to the Building caused by such removal.

(c) Notice is hereby given that Landlord shall not be liable for any labor or materials furnished or to be furnished to Tenant upon credit, and that no mechanic's or other lien for any such labor or materials shall attach to or affect the reversion or other estate or interest of Landlord in and to the Premises, the Building or the Property. To the maximum extent permitted by law, before such time as any contractor commences to perform work on behalf of Tenant, such contractor (and any subcontractors) shall furnish a written statement acknowledging the provisions set forth in the prior clause. Tenant agrees to pay when due the entire cost of any work done on behalf of Tenant, its agents, employees or independent contractors. If any lien is filed against all or any part of the Property for work claimed to have been done for, or materials claimed to have been furnished to, Tenant or its agents, employees or independent contractors and a subsequent Statement of Account is recorded pursuant to M.G.L.c. 254, §8, Tenant, at its sole cost and expense, shall cause such lien to be dissolved promptly within ten (10) days after receipt of notice that such lien has been filed, by the payment thereof or by the filing of a bond sufficient to accomplish the foregoing. If Tenant shall fail to discharge any such lien, Landlord may, at its option, discharge such lien and treat the cost thereof (including attorneys' fees incurred in connection therewith) as Additional Rent payable upon demand, it being expressly agreed that such discharge by Landlord shall not be deemed to waive or release the Event of Default in not discharging such lien. Tenant shall indemnify and hold Landlord harmless from and against any and all expenses, liens, claims, liabilities and damages based on or arising, directly or indirectly, by reason of the making of any alterations, additions or improvements by or on behalf of Tenant to the Premises under this Section, which obligation shall survive the expiration or termination of this Lease.

(d) In the course of any work being performed by Tenant (including, without limitation, the "field installation" of any Tenant's Removable Property), Tenant agrees to use labor compatible with that being employed by Landlord for work in the Building or on the Property or other buildings owned by Landlord or its affiliates (which term, for purposes hereof, shall include, without limitation, entities which control or are under common control with or are controlled by Landlord or, if Landlord is a partnership or limited liability company, by any partner or member of Landlord) and not to employ or permit the use of any labor or otherwise take any action which might result in a labor dispute involving personnel providing services in the Building or on the Property pursuant to arrangements made by Landlord.

5.3 **Extra Hazardous Use**. Tenant covenants and agrees that Tenant will not do or permit anything to be done in or upon the Premises, or bring in anything or keep anything therein, which shall increase the rate of property or liability insurance on the Premises or the Property above the standard rate applicable to Premises being occupied for the Permitted Uses. If the premium or rates payable with respect to any policy or policies of insurance carried by or on behalf of Landlord with respect to the Property increases as a result of any act or activity on or use of the Premises (other than the Permitted Uses) during the Term or payment by the insurer of any claim arising from any act or neglect of Tenant, its employees, agents, contractors or invitees, Tenant shall pay such increase, from time to time, within fifteen (15) days after demand therefore by Landlord, as Additional Rent.

5.4 Hazardous Materials.

(a) Tenant shall have the right to use, store, handle, treat, transport, release or dispose of the Hazardous Materials set forth in **Exhibit I** hereto on or about the Premises or the Property to the extent necessary or desirable in connection with the Permitted Uses provided the same is done in compliance with all applicable Environmental Laws. Such exhibit is representative but not exclusive of the Hazardous Materials used on or about the Premises by Tenant.

(b) Any handling, treatment, transportation, storage, disposal or use of Hazardous Materials by Tenant in or about the Premises or the Property and Tenant's use of the Premises shall comply with all applicable Environmental Laws. To the extent required by any governmental authority or by Landlord, Tenant shall, within ten (10) Business Days of the written request therefore, disclose in writing to Landlord all Hazardous Materials that are being used by Tenant in the Premises at the time of such request, the nature of such use and the manner of storage and disposal. Without Landlord's prior written consent, Tenant shall not conduct any sampling or investigation of soil or groundwater on the Property to determine the presence of any constituents therein (unless such sampling or investigation is required by law, governmental authority, or in connection with a permit for Tenant's operations in accordance with the Permitted Use, in which case, Tenant shall provide Landlord with fifteen (15) days' prior written notice accompanied by Tenant's proposed work plan, and Tenant shall deliver to Landlord a copy of the results of such sampling or investigation within ten (10) days after receipt by Tenant).

(c) Tenant shall indemnify, defend upon demand with counsel reasonably acceptable to Landlord, and hold Landlord harmless from and against, any liabilities, losses claims, damages, interest, penalties, fines, attorneys' fees, experts' fees, court costs, remediation costs, and other expenses (collectively, "**Claims**") which result from the use, storage, handling, treatment, transportation, release, threat of release or disposal of Hazardous Materials in or about the Premises or the Property by Tenant or Tenant's agents, employees, contractors or invitees. The provisions of this **paragraph (c)** shall survive the expiration or earlier termination of this Lease.

(d) Tenant shall give written notice to Landlord as soon as reasonably practicable of (i) any communication received by Tenant from any governmental authority concerning Hazardous Materials which relates to the Premises or the Property, and (ii) any Environmental Condition of which Tenant is aware.

(e) Tenant acknowledges that it has received copies of the environmental information listed on **Exhibit L** ("**Environmental Reports**") from Landlord with respect to the Property. Except as set forth in the Environmental Reports, Landlord represents and warrants to Tenant that, to the best of Landlord's knowledge, there are no Hazardous Materials in, on, under or emanating from the Premises or the Property that require remediation under any

Environmental Law. Landlord agrees to indemnify, defend, and save Tenant harmless from and against any Claims actually incurred by Tenant arising from any enforcement action, third party claim for bodily injury or property damage or remediation required by any Environmental Law with respect to any Hazardous Materials in, on, under or emanating from the Premises or the Property (except if and to the extent that Tenant is required to indemnify Landlord against such Claims under Section 5.4(c) above), or to the extent arising from Landlord's violation of any Environmental Law during the Term of this Lease.

ARTICLE 6
ASSIGNMENT AND SUBLETTING

6.1 Prohibition.

(a) Tenant covenants and agrees that neither this Lease nor the term and estate hereby granted, nor any interest herein or therein, will be assigned, mortgaged, pledged, encumbered or otherwise transferred, whether voluntarily, involuntarily, by operation of law or otherwise, and that neither the Premises nor any part thereof will be encumbered in any manner by reason of any act or omission on the part of Tenant, or used or occupied or permitted to be used or occupied, by anyone other than Tenant, or for any use or purpose other than a Permitted Use, or be sublet (which term, without limitation, shall include granting of concessions, licenses and the like) in whole or in part, without, in each case, the prior written consent of Landlord. Tenant agrees that the Premises shall not be offered or advertised for assignment or subletting by Tenant or any person acting on behalf of Tenant without first giving prior written notice to Landlord. Landlord agrees to either grant or withhold its consent (and specify reasons for withholding its consent) within twenty (20) days of receipt of a request for consent. Without limiting the foregoing, any agreement pursuant to which: (x) Tenant is relieved from the obligation to pay, or a third party agrees to pay on Tenant's behalf, all or any portion of the Basic Rent or Additional Rent under this Lease; and/or (y) a third party undertakes or is granted by or on behalf of Tenant the right to assign or attempt to assign this Lease or sublet or attempt to sublet all or any portion of the Premises, shall for all purposes hereof be deemed to be an assignment of this Lease and subject to the provisions of this **Article 6**. The provisions of this **paragraph (a)** shall apply to a transfer (by one or more transfers) of a controlling portion of or interest in the stock or partnership or membership interests or other evidences of equity interests of Tenant as if such transfer were an assignment of this Lease; provided that if equity interests in Tenant at any time are or become traded on a public stock exchange, the transfer of equity interests in Tenant on a public stock exchange shall not be deemed an assignment within the meaning of this Article.

(b) The provisions of **paragraph (a)** shall not apply to either (x) transactions with an entity into or with which Tenant is merged or consolidated, or to which all or substantially all of Tenant's assets are transferred, or (y) transactions with any entity which controls or is controlled by Tenant or is under common control with Tenant; provided that in any such event:

(i) the successor to Tenant has a net worth, computed in accordance with generally accepted accounting principles consistently applied, at least equal to the net worth of Tenant herein named on the date of this Lease,

(ii) proof satisfactory to Landlord of such net worth shall have been delivered to Landlord at least ten (10) days prior to the effective date of any such transaction (or as soon thereafter as possible if disclosure of such transaction would not be permitted under applicable law), and

(iii) the assignee or surviving entity agrees directly with Landlord, by written instrument in form reasonably satisfactory to Landlord in its reasonable discretion, to be bound by all the obligations of Tenant hereunder, including, without limitation, the covenant against further assignment and subletting.

(c) In the event Landlord does not exercise its options pursuant to **Section 6.4** below to recapture the Premises or terminate this Lease in whole or in part, and providing that Tenant is not in default of any of Tenant's obligations under this Lease beyond applicable notice and cure periods, Landlord's consent to a proposed assignment or sublease shall not be unreasonably withheld, conditioned, or delayed. Without limitation, it shall be reasonable for Landlord to withhold consent if the following conditions are not satisfied:

(i) The proposed use is limited to the Permitted Uses;

(ii) The proposed assignee or subtenant is a reputable person or entity with sufficient financial worth considering the responsibility involved, based on evidence provided by Tenant (and others) to Landlord, as determined by Landlord in its reasonable discretion;

(iii) Neither (A) the proposed assignee or sublessee, nor (B) any person or entity which, directly or indirectly, controls, is controlled by, or is under common control with, the proposed assignee or sublessee or any person or entity who controls the proposed assignee or sublessee, is then an occupant of any part of iPark, provided that Landlord has space available for lease in iPark, comparable in terms of size and finish as the Premises, at the time Tenant requests Landlord's consent to the proposed assignment or sublease;

(iv) The proposed assignee or sublessee is not a person or entity with whom Landlord is then negotiating to lease space at the Property; comparable in terms of size and finish as the Premises (or the applicable portion of the Premises to be sublet);

(v) The proposed sublease or assignment shall be in form reasonably satisfactory to Landlord and shall comply with the applicable provisions of this **Article 6**;

(vi) The amount of the aggregate rent to be paid by the proposed subtenant is not less than ninety percent (90%) of the then current market rent per rentable square foot for the Premises as determined by Landlord in its reasonable discretion (Tenant shall request, in a written notice to Landlord, that Landlord determine the amount of such rent, and Landlord shall notify Tenant within five (5) Business Days of Landlord's receipt of such notice from Tenant of Landlord's reasonable determination of such rent); and

(vii) Tenant shall not have (i) advertised or publicized in any way the availability of the Premises without prior notice to Landlord, or (ii) listed the Premises for subletting, whether through a broker, agent, representative, or otherwise at a rental rate less than that referred to in subparagraph (c)(vi) above.

6.2 **Acceptance of Rent**. If this Lease be assigned, or if the Premises or any part thereof be sublet or occupied by anyone other than Tenant, whether or not in violation of the terms and conditions of the Lease, Landlord may, at any time after an Event of Default, collect rent and other charges from the assignee, subtenant or occupant, and apply the net amount collected to the rent and other charges herein reserved, but no such assignment, subletting, occupancy, collection or modification of any provisions of this Lease shall be deemed a waiver of this covenant, or the acceptance of the assignee, subtenant or occupant as a tenant or a release of Tenant from the further performance of covenants on the part of Tenant to be performed hereunder. Any consent by Landlord to a particular assignment, subletting or occupancy or other act for which Landlord's consent is required under **paragraph (a)** of **Section 6.1** shall not in any way diminish the prohibition stated in **paragraph (a)** of **Section 6.1** as to any further such assignment, subletting or occupancy or other act or the continuing liability of the original named Tenant. No assignment or subletting hereunder shall relieve Tenant from its obligations hereunder, and Tenant shall remain fully and primarily liable therefore. Landlord may withhold its consent to a particular assignment if the assignment does not provide that the assignee agrees to be independently bound by and upon all of the covenants, agreements, terms, provisions and conditions set forth in this Lease on the part of Tenant to be kept and performed. In addition to Tenant reimbursing Landlord for all reasonable costs incurred by Landlord in connection with any request from Tenant regarding assignment or subletting or any other act that is subject to **Section 6.1**, as set forth in **Section 6.4** below, if Tenant has committed an Event of Default (as defined in Section 14.1 hereof), Tenant shall pay Landlord 50% of any profit derived from any assignment or sublease. Provided that Tenant has not committed an Event of Default, Tenant shall retain 100% of any profit derived from any assignment or sublease.

6.3 **Intentionally Omitted.**

6.4 **Landlord's Recapture Right**. If an Event of Default (as defined in Section 14.1 hereof) has occurred and is continuing), Landlord shall have the right, to be exercised in writing within thirty (30) days after written notice from Tenant seeking Landlord's consent to assign this Lease or sublease all or any portion of the Premises, to terminate this Lease (in the event of a

proposed assignment) or recapture that portion of the Premises to be subleased (in the event of a proposed sublease). In the case of a proposed assignment, this Lease shall terminate as of the date (the "**Recapture Date**") which is the later of (a) sixty (60) days after the date of Landlord's election, and (b) the proposed effective date of such assignment or sublease, as if such date were the last day of the Term of this Lease. If Landlord exercises the rights under this Section in connection with a proposed sublease, this Lease shall be deemed amended to eliminate the proposed sublease premises from the Premises as of the Recapture Date, and thereafter all Basic Rent and Escalation Charges shall be appropriately prorated to reflect the reduction of the Premises as of the Recapture Date, and Landlord shall separately demise the recaptured portion of the Premises from the remainder of the Premises.

6.5 Further Requirements. Tenant shall reimburse Landlord on demand, as Additional Rent, for any actual and out-of-pocket costs (including reasonable attorneys' fees and expenses) incurred by Landlord in connection with any actual or proposed assignment or sublease or other act described in **paragraph (a)** of **Section 6.1**, whether or not consummated, including the costs of making investigations as to the acceptability of the proposed assignee or subtenant. Any sublease to which Landlord gives its consent shall not be valid unless and until Tenant and the sublessee execute a consent agreement in form and substance satisfactory to Landlord in its reasonable discretion and a fully executed counterpart of such sublease has been delivered to Landlord. Any sublease shall provide that: (i) the term of the sublease ends no later than one day before the last day of the Term of this Lease; (ii) such sublease is subject and subordinate to this Lease; (iii) Landlord may enforce the provisions of the sublease, including collection of rents; and (iv) in the event of termination of this Lease or reentry or repossession of the Premises by Landlord, Landlord may, at its sole discretion and option, take over all of the right, title and interest of Tenant, as sublessor, under such sublease, and such subtenant shall, at Landlord's option, attorn to Landlord, but nevertheless, Landlord shall not (A) be liable for any previous act or omission of Tenant under such sublease (unless such act or omission is of a continuing nature and Landlord does not cure the same within a reasonable time); (B) be subject to any defense or offset previously accrued in favor of the subtenant against Tenant; or (C) be bound by any previous modification of such sublease made without Landlord's written consent or by any previous prepayment of more than one month's rent.

ARTICLE 7
RESPONSIBILITY FOR REPAIRS AND CONDITION OF PREMISES; SERVICES TO BE FURNISHED BY LANDLORD

7.1 Landlord Repairs.

(a) Except as otherwise provided in this Lease, Landlord agrees to keep in good order, condition and repair the roof, public areas, exterior walls (including exterior glass) and structure of the Building (including all plumbing, mechanical and electrical systems, but specifically excluding any plumbing, mechanical and electrical systems installed by Tenant, and any supplemental heating, ventilation or air conditioning equipment or systems installed at

Tenant's request or as a result of Tenant's requirements in excess of building standard design criteria, all of which shall be the responsibility of Tenant), all insofar as they affect the Premises, except that Landlord shall in no event be responsible to Tenant for the repair of glass in the Premises, the doors (or related glass and finish work) leading to the Premises, or any condition in the Premises or the Building caused by any act or neglect of Tenant, its invitees or contractors. Landlord shall also keep and maintain all Common Facilities in a good and clean order, condition and repair, free of snow and ice and accumulation of dirt and rubbish, and shall keep and maintain all landscaped areas on the Property in a neat and orderly condition. Landlord shall not be responsible to make any improvements or repairs to the Building other than as expressly in this **Section 7.1** provided, unless expressly provided otherwise in this Lease.

(b) Landlord shall never be liable for any failure to make repairs which Landlord has undertaken to make under the provisions of this **Section 7.1** or elsewhere in this Lease, unless Tenant has given notice to Landlord of the need to make such repairs, and Landlord has failed to commence to make such repairs within a reasonable time after receipt of such notice, or fails to proceed with reasonable diligence to complete such repairs.

7.2 Tenant Repairs.

(a) Tenant will keep the Premises and every part thereof neat and clean, and will maintain the same in good order, condition and repair, excepting only those repairs for which Landlord is responsible under the terms of this Lease, reasonable wear and tear of the Premises, and damage by fire or other casualty or as a consequence of the exercise of the power of eminent domain; and Tenant shall surrender the Premises, at the end of the Term, in such condition. Without limitation, Tenant shall comply with all laws, codes and ordinances from time to time in effect and all directions, rules and regulations of governmental agencies having jurisdiction, and the standards recommended by the Boston Board of Fire Underwriters applicable to Tenant's particular use and occupancy of the Premises, and shall, at Tenant's expense, obtain all permits, licenses and the like required thereby. Subject to **Section 10.4** regarding waiver of subrogation, Tenant shall be responsible for the cost of repairs which may be made necessary by reason of damage to the Building caused by any negligence or willful misconduct of Tenant, or its contractors or invitees (including any damage by fire or other casualty arising therefrom).

(b) If repairs are required to be made by Tenant pursuant to the terms hereof, and Tenant fails to commence the repairs, upon not less than ten (10) days' prior written notice (except that no notice shall be required in the event of an emergency), Landlord may make or cause such repairs to be made (but shall not be required to do so), and the provisions of **Section 14.4** shall be applicable to the costs thereof. Landlord shall not be responsible to Tenant for any loss or damage whatsoever that may accrue to Tenant's stock or business by reason of Landlord's making such repairs.

7.3 Floor Load - Heavy Machinery.

(a) Tenant shall not place a load upon any floor in the Premises exceeding the floor load per square foot of area which such floor was designed to carry and which is allowed by law. Landlord reserves the right to prescribe the weight and position of all heavy business machines and mechanical equipment, including safes, which shall be placed so as to distribute the weight. Business machines and mechanical equipment shall be placed and maintained by Tenant at Tenant's expense in settings sufficient, in Landlord's judgment, to absorb and prevent vibration, noise and annoyance. Tenant shall not move any safe, heavy machinery, heavy equipment, freight, bulky matter or fixtures into or out of the Building without Landlord's prior consent, which consent shall not be unreasonably withheld, conditioned or delayed and which consent may include a requirement to provide insurance, naming Landlord as an insured, in such amounts as Landlord may deem reasonable.

(b) If any such safe, machinery, equipment, freight, bulky matter or fixtures requires special handling, Tenant agrees to employ only persons holding a Master Rigger's License to do such work, and that all work in connection therewith shall comply with applicable laws and regulations. Any such moving shall be at the sole risk and hazard of Tenant, and Tenant will exonerate, indemnify and save Landlord harmless against and from any liability, loss, injury, claim or suit resulting directly or indirectly from such moving, subject to Section 10.4.

7.4 Utility Services. The Premises shall be separately metered by Landlord, at Landlord's expense, prior to the Commencement Date, for water, electricity and gas.

7.5 Other Services.

Landlord shall also provide at all times:

(a) Warm and cold water (at temperatures supplied by the city in which the Property is located) for laboratory use, drinking, lavatory and toilet purposes.

(b) Access to the Premises at all times, subject to security precautions from time to time in effect, if any, and subject always to restrictions based on emergency conditions.

Landlord may from time to time, but shall not be obligated to, provide one or more attendants in or about the lobby of the Building, and the costs of such services shall constitute Operating Expenses in accordance with the provisions of **Article 9** hereof. Tenant expressly acknowledges and agrees that, if provided: (i) such attendants shall not serve as police officers, and will be unarmed, and will not be trained in situations involving potentially physical confrontation; and (ii) such attendants will be solely an amenity to tenants of the Building for purposes such as assisting visitors and invitees of tenants and others in the Building, monitoring fire control and alarm equipment, and summoning emergency services to the Building as and when needed, and not for the purpose of securing any individual tenant premises or guaranteeing

the physical safety of Tenant's Premises or of Tenant's employees, agents, contractors or invitees. If and to the extent that Tenant desires to provide security for the Premises or for such persons or their property, Tenant shall be responsible for so doing, after having first consulted with Landlord and after obtaining Landlord's consent, which shall not be unreasonably withheld. Landlord expressly disclaims any and all responsibility and/or liability for the physical safety of Tenant's property, and for that of Tenant's employees, agents, contractors and invitees, and, without in any way limiting the operation of **Article 10** hereof, Tenant, for itself and its agents, contractors, invitees and employees, hereby expressly waives any claim, action, cause of action or other right which may accrue or arise as a result of any damage or injury to the person or property of Tenant or any such agent, invitee, contractor or employee unless arising out of the negligence or willful misconduct of Landlord, its agents, its employees, or its contractors. Tenant agrees that, as between Landlord and Tenant, it is Tenant's responsibility to advise its employees, agents, contractors and invitees as to necessary and appropriate safety precautions.

7.6 Interruption of Service.

(a) Landlord reserves the right to curtail, suspend, interrupt and/or stop the supply of water, sewage, electrical current, cleaning, and other services, and to curtail, suspend, interrupt and/or stop use of entrances and/or lobbies serving access to the Building, or other portions of the Property, provided Tenant has one reasonable means of access to the Premises at all times, without thereby incurring any liability to Tenant, when necessary by reason of accident or emergency, or for repairs, alterations, replacements or improvements in the judgment of Landlord, reasonably exercised, desirable or necessary, or when prevented from supplying such services or use due to any act or neglect of Tenant or Tenant's agents employees, contractors or invitees or any person claiming by, through or under Tenant or by Force Majeure, including, but not limited to, strikes, lockouts, difficulty in obtaining materials, accidents, laws or orders, or inability, by exercise of reasonable diligence, to obtain electricity, water, gas, steam, coal, oil or other suitable fuel or power; provided, however, Landlord shall use reasonable efforts to restore any such service. If, however, such curtailment, suspension, interruption and/or stoppage may be restored by Landlord and is within Landlord's control, Landlord agrees to use best efforts to restore such service. With respect to non-emergency repairs and maintenance, Landlord shall provide Tenant with reasonable advance notice and shall schedule such repairs and maintenance in a manner to minimize disruption with Tenant's business operations at the Premises. Except as set forth in **paragraph (b)** below, no diminution or abatement of rent or other compensation, nor any direct, indirect or consequential damages shall or will be claimed by Tenant as a result of, nor shall this Lease or any of the obligations of Tenant be affected or reduced by reason of, any such interruption, curtailment, suspension or stoppage in the furnishing of the foregoing services or use, irrespective of the cause thereof. Except as set forth in **paragraph (b)** below, failure or omission on the part of Landlord to furnish any of the foregoing services or use as provided in this paragraph shall not be construed as an eviction of Tenant, actual or constructive, nor entitle Tenant to an abatement of rent, nor to render the Landlord liable in damages, nor release Tenant from prompt fulfillment of any of its covenants under this Lease.

(b) Notwithstanding anything contained in this Lease to the contrary, if (i) an interruption or curtailment, suspension or stoppage of an Essential Service (as said term is hereinafter defined) shall occur, except any of the same due to any act or neglect of Tenant or Tenant's agents employees, contractors or invitees or any person claiming by, through or under Tenant (any such interruption of an Essential Service being hereinafter referred to as a "**Service Interruption**"), and (ii) such Service Interruption occurs or continues as a result of the negligence or a wrongful conduct of the Landlord or Landlord's agents, servants, employees or contractors, and (iii) such Service Interruption continues for more than five (5) consecutive Business Days after Landlord shall have received notice thereof from Tenant, and (iv) as a result of such Service Interruption, the conduct of Tenant's normal operations in the Premises are materially and adversely affected, then there shall be an abatement of one day's Basic Rent and Escalation Charges for each day during which such Service Interruption continues after such five (5) Business Day period; provided, however, that if any part of the Premises is reasonably useable for Tenant's normal business operations or if Tenant conducts all or any part of its operations in any portion of the Premises notwithstanding such Service Interruption, then the amount of each daily abatement of Basic Rent and Escalation Charges shall only be proportionate to the nature and extent of the interruption of Tenant's normal operations or ability to use the Premises. The rights granted to Tenant under this **paragraph (b)** shall be Tenant's sole and exclusive remedy resulting from a failure of Landlord to provide services, and Landlord shall not otherwise be liable for any loss or damage suffered or sustained by Tenant resulting from any failure or cessation of services. For purposes hereof, the term "**Essential Services**" shall mean the following services: access to the Premises, gas, water and sewer/septic service and electricity, but only to the extent that Landlord has an obligation to provide same to Tenant under this Lease. Any abatement of Basic Rent under this paragraph shall apply only with respect to Basic Rent allocable to the period after each of the conditions set forth in subsections (i) through (iv) hereof shall have been satisfied and only during such times as each of such conditions shall exist.

ARTICLE 8
REAL ESTATE TAXES

8.1 Payments on Account of Real Estate Taxes.

(a) "**Tax Year**" shall mean a twelve-month period commencing on July 1 and falling wholly or partially within the Term, and "**Taxes**" shall mean (i) all taxes, assessments (special or otherwise), levies, fees and all other government levies, exactions and charges of every kind and nature, general and special, ordinary and extraordinary, foreseen and unforeseen, which are, at any time prior to or during the Term, imposed or levied upon or assessed against the Property or any portion thereof, or against any Basic Rent, Additional Rent or other rent of any kind or nature payable to Landlord by anyone on account of the ownership, leasing or operation of the Property, or which arise on account of or in respect of the ownership, development, leasing, operation or use of the Property or any portion thereof; (ii) all gross receipts taxes or similar taxes imposed or levied upon, assessed against or measured by any

Basic Rent, Additional Rent or other rent of any kind or nature or other sum payable to Landlord by anyone on account of the ownership, development, leasing, operation, or use of the Property or any portion thereof; (iii) all value added, use and similar taxes at any time levied, assessed or payable on account of the ownership, development, leasing, operation, or use of the Property or any portion thereof; and (iv) reasonable expenses of any proceeding for abatement of any of the foregoing items included in Taxes, provided Landlord prevails in such abatement proceeding; but the amount of special taxes or special assessments included in Taxes shall be limited to the amount of the installment (plus any interest, other than penalty interest, payable thereon) of such special tax or special assessment required to be paid during the year in respect of which such Taxes are being determined. There shall be excluded from Taxes (i) any interest, penalty, charge or assessment arising from the failure of Landlord to pay taxes when due and (ii) all income, estate, succession, inheritance and transfer taxes of Landlord; provided, however, that if at any time during the Term the present system of ad valorem taxation of real property shall be changed so that a capital levy, franchise, income, profits, sales, rental, use and occupancy, or other tax or charge shall in whole or in part be substituted for, or added to, such ad valorem tax and levied against, or be payable by, Landlord with respect to the Property or any portion thereof, such tax or charge shall be included in the term "**Taxes**" for the purposes of this Article.

(b) Tenant shall pay to Landlord Tenant's Proportionate Share of Taxes for such Tax Year, such amount to be apportioned for any portion of a Tax Year in which the Commencement Date falls or the Term expires. Tenant's payment of its Proportionate Share of Taxes shall include the period from the Commencement Date to the Rent Commencement Date. In the event that the Property Rentable Area shall change during the Term of this lease Tenant's Proportionate Share of Taxes shall be adjusted *pro rata.*

(c) Estimated payments by Tenant on account of Taxes shall be made on the first day of each and every calendar month during the Term of this Lease, commencing on the Commencement Date in the fashion herein provided for the payment of Basic Rent. The monthly amount so to be paid to Landlord shall be sufficient to provide Landlord by the time real estate tax payments are due with a sum equal to Tenant's required payment, as reasonably estimated by Landlord from time to time, on account of Taxes for the then current Tax Year. Promptly after receipt by Landlord of bills for such Taxes, Landlord shall advise Tenant of the amount thereof and the computation of Tenant's payment on account thereof. If estimated payments theretofore made by Tenant for the Tax Year covered by such bills exceed the required payment on account thereof for such Tax Year, Landlord shall credit the amount of overpayment against subsequent obligations of Tenant on account of Taxes (or promptly refund such overpayment if the Term of this Lease has ended and Tenant has no further obligation to Landlord); but if the required payments on account thereof for such Tax Year are greater than estimated payments theretofore made on account thereof for such Tax Year, Tenant shall pay the difference to Landlord within thirty (30) days after being so advised by Landlord, and the obligation to make such payment for any period within the Term shall survive expiration of the Term.

8.2 **Abatement**. If Landlord shall receive any tax refund or reimbursement of Taxes or sum in lieu thereof with respect to any Tax Year all or any portion of which falls within the Term, then out of any balance remaining thereof after deducting Landlord's reasonable expenses in obtaining such refund, Landlord shall pay to Tenant, provided there does not then exist an Event of Default, an amount equal to such refund or reimbursement or sum in lieu thereof (exclusive of any interest, and apportioned if such refund is for a Tax Year a portion of which falls outside the Term,) multiplied by Tenant's Proportionate Share; provided, that in no event shall Tenant be entitled to receive more than the payments made by Tenant on account of Taxes for such Tax Year pursuant to **paragraph (b)** of **Section 8.1**.

ARTICLE 9
OPERATING AND UTILITY EXPENSES

9.1 **Definitions**. For the purposes of this Article, the following terms shall have the following respective meanings:

(a) "**Operating Year**" shall mean each calendar year, all or any part of which falls within the Term.

(b) "**Operating Expenses**" shall mean the aggregate costs and expenses incurred by Landlord with respect to the operation, administration, cleaning, repair, maintenance and management of the Property, all as set forth in **Exhibit D** annexed hereto ("**Operating Services**"), provided that, if during any portion of the Operating Year for which Operating Expenses are being computed, less than all of the rentable area of the Property was occupied by tenants or if Landlord is not supplying all tenants with the Operating Services being supplied hereunder, actual Operating Expenses incurred shall be reasonably extrapolated by Landlord on an item by item basis to the estimated Operating Expenses that would have been incurred if ninety-five percent (95%) of the Property were fully occupied for such Operating Year and such services were being supplied to all tenants, and such extrapolated amount shall, for the purposes hereof, be deemed to be included in the Operating Expenses for such Year. Furthermore, if during any Operating Year for which Operating Expenses are computed, Landlord has agreed to supply an Operating Service to a particular tenant of the Property and such tenant has agreed to pay one hundred percent (100%) of the cost of such Operating Service, then the costs associated with providing such Operating Service to such tenant shall not be included in Operating Expenses. Actual Operating Expenses incurred in providing such Operating Service to the other tenants of the Property shall be reasonably extrapolated by Landlord on an item by item basis to the estimated Operating Expenses that would have been incurred if ninety-five percent (95%) of the Property were fully occupied for such Year and such services were being supplied to all tenants, and such extrapolated amount shall, for the purposes hereof, be deemed to be the Operating Expenses attributable to such Operating Service for such Year.

9.2 Tenant's Payment of Operating Expenses.

(a) Tenant shall pay to Landlord, as an Escalation Charge, an amount equal to Tenant's Proportionate Share of Operating Expenses, such amount to be apportioned for any portion of an Operating Year in which the Rent Commencement Date falls or the Term of this Lease ends. For the period from the Commencement Date to the Rent Commencement Date, Tenant's payment of Operating Expenses shall be equal to the actual amount of Operating Expenses incurred with respect to the Premises, but in no event shall exceed $1.75 per square foot.

(b) Estimated payments by Tenant on account of Operating Expenses shall be made on the first day of each and every calendar month during the Term of this Lease, commencing on the Commencement Date in the fashion herein provided for the payment of Basic Rent. The monthly amount so to be paid to Landlord shall be sufficient to provide Landlord by the end of each Operating Year a sum equal to Tenant's required payment, as reasonably estimated by Landlord from time to time during each Operating Year, on account of Operating Expenses for such Operating Year. Within ninety (90) days after the end of each Operating Year, Landlord shall submit to Tenant a reasonably detailed accounting of Operating Expenses for such Operating Year, and Landlord shall certify to the accuracy thereof. If estimated payments theretofore made for such Operating Year by Tenant exceed Tenant's required payment on account thereof for such Operating Year according to such statement, Landlord shall credit the amount of overpayment against subsequent obligations of Tenant with respect to Operating Expenses (or promptly refund such overpayment if the Term of this Lease has ended and Tenant has no further obligation to Landlord); but if the required payments on account thereof for such Operating Year are greater than the estimated payments (if any) theretofore made on account thereof for such Operating Year, Tenant shall make payment to Landlord within thirty (30) days after being so advised by Landlord, and the obligation to make such payment for any period within the Term shall survive expiration of the Term.

(c) Tenant shall have the right to examine, copy and audit Landlord's books and records establishing Operating Expenses for any Operating Year for a period of one (1) year following the date that Tenant receives the statement of Operating Expenses for such Operating Year from Landlord. Tenant shall give Landlord not less than thirty (30) days' prior notice of its intention to examine and audit such books and records, and such examination and audit shall take place at such place within the city and state in which the Property is located. All costs of the examination and audit shall be borne by Tenant; provided, however, that if such examination and audit establishes that the actual Operating Expenses for the Operating Year in question are less than the amount set forth as the annual Operating Expenses on the annual statement delivered to Tenant by at least ten percent (10%), then Landlord shall pay the reasonable costs of such examination and audit. If, pursuant to the audit, the payments made for such Operating Year by Tenant exceed Tenant's required payment on account thereof for such Operating Year, Landlord shall credit the amount of overpayment against subsequent obligations of Tenant with respect to Operating Expenses (or promptly refund such overpayment if the Term of this Lease has ended

and Tenant has no further obligation to Landlord); but, if the payments made by Tenant for such Operating Year are less than Tenant's required payment as established by the examination and audit, Tenant shall pay the deficiency to Landlord within thirty (30) days after conclusion of the examination and audit, and the obligation to make such payment for any period within the Term shall survive expiration of the Term. If Tenant does not elect to exercise its right to examine and audit Landlord's books and records for any Operating Year within the time period provided for by this paragraph, Tenant shall have no further right to challenge Landlord's statement of Operating Expenses.

9.3 Utility Payments. Tenant shall be responsible for the payment of all water, electricity and gas used and consumed in the Premises, provided Landlord has separately metered the same as required above. Tenant shall pay for electricity and natural gas directly to the utility company on or before the date when due. The obligation to pay for electricity and natural gas used and consumed in the Premises during the last month of the Term hereof shall survive expiration of the Term.

ARTICLE 10
INDEMNITY AND PUBLIC LIABILITY INSURANCE

10.1 Tenant's Indemnity. Except to the extent arising from the gross negligence or willful misconduct of Landlord or its agents or employees, Tenant agrees to indemnify and save harmless Landlord and Landlord's partners, members, shareholders, officers, directors, managers, employees, agents and contractors and any Holder from and against all claims, losses, cost, damages, liability or expenses of whatever nature arising from: (i) any accident, injury or damage whatsoever to any person, or to the property of any person, occurring in the Premises; (ii) any accident, injury or damage whatsoever to any person, or to the property of any person, occurring outside of the Premises, but on the Property, where such accident, damage or injury results from any negligence or willful misconduct on the part of Tenant or Tenant's agents, employees, contractors, invitees or sublessees; or (iii) the use or occupancy of the Premises or of any business conducted therein or anything or work whatsoever done or any condition created (other than by Landlord) in the Premises, and, in any case, occurring after the Commencement Date (or such earlier date as of which Tenant takes possession of the Premises) until the expiration of the Term of this Lease and thereafter so long as Tenant is in occupancy of any part of the Premises. This indemnity and hold harmless agreement shall include indemnity against all losses, costs, damages, expenses and liabilities incurred in or in connection with any such claim or any proceeding brought thereon, and the defense thereof, including, without limitation, reasonable attorneys' fees and costs at both the trial and appellate levels. The provisions of this **Section 10.1** shall survive the expiration or earlier termination of this Lease.

10.2 Tenant Insurance. Tenant agrees to maintain in full force from the date upon which Tenant first enters the Premises for any reason, throughout the Term of this Lease, and thereafter so long as Tenant is in occupancy of any part of the Premises, a policy of commercial general liability and property damage insurance (including broad form contractual liability,

independent contractor's hazard and completed operations coverage) under which Tenant is named as an insured and Landlord, and, at Landlord's request, Landlord's property manager, any Holder, and such other persons as Landlord reasonably may request are named as additional insureds, and under which the insurer agrees to indemnify and hold Landlord and such other additional named insureds harmless from and against all cost, expense and/or liability arising out of or based upon any and all claims, accidents, injuries and damages set forth in **Section 10.1.** Tenant may satisfy such insurance requirements by including the Premises in a so-called "blanket" and/or "umbrella" insurance policy, provided that the amount of coverage allocated to the Premises shall fulfill the requirements set forth herein. Each policy required hereunder shall be non-cancelable and non-amendable with respect to Landlord and Landlord's said designees without thirty (30) days' prior notice, shall be written on an "occurrence" basis, and shall be in at least the amounts of the Initial General Liability Insurance specified in **Section 1.1** or such greater amounts as Landlord in its reasonable discretion shall from time to time request, and a duplicate original or certificates thereof reasonably satisfactory to Landlord, together with a photocopy of the entire policy, shall be delivered to Landlord.

10.3 **Tenant's Risk.** Tenant agrees that its use and occupancy of the Premises and its use of such other portions of the Property as Tenant is herein given the right to use shall be at Tenant's own risk. Landlord shall not be liable to Tenant, its employees, agents, invitees or contractors for any damage, injury, loss, compensation, or claim (including, but not limited to, claims for the interruption of or loss to Tenant's business) based on, arising out of or resulting from any cause whatsoever, including, but not limited to, repairs to any portion of the Premises or the Property, any fire, robbery, theft, mysterious disappearance and/or any other crime or casualty, the actions of any other tenants of the Building or of any other person or persons, or any leakage in any part or portion of the Premises or the Building, or from water, rain or snow that may leak into, or flow from any part of the Premises or the Building, or from drains, pipes or plumbing fixtures in the Building, unless due to the negligence or willful misconduct of Landlord or Landlord's agents, employees, or contractors. Any goods, property or personal effects stored or placed in or about the Premises shall be at the sole risk of Tenant, and neither Landlord nor Landlord's insurers shall in any manner be held responsible therefore unless due to the negligence or willful misconduct of Landlord, Landlord's agents, or its employees. Landlord shall not be responsible or liable to Tenant, or to those claiming by, through or under Tenant, for any loss or damage that may be occasioned by or through the acts or omissions of persons occupying adjoining premises or any part of the premises adjacent to or connecting with the Premises or any part of the Property or otherwise. Notwithstanding the foregoing, Landlord shall not be released from liability for any injury, loss, damages or liability to the extent arising from any negligence or willful misconduct of Landlord, its servants, employees or agents acting within the scope of their authority on or about the Premises; provided, however, that in no event shall Landlord, its servants, employees or agents have any liability to Tenant based on any loss with respect to or interruption in the operation of Tenant's business. Tenant shall carry "all-risk" property insurance on a "replacement cost" basis, insuring Tenant's Removable Property and any Alterations made by Tenant pursuant to **Section 5.2,** to the extent that the same have not become the property of Landlord. The provisions of this **Section 10.3** shall be applicable from and after the execution of this Lease and until the end of the Term of this Lease, and during such further period as Tenant may use or be in occupancy of any part of the Premises or of the Building.

10.4 Waiver of Subrogation. The parties hereto shall each procure an appropriate clause in, or endorsement on, any property insurance policy on the Premises, the Property, or any personal property, fixtures or equipment located thereon or therein, pursuant to which the insurer waives subrogation or consents to a waiver of right of recovery in favor of either party, its respective agents or employees. Having obtained such clauses and/or endorsements, each party hereby agrees that it will not make any claim against or seek to recover from the other or its agents or employees for any loss or damage to its property or the property of others resulting from fire or other perils covered by such property insurance (or which would have been covered had all insurance required hereunder been maintained).

ARTICLE 11
FIRE, EMINENT DOMAIN, ETC.

11.1 Landlord's Right of Termination. Within sixty (60) days after damage by fire or other casualty, Landlord shall provide Tenant with a good faith estimate of the time to restore the Premises and/or Building. If the Premises or the Building are substantially damaged by fire or casualty (the term "substantially damaged" meaning damage of such a character that the same cannot, in the ordinary course, reasonably be expected to be repaired within one hundred twenty (120) days from the time that repair work would commence), or if any part of the Building is taken by any exercise of the right of eminent domain, then Landlord shall have the right to terminate this Lease (even if Landlord's entire interest in the Premises may have been divested) by giving notice of Landlord's election so to do within sixty (60) days after the occurrence of such casualty or the effective date of such taking, whereupon this Lease shall terminate thirty (30) days after the date of such notice with the same force and effect as if such date were the date originally established as the expiration date hereof, provided that if the Premises are not damaged and the Premises need not be vacant for Landlord to restore the damaged portion(s) of the Building, then such termination right shall be available only if all other leases in the Building are also terminated.

11.2 Restoration; Tenant's Right of Termination. If the Premises or the Building are damaged by fire or other casualty, and this Lease is not terminated pursuant to **Section 11.1**, Landlord shall thereafter use reasonable efforts to restore the Building and the Premises (excluding any Alterations made by Tenant pursuant to **Section 5.2** which have not become the property of the Landlord) to proper condition for Tenant's use and occupation, provided that Landlord's obligation shall be limited to the amount of insurance proceeds available therefore, (but such limitation shall only apply if all insurance required to be maintained by Landlord hereunder is in effect at the time of such fire or casualty) and Landlord shall not be obligated to commence restoration until Landlord has received the insurance proceeds. If, for any reason, such restoration shall not be substantially completed within six (6) months after the expiration of the sixty-day period referred to in **Section 11.1** (which six-month period may be extended for

such periods of time as Landlord is prevented from proceeding with or completing such restoration due to Force Majeure, but in no event for more than an additional three (3) months), Tenant shall have the right to terminate this Lease by giving notice to Landlord thereof within thirty (30) days after the expiration of such period (as so extended) provided that such restoration is not completed within such period. This Lease shall cease and come to an end without further liability or obligation on the part of either party thirty (30) days after such giving of notice by Tenant unless, within such thirty-day period, Landlord substantially completes such restoration. Such right of termination shall be Tenant's sole and exclusive remedy at law or in equity for Landlord's failure so to complete such restoration, and time shall be of the essence with respect thereto.

11.3 Landlord's Insurance. Landlord agrees to maintain in full force and effect, during the Term of this Lease, property damage insurance with such deductibles and in such amounts as may from time to time be carried by reasonably prudent owners of similar buildings in the area in which the Property is located, provided that in no event shall Landlord be required to carry other than fire and extended coverage insurance or insurance in amounts equal to 100% of the actual insurable cash value of the Building (excluding footings and foundations). Landlord may satisfy such insurance requirements by including the Property in a so-called "blanket" insurance policy, provided that the amount of coverage allocated to the Property shall fulfill the foregoing requirements.

11.4 Abatement of Rent. If the Premises or the Building are damaged by fire or other casualty, Basic Rent and Escalation Charges payable by Tenant shall abate proportionately for the period during which, by reason of such damage, there is substantial interference with Tenant's use of, or access to the Premises, having regard for the extent to which Tenant may be required to discontinue Tenant's use of all or an undamaged portion of the Premises due to such damage, but such abatement or reduction shall end if and when Landlord shall have substantially completed sufficient restoration that Tenant is reasonably able to use the Premises and the Premises are in substantially the condition in which they were prior to such damage (excluding any Alterations made by Tenant pursuant to **Section 5.2**) which have not become the property of the Landlord). If such fire or other casualty occurs during the period between the Commencement Date and the Rent Commencement Date, the Rent Commencement Date shall be delayed one day for each day from the date of the casualty until Landlord shall have substantially completed sufficient restoration such that Tenant is reasonably able to commence construction of Tenant's Work, and all Escalation Charges shall abate during such period. If the Premises shall be affected by any exercise of the power of eminent domain, Basic Rent and Escalation Charges payable by Tenant shall be justly and equitably abated and reduced according to the nature and extent of the loss of use thereof suffered by Tenant. In no event shall Landlord have any liability for damages to Tenant for inconvenience, annoyance, or interruption of business arising from any fire or other casualty or eminent domain.

11.5 Condemnation Award. Landlord shall have and hereby reserves and excepts, and Tenant hereby grants and assigns to Landlord, all rights to recover for damages to the

Property and the leasehold interest hereby created, and to compensation accrued or hereafter to accrue by reason of any taking, by exercise of the right of eminent domain, and by way of confirming the foregoing, Tenant hereby grants and assigns, and covenants with Landlord to grant and assign to Landlord, all rights to such damages or compensation, and covenants to deliver such further assignments and assurances thereof as Landlord may from time to time request, and Tenant hereby irrevocably appoints Landlord its attorney-in-fact to execute and deliver in Tenant's name all such assignments and assurances. Nothing contained herein shall be construed to prevent Tenant from prosecuting in any condemnation proceedings a claim for the value of any of Tenant's Removable Property installed in the Premises by Tenant at Tenant's expense and for relocation expenses, provided that such action shall not affect the amount of compensation otherwise recoverable by Landlord from the taking authority.

ARTICLE 12
HOLDING OVER; SURRENDER

12.1 Holding Over. Any holding over by Tenant after the expiration of the Term of this Lease shall be treated as a daily tenancy at sufferance at an amount equal to two (2) times the Basic Rent then in effect plus Escalation Charges and other Additional Rent herein provided (prorated on a daily basis). Tenant shall also pay to Landlord all damages, direct and/or indirect, sustained by reason of any such holding over. In all other respects, such holding over shall be on the terms and conditions set forth in this Lease as far as applicable.

12.2 Surrender of Premises. Upon the expiration or earlier termination of the Term of this Lease, Tenant shall peaceably quit and surrender to Landlord the Premises in neat and clean condition and in good order, condition and repair, together with all alterations, additions and improvements which may have been made or installed in, on or to the Premises prior to or during the Term of this Lease (except as hereinafter provided), excepting only ordinary wear and use, damage by fire or other casualty, and taking by eminent domain. Tenant shall remove all of Tenant's Removable Property and, to the extent specified by Landlord at the time of Landlord's consent thereto, all alterations, installations and additions made by Tenant (excluding Tenant's Work, other than the Tank) and all partitions wholly within the Premises unless installed initially by Landlord in preparing the Premises for Tenant's occupancy; and shall repair any damages to the Premises, the Building, or the Property caused by such removal, subject to Section 10.4 above. Any Tenant's Removable Property which shall remain in the Building or on the Premises after the expiration or termination of the Term of this Lease (and vacancy thereof by Tenant) shall be deemed conclusively to have been abandoned, and either may be retained by Landlord as its property or may be disposed of in such manner as Landlord may see fit, at Tenant's sole cost and expense.

ARTICLE 13
RIGHTS OF MORTGAGEES; TRANSFER OF TITLE

13.1 Rights of Mortgagees.

(a) This Lease shall be subordinate to any mortgage, deed of trust or ground lease or similar encumbrance (collectively, a "**Mortgage**", and the holder thereof from time to time the "**Holder**") from time to time encumbering the Premises, whether executed and delivered prior to or subsequent to the date of this Lease, unless the Holder shall elect otherwise. If this Lease is subordinate to any Mortgage and the Holder or any other party shall succeed to the interest of Landlord pursuant to the Mortgage (such Holder or other party, a "**Successor**"), at the election of the Successor), Tenant shall attorn to the Successor and this Lease shall continue in full force and effect between the Successor and Tenant. Not more than fifteen (15) days after Landlord's written request, Tenant agrees to execute such instruments of subordination or attornment in confirmation of the foregoing agreement as the Successor reasonably may request.

(b) Landlord represents and warrants that the only Mortgage which encumbers the Property as of the date of this Lease is held by UBS Principal Finance LLC (the "**Existing Holder**"). Tenant acknowledges that Landlord has delivered Existing Holder's form of Non-Disturbance Agreement to Tenant. Landlord agrees to use best efforts to have the Existing Holder enter into such Non-Disturbance Agreement with Tenant. Tenant agrees to use commercially reasonable efforts to enter into such Non-Disturbance Agreement with Existing Holder. In addition, Landlord agrees to use best efforts to obtain any subsequent Holder's written agreement that, subject to such reasonable qualifications as the Holder may impose, in the event that the Holder or any other party shall succeed to the interest of Landlord hereunder pursuant to such Mortgage, so long as no Event of Default exists hereunder, Tenant's right to possession of the Premises shall not be disturbed and Tenant's other rights hereunder shall not be adversely affected by any foreclosure of such Mortgage, and such Holder shall recognize Tenant as its tenant on the terms and conditions of this Lease. For purposes hereof, the term "best efforts" shall not include the payment of any sum of money or the consent to less favorable terms and conditions with respect to the obligations or indebtedness secured or created by the Mortgage.

13.2 Assignment of Rents and Transfer of Title.

(a) With reference to any assignment by Landlord of Landlord's interest in this Lease, or the rents payable hereunder, conditional in nature or otherwise, which assignment is made to the holder of a mortgage on property which includes the Premises, Tenant agrees that the execution thereof by Landlord, and the acceptance thereof by the holder of such mortgage shall never be treated as an assumption by such holder of any of the obligations of Landlord hereunder unless such holder shall, by notice sent to Tenant, specifically otherwise elect and, except as aforesaid, such holder shall be treated as having assumed Landlord's obligations hereunder only upon foreclosure of such holder's mortgage and the taking of possession of the Premises.

(b) In no event shall the acquisition of Landlord's interest in the Property by a purchaser which, simultaneously therewith, leases Landlord's entire interest in the Property back to the seller thereof be treated as an assumption by operation of law or otherwise, of Landlord's obligations hereunder, but Tenant shall look solely to such seller-lessee, and its successors from time to time in title, for performance of Landlord's obligations hereunder. In any such event, this Lease shall be subject and subordinate to the lease to such purchaser provided that Tenant's rights under this Lease are not disturbed. For all purposes, such seller-lessee, and its successors in title, shall be the Landlord hereunder unless and until Landlord's position shall have been assumed by such purchaser-lessor.

(c) Except as provided in **paragraph (b)** of this Section, in the event of any transfer of title to the Property by Landlord, Landlord shall thereafter be entirely freed and relieved from the performance and observance of all covenants and obligations hereunder provided such transferee assumes all of Landlord's obligations hereunder in writing.

13.3 Notice to Mortgagee. After receiving notice from Landlord of any Holder of a Mortgage which includes the Premises, no notice from Tenant to Landlord alleging any default by Landlord shall be effective unless and until a copy of the same is given to such Holder (provided Tenant shall have been furnished with the name and address of such Holder), and the curing of any of Landlord's defaults by such Holder shall be treated as performance by Landlord.

ARTICLE 14
DEFAULT; REMEDIES

14.1 Tenant's Default.

(a) If at any time subsequent to the date of this Lease any one or more of the following events (herein referred to as an "**Event of Default**") shall occur:

(i) Tenant shall fail to pay the Basic Rent, Escalation Charges or any other Additional Rent hereunder when due and such failure shall continue for five (5) Business Days after notice to Tenant from Landlord; or

(ii) Tenant shall neglect or fail to perform or observe any other covenant herein contained on Tenant's part to be performed or observed and Tenant shall fail to remedy the same within thirty (30) days after notice to Tenant specifying such neglect or failure, or if such failure is of such a nature that Tenant cannot reasonably remedy the same within such thirty (30) day period, Tenant shall fail to commence promptly (and in any event within such thirty (30) day period) to remedy the same and to prosecute such remedy to completion with diligence and continuity (and in any event, within ninety (90) days after the notice described in this **subparagraph (ii)**); or

(iii) Tenant's leasehold interest in the Premises shall be taken on execution or by other process of law directed against Tenant; or

(iv) Tenant shall make an assignment for the benefit of creditors or shall be adjudicated insolvent, or shall file any petition or answer seeking any reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief for itself under any present or future Federal, State or other statute, law or regulation for the relief of debtors (other than the Bankruptcy Code, as hereinafter defined), or shall seek or consent to or acquiesce in the appointment of any trustee, receiver or liquidator of Tenant or of all or any substantial part of its properties, or shall admit in writing its inability to pay its debts generally as they become due; or

(v) An Event of Bankruptcy (as hereinafter defined) shall occur with respect to Tenant; or

(vi) A petition shall be filed against Tenant under any law (other than the Bankruptcy Code) seeking any reorganization, arrangement, composition, readjustment, liquidation, dissolution, or similar relief under any present or future Federal, State or other statute, law or regulation and shall remain undismissed or unstayed for an aggregate of ninety (90) days (whether or not consecutive), or if any trustee, conservator, receiver or liquidator of Tenant or of all or any substantial part of its properties shall be appointed without the consent or acquiescence of Tenant and such appointment shall remain unvacated or unstayed for an aggregate of ninety (90) days (whether or not consecutive); or

(vii) If: (*x*) Tenant shall fail to pay the Basic Rent, Escalation Charges or any other Additional Rent hereunder when due or shall fail to perform or observe any other covenant herein contained on Tenant's part to be performed or observed and Tenant shall cure any such failure within the applicable grace period set forth in clauses (i) or (ii) above; or (*y*) an Event of Default of the kind set forth in clauses (i) or (ii) above shall occur and Landlord shall, in its sole discretion, permit Tenant to cure such Event of Default after the applicable grace period has expired; and the same or a similar failure shall occur more than once twice within the next 365 days (whether or not such similar failure is cured within the applicable grace period);

then in any such case, Landlord may terminate this Lease as hereinafter provided and exercise any other rights or remedies available under this Lease, at law or in equity. .

(b) For purposes of **clause (a)(v)** above, an "**Event of Bankruptcy**" means the filing of a voluntary petition by Tenant, or the entry of an order for relief against Tenant, under Chapter 7, 11, or 13 of the Bankruptcy Code, and the term "**Bankruptcy Code**" means 11 U.S.C §101, et seq.. If an Event of Bankruptcy occurs, then the trustee of Tenant's bankruptcy estate or Tenant as debtor-in-possession may (subject to final approval of the court) assume this Lease, and may subsequently assign it, only if it does the following within sixty (60) days after

the date of the filing of the voluntary petition, the entry of the order for relief (or such additional time as a court of competent jurisdiction may grant, for cause, upon a motion made within the original sixty-day period):

(i) file a motion to assume the Lease with the appropriate court;

(ii) satisfy all of the following conditions, which Landlord and Tenant acknowledge to be commercially reasonable:

(A) cure all Defaults of Tenant under this Lease or provide Landlord with Adequate Assurance (as defined below) that it will (x) cure all monetary Defaults of Tenant hereunder within ten (10) days from the date of the assumption; and (y) cure all nonmonetary Defaults of Tenant hereunder within thirty (30) days from the date of the assumption;

(B) compensate Landlord and any other person or entity, or provide Landlord with Adequate Assurance that within ten (10) days after the date of the assumption, it will compensate Landlord and such other person or entity, for any pecuniary loss that Landlord and such other person or entity incurred as a result of any Event of Default, the trustee, or the debtor-in-possession;

(C) provide Landlord with Adequate Assurance of Future Performance (as defined below) of all of Tenant's obligations under this Lease; and

(D) deliver to Landlord a written statement that the conditions herein have been satisfied.

(c) For purposes only of the foregoing **paragraph (b)**, and in addition to any other requirements under the Bankruptcy Code, any future federal bankruptcy law and applicable case law, "**Adequate Assurance**" means at least meeting the following conditions, which Landlord and Tenant acknowledge to be commercially reasonable:

(i) entering an order segregating sufficient cash to pay Landlord and any other person or entity under **paragraph (b)** above, and

(ii) granting to Landlord a valid first lien and security interest (in form acceptable to Landlord) in all property comprising the Tenant's "property of the estate," as that term is defined in Section 541 of the Bankruptcy Code, located on, used at or relating to the Premises, which lien and security interest secures the trustee's or debtor-in-possession's obligation to cure the monetary and nonmonetary defaults under the Lease within the periods set forth in **paragraph (b)** above.

(d) For purposes only of **paragraph (b)** above, and in addition to any other requirements under the Bankruptcy Code, any future federal bankruptcy law and applicable case law, "**Adequate Assurance of Future Performance**" means at least meeting the following conditions, which Landlord and Tenant acknowledge to be commercially reasonable:

(i) the trustee or debtor-in-possession depositing with Landlord, as security for the timely payment of rent and other monetary obligations, an amount equal to the sum of two (2) months' Basic Rent plus an amount equal to two (2) months' installments on account of Escalation Charges;

(ii) the trustee or the debtor-in-possession agreeing to pay in advance, on each day that the Basic Rent is payable, the monthly installments on account of Escalation Charges;

(iii) the trustee or debtor-in-possession providing adequate assurance of the source of the rent and other consideration due under this Lease;

(iv) Tenant's bankruptcy estate and the trustee or debtor-in-possession providing Adequate Assurance of the feasibility of the bankruptcy estate (and any successor after the conclusion of the Tenant's bankruptcy proceedings) continuing to have sufficient unencumbered assets after the payment of all secured obligations and administrative expenses to assure Landlord that the bankruptcy estate (and any successor after the conclusion of the Tenant's bankruptcy proceedings) will have sufficient funds to fulfill Tenant's obligations hereunder.

(e) If the trustee or the debtor-in-possession assumes the Lease under **paragraph (b)** above and applicable bankruptcy law, it may assign its interest in this Lease only if the proposed assignee first provides Landlord with Adequate Assurance of Future Performance of all of Tenant's obligations under the Lease, and if Landlord determines, in the exercise of its reasonable business judgment, that the assignment of this Lease will not breach any other lease, or any mortgage, financing agreement, or other agreement relating to the Property by which Landlord or the Property is then bound (and Landlord shall not be required to obtain consents or waivers from any third party required under any lease, mortgage, financing agreement, or other such agreement by which Landlord is then bound).

(f) For purposes only of **paragraph (e)** above, and in addition to any other requirements under the Bankruptcy Code, any future federal bankruptcy law and applicable case law, "**Adequate Assurance of Future Performance**" means at least the satisfaction of the following conditions, which Landlord and Tenant acknowledge to be commercially reasonable:

(i) the proposed assignee submitting a current financial statement, audited by a certified public accountant, that allows a net worth and working capital in amounts determined in the reasonable business judgment of Landlord to be sufficient to assure the future performance by the assignee of Tenant's obligation under this Lease; and

(ii) if requested by Landlord in the exercise of its reasonable business judgment, the proposed assignee obtaining a guarantee (in form and substance satisfactory to Landlord) from one or more persons who satisfy Landlord's standards of creditworthiness.

14.2 Landlord's Remedies.

(a) Upon the occurrence of an Event of Default, Landlord may terminate this Lease by notice to Tenant, specifying a date not less than five (5) days after the giving of such notice on which this Lease shall terminate and this Lease shall come to an end on the date specified therein as fully and completely as if such date were the date herein originally fixed for the expiration of the Term of this Lease, and Tenant will then quit and surrender the Premises to Landlord, but Tenant shall remain liable as hereinafter provided.

(b) If this Lease shall have been terminated as provided in this **Article**, or if any execution or attachment shall be issued against Tenant or any of Tenant's property whereupon the Premises shall be taken or occupied by someone other than Tenant, then Landlord may re-enter the Premises, either by summary proceedings, ejectment or otherwise, and remove and dispossess Tenant and all other persons and any and all property from the same, as if this Lease had not been made.

(c) If this Lease shall have been terminated as provided in this Article, Tenant shall pay the Basic Rent, Escalation Charges and other sums payable hereunder up to the time of such termination, and thereafter Tenant, until the end of what would have been the Term of this Lease in the absence of such termination, and whether or not the Premises shall have been relet, shall be liable to Landlord for, and shall pay to Landlord, as liquidated current damages: (x) the Basic Rent, Escalation Charges and other sums that would be payable hereunder if such termination had not occurred, less the net proceeds, if any, of any reletting of the Premises, after deducting all reasonable expenses in connection with such reletting, including, without limitation, all repossession costs, brokerage commissions, legal expenses, attorneys' fees, advertising, alteration costs and expenses of preparation for such reletting. Tenant shall pay the portion of such current damages referred to in clause (x) above to Landlord monthly on the days which the Basic Rent would have been payable hereunder if this Lease had not been terminated.

(d) At any time after termination of this Lease as provided in this Article, whether or not Landlord shall have collected any such current damages, as liquidated final damages and in lieu of all such current damages beyond the date of such demand, at Landlord's election Tenant shall pay to Landlord an amount equal to the excess, if any, of the Basic Rent, Escalation Charges and other sums as hereinbefore provided which would be payable hereunder from the date of such demand assuming that, for the purposes of this paragraph, annual payments by Tenant on account of Taxes and Operating Expenses would be the same as the payments

required for the immediately preceding Operating or Tax Year for what would be the then unexpired Term of this Lease if the same remained in effect, over the then fair market rental value of the Premises for the same period.

(e) In case of any Event of Default, re-entry, expiration and dispossession by summary proceedings or otherwise, Landlord may (i) re-let the Premises or any part or parts thereof, either in the name of Landlord or otherwise, for a term or terms which may at Landlord's option be equal to or less than or exceed the period which would otherwise have constituted the balance of the Term of this Lease and may grant concessions or free rent to the extent that Landlord reasonably considers advisable and necessary to re-let the same and (ii) make such alterations, repairs and decorations in the Premises as Landlord considers advisable and necessary for the purpose of reletting the Premises; and the making of such reasonable alterations, repairs and decorations shall not operate or be construed to release Tenant from liability hereunder as aforesaid. Landlord agrees to use commercially reasonable efforts to relet the Premises after an Event of Default, provided Tenant has vacated the Premises. Tenant hereby expressly waives any and all rights of redemption granted by or under any present or future laws in the event of Tenant being evicted or dispossessed, or in the event of Landlord obtaining possession of the Premises, by reason of the violation by Tenant of any of the covenants and conditions of this Lease.

14.3 **Additional Rent**. If Tenant shall fail to pay when due any sums under this Lease designated as an Escalation Charge or other Additional Rent, Landlord shall have the same rights and remedies as Landlord has hereunder for failure to pay Basic Rent.

14.4 **Remedying Defaults**. Landlord shall have the right, but shall not be required, to pay such sums or do any act which requires the expenditure of monies which may be necessary or appropriate by reason of the failure or neglect of Tenant to perform any of the provisions of this Lease, and in the event of the exercise of such right by Landlord, Tenant agrees to pay to Landlord forthwith upon demand all such sums, together with interest thereon at a rate equal to 3% plus the prime rate published from time to time in The Wall Street Journal or its successor publication (but in no event less than 18% per annum), as Additional Rent. Any payment of Basic Rent, Escalation Charges or other sums payable hereunder not paid when due shall, at the option of Landlord, bear interest at a rate equal to 3% plus the prime rate published from time to time in The Wall Street Journal or its successor publication (but in no event less than 18% per annum), from the due date thereof and shall be payable forthwith on demand by Landlord, as Additional Rent.

14.5 **Remedies Cumulative**. The specified remedies to which Landlord may resort hereunder are not intended to be exclusive of any remedies or means of redress to which Landlord may at any time be entitled lawfully, and Landlord may invoke any remedy (including the remedy of specific performance) allowed at law or in equity as if specific remedies were not herein provided for.

14.6 Enforcement Costs. Tenant shall pay all costs and expenses (including, without limitation, attorneys' fees and expenses at both the trial and appellate levels) incurred by or on behalf of Landlord in connection with the successful enforcement of any rights of Landlord or obligations of Tenant hereunder, whether or not occasioned by an Event of Default. Landlord shall pay all costs and expenses (including, without limitation, attorneys' fees and expenses at both the trial and appellate levels) incurred by or on behalf of Tenant in connection with the successful enforcement of any rights of Tenant or obligations of Landlord hereunder, whether or not occasioned by a default of Landlord.

14.7 Waiver.

(a) Failure on the part of Landlord or Tenant to complain of any action or non-action on the part of the other, no matter how long the same may continue, shall never be a waiver by Tenant or Landlord, respectively, of any of the other's rights hereunder. Further, no waiver at any time of any of the provisions hereof by Landlord or Tenant shall be construed as a waiver of any of the other provisions hereof, and a waiver at any time of any of the provisions hereof shall not be construed as a waiver at any subsequent time of the same provisions. The consent or approval of Landlord or Tenant to or of any action by the other requiring such consent or approval shall not be construed to waive or render unnecessary Landlord's or Tenant's consent or approval to or of any subsequent similar act by the other.

(b) No payment by Tenant, or acceptance by Landlord, of a lesser amount than shall be due from Tenant to Landlord shall be treated otherwise than as a payment on account of the earliest installment of any payment due from Tenant under the provisions hereof. The acceptance by Landlord of a check for a lesser amount with an endorsement or statement thereon, or upon any letter accompanying such check, that such lesser amount is payment in full, shall be given no effect, and Landlord may accept such check without prejudice to any other rights or remedies which Landlord may have against Tenant.

14.8 Security Deposit.

(a) Simultaneously with the execution of this Lease by Tenant, Tenant shall provide Landlord with a Security Deposit set forth in Section 1.1, consisting of an irrevocable, unconditional, absolutely "clean" letter of credit, in the form of **Exhibit H** attached hereto and incorporated herein, in the face amount equal to the Security Deposit, running to Landlord as the sole beneficiary, to be held, disbursed and/or released in accordance with this Section 14.8 (the "**Letter of Credit**"). The Letter of Credit shall have a stated duration of and shall be effective for at least one (1) year with provision for automatic successive annual one-year extensions during the Term and for sixty (60) days after the expiration date or the earlier termination of the Term, except that if such earlier termination is based on Tenant's default, Tenant shall keep the Letter of Credit in force until sixty (60) days after the date when the Term would have expired had it not been earlier terminated. Tenant shall deliver to Landlord a renewal Letter of Credit no later than thirty (30) days prior to the expiration date of any Letter of Credit issued under this

Section 14.8, and if Tenant fails to do so, Landlord may draw the entire amount of the expiring Letter of Credit and hold the proceeds in cash as the Security Deposit, as hereinafter provided, but in that event, Tenant shall, upon demand, provide Landlord with a new Letter of Credit, meeting the requirements of this Lease as the Security Deposit, in lieu of such cash, and upon delivery of the same, the cost proceeds shall be immediately returned to Tenant. Each Letter of Credit shall be issued by Citizen's Bank, or a commercial bank provided such commercial bank has a credit rating with respect to certificates of deposit, short term deposits or commercial paper of at least P-2 (or equivalent) by Moodys Investor Service, Inc., or at least A-2 (or equivalent) by Standard & Poors Corporation. If the issuers credit rating is reduced below P-2 (or equivalent) by Moodys Investor Service, Inc., or at least A-2 (or equivalent) by Standard & Poors Corporation, or if the financial condition of the issuer changes in any other materially adverse way, then Landlord shall have the right to require that Tenant obtain from a different issuer a substitute letter of credit that complies in all respects with the requirements of this Section, and Tenants failure to obtain such substitute letter of credit within ten (10) business days after Landlords written demand therefore (with no other notice or grace or cure period being applicable thereto) shall entitle Landlord to immediately draw upon the existing Letter of Credit in full, without any further notice to Tenant. If the issuer of the Letter of Credit shall admit in writing its inability to pay its debts generally as they become due, shall file a petition in bankruptcy or a petition to take advantage of any insolvency act, shall consent to the appointment of a receiver or conservator of itself or the whole or any substantial part of its property, shall file a petition or answer seeking reorganization or arrangement under the United States Bankruptcy Code, shall have a receiver or conservator appointed or shall become subject to operational supervision by and Federal or State regulatory authority, then Tenant within thirty (30) days after written demand by Landlord shall obtain a replacement Letter of Credit from another financial institution satisfactory to Landlord, in its reasonable judgment.

(b) The Security Deposit shall constitute security for payment of Basic Rent and Additional Rent and for any and all other obligations of Tenant under this Lease. If Tenant defaults with respect to any covenant or condition of this Lease beyond any applicable notice and grace period, including but not limited to the payment of Basic Rent, Additional Rent or any other payment due under this Lease, and/or the obligation of Tenant to maintain the Premises and deliver possession thereof back to Landlord at the expiration or earlier termination of the Lease Term in the condition required herein, Landlord may draw upon the Letter of Credit at any time and from time to time in such amount or amounts as may be necessary to cure the default(s) or to reimburse Landlord for any sum(s) which Landlord spent to cure the default(s), and if Landlord has terminated this Lease due to Tenant's default(s), Landlord may also draw upon the Letter of Credit in such amount (or all) as necessary to obtain any amounts from time to time owed to Landlord by Tenant after termination. In the case of each such drawing (except a drawing occurring after termination or expiration of this Lease), Tenant shall, on demand, cause the Letter of Credit to be reinstated to the full amount that was required hereunder prior to such drawing, or cause a similar Letter of Credit, aggregating said full amount, to be issued to Landlord. Any amount drawn by landlord shall not be deemed to fix or determine the amounts to which Landlord is entitled under this Lease or otherwise, and Landlord shall be entitled to

pursue any remedies provided for in this Lease to the extent Landlord is unable or elects, in its sole and absolute discretion, not to obtain complete or partial satisfaction by drawing upon the Letter of Credit. The parties expressly acknowledge and agree that the Security Deposit is not an advance payment of Basic Rent or Additional Rent. If Tenant shall have fully complied with all of the covenants and conditions of this Lease, but not otherwise, the Letter of Credit shall be returned to Tenant (or if Landlord shall have drawn on the same and held the proceeds), the amount of the Security Deposit then held by Landlord shall be repaid to Tenant within thirty (30) days after the expiration or sooner termination of this Lease. In the event of a sale or transfer of Landlord's estate or interest in the Building, Landlord shall transfer the Security Deposit to the purchaser or transferee, and Landlord shall be considered released by Tenant from all liability for the return of the Security Deposit from and after and to the extent of such transfer.

(c) Notwithstanding anything to the contrary set forth herein, upon completion of Tenant's Work and occupancy of the Premises, and provided Tenant is not in default under this Lease beyond any applicable notice and cure periods, Tenant shall have the right to reduce the amount of the Security Deposit by Three Hundred Thousand Dollars ($300,000.00). Provided that Tenant has delivered to Landlord a substitute Letter of Credit in the amount of Two Hundred Thousand Dollars ($200,000.00) (the "**Reduced Amount**"), or an amendment, in form reasonably satisfactory to Landlord, to the Letter of Credit then being held by Landlord reducing the amount thereof to the Reduced Amount, and provided that the foregoing conditions have been satisfied, Landlord shall immediately return the then-current Letter of Credit to Tenant.

14.9 **Landlord's Default**. Landlord shall in no event be in default under this Lease unless Landlord shall neglect or fail to perform any of its obligations hereunder and shall fail to remedy the same within thirty (30) days after notice to Landlord specifying such neglect or failure, or if such failure is of such a nature that Landlord cannot reasonably remedy the same within such thirty (30) day period, Landlord shall fail to commence promptly (and in any event within such thirty (30) day period) to remedy the same and to prosecute such remedy to completion with diligence and continuity.

ARTICLE 15
MISCELLANEOUS PROVISIONS

15.1 **Rights of Access**. Landlord, its agents, contractors and employees shall have the right to enter the Premises at all reasonable hours and upon twenty-four (24) hours' advance notice (except in the event of an emergency, when no notice shall be given) for the purpose of inspecting the Premises, doing maintenance or making repairs or otherwise exercising its rights or fulfilling its obligations under this Lease, and Landlord also shall have the right to make access available at all reasonable hours to prospective or existing mortgagees, purchasers or tenants of any part of the Property. Landlord shall exercise its rights under this Article 15 at such time and in such manner so as to minimize any unreasonable interference with Tenant's use and occupancy of the Premises and shall comply with Tenant's reasonable security requirements.

15.2 Covenant of Quiet Enjoyment. Subject to the terms and conditions of this Lease, on payment of the Basic Rent and Escalation Charges and other Additional Rent and observing, keeping and performing all of the other terms and conditions of this Lease on Tenant's part to be observed, kept and performed, Tenant shall lawfully, peaceably and quietly enjoy the Premises during the term hereof, without hindrance or ejection by any persons lawfully claiming under Landlord to have title to the Premises superior to Tenant. The foregoing covenant of quiet enjoyment is in lieu of any other covenant, express or implied.

15.3 Landlord's Liability.

(a) Tenant agrees to look solely to Landlord's equity interest in the Property and the proceeds of any insurance carried by Landlord at the time of recovery for recovery of any judgment against Landlord, and agrees that neither Landlord nor any successor of Landlord shall be personally liable for any such judgment, or for the payment of any monetary obligation to Tenant. The provision contained in the foregoing sentence is not intended to, and shall not, limit any right that Tenant might otherwise have to obtain injunctive relief against Landlord or any successor of Landlord, or to take any action not involving the personal liability of Landlord or any successor of Landlord to respond in monetary damages from Landlord's assets other than Landlord's equity interest in the Property.

(b) In no event shall either party ever be liable to the other for any loss of business or any other indirect or consequential damages suffered by it from whatever cause. Notwithstanding the foregoing, Landlord shall have all of the rights and remedies available to it under Section 12.1 in the event that Tenant fails to surrender the Premises in accordance with the terms of this Lease.

(c) Where provision is made in this Lease for Landlord's consent, and Tenant shall request such consent, and Landlord shall fail or refuse to give such consent, Tenant shall not be entitled to any damages for any withholding by Landlord of its consent (except in the event that Tenant requests Landlord's consent to an assignment or sublease, or to Tenant's Work, or to any Alterations, in which case Tenant's damages shall be limited to $500,000.00), it being intended that Tenant's sole remedy shall be an action for specific performance or injunction (except in the event that Tenant requests Landlord's consent to an assignment or sublease, or to Tenant's Work, or to any Alterations, which remedy shall be as set forth herein), and that such remedy shall be available only in those cases where Landlord has expressly agreed in writing not to unreasonably withhold its consent. Furthermore, whenever Tenant requests Landlord's consent or approval (whether or not provided for herein), Tenant shall pay to Landlord, within ten (10) days of demand, as Additional Rent, any reasonable out-of-pocket expenses incurred by Landlord (including without limitation reasonable attorneys' fees and costs, if any) in connection therewith.

(d) Any repairs or restoration required or permitted to be made by Landlord under this Lease may be made during normal business hours, provided that such repairs and

restoration are conducted in a manner so as to avoid unreasonable interference with Tenant's use and occupancy of the Premises, and Landlord shall have no liability for damages to Tenant for inconvenience, annoyance or interruption of business arising from such repairs or restoration.

15.4 **Estoppel Certificate**. Tenant shall, at any time and from time to time, upon not less than ten (10) business days prior written notice by Landlord, execute, acknowledge and deliver to Landlord an estoppel certificate containing such statements of fact as Landlord reasonably requests.

15.5 **Brokerage**. Tenant warrants and represents that Tenant has dealt with no broker in connection with the consummation of this Lease other than Broker, and, in the event of any brokerage claims against Landlord predicated upon prior dealings with Tenant, Tenant agrees to defend the same and indemnify Landlord against any such claim (except any claim by Broker). Landlord warrants and represents that Landlord has dealt with no Broker in connection with the consummation of this Lease other than Broker, and, in the event of any brokerage claims against Tenant predicated upon prior dealings with Landlord, Landlord agrees to defend the same and indemnify Tenant against any such claim. Landlord shall be responsible for compensating Broker with respect to the consummation of this Lease.

15.6 **Rules and Regulations**. Tenant shall abide by the reasonable Rules and Regulations from time to time established by Landlord, it being agreed that such Rules and Regulations will be established and applied by Landlord in a non-discriminatory fashion, such that all Rules and Regulations shall be generally applicable to other tenants of the Building of similar nature to the Tenant named herein. Landlord agrees to use reasonable efforts to insure that any such Rules and Regulations are uniformly enforced, but Landlord shall not be liable to Tenant for violation of the same by any other tenant or occupant of the Building, or persons having business with them. In the event that there shall be a conflict between such Rules and Regulations and the provisions of this Lease, the provisions of this Lease shall control. The Rules and Regulations currently in effect are set forth in Exhibit E.

15.7 **Invalidity of Particular Provisions**. If any term or provision of this Lease, or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Lease, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby, and each term and provision of this Lease shall be valid and be enforced to the fullest extent permitted by law.

15.8 **Provisions Binding, Etc**. Except as herein otherwise provided, the terms hereof shall be binding upon and shall inure to the benefit of the successors and assigns, respectively, of Landlord and Tenant (except in the case of Tenant, only such successors and assigns as may be permitted hereunder) and, if Tenant shall be an individual, upon and to his heirs, executors, administrators, successors and permitted assigns. Each term and each provision of this Lease to be performed by Tenant shall be construed to be both a covenant and a condition. Any reference in this Lease to successors and assigns of Tenant shall not be construed to constitute a consent to assignment by Tenant.

15.9 **Recording**. Simultaneously with the execution of this Lease, Landlord and Tenant shall execute a notice of lease in the form attached hereto as **Exhibit J**. At Landlord's request, promptly upon expiration of or earlier termination of the Term, Tenant shall execute and deliver to Landlord a release of any document recorded in the real property records for the location of the Property evidencing this Lease, and Tenant hereby appoints Landlord Tenant's attorney-in-fact, coupled with an interest, to execute any such document if Tenant fails to respond to Landlord's request to do so within fifteen (15) days. The obligations of Tenant under this Section shall survive the expiration or any earlier termination of the Term.

15.10 **Notice**. All notices or other communications required hereunder shall be in writing and shall be deemed duly given if delivered in person (with receipt therefore), if sent by reputable overnight delivery or courier service (e.g., Federal Express) providing for receipted delivery, or if sent by certified or registered mail, return receipt requested, postage prepaid, to the following address:

(a) if to Landlord at Landlord's Address, to the attention of Ted Saraceno.

(b) if to Tenant, at Tenant's Address, to the attention of Barbara Burnim Day, and after the Commencement Date, at the Premises.

With a copy to:

Testa, Hurwitz & Thibeault, LLP
125 High Street
Boston, MA 02110-2704
Attention: Real Estate Department

Where receipt of notice or other communication shall be conclusively established by either (i) return of a return receipt indicating that the notice has been delivered; or (ii) return of the letter containing the notice with an indication from the courier or postal service that the addressee has refused to accept delivery of the notice. Either party may change its address for the giving of notices by notice given in accordance with this Section.

15.11 **When Lease Becomes Binding; Entire Agreement; Modification**. The submission of this document for examination and negotiation does not constitute an offer to lease, or a reservation of, or option for, the Premises, and this document shall become effective and binding only upon the execution and delivery hereof by both Landlord and Tenant. This Lease is the entire agreement between Landlord and Tenant, and this Lease expressly supersedes any negotiations, considerations, representations and understandings and proposals or other written documents relating hereto. This Lease may be modified or altered only by written agreement between Landlord and Tenant, and no act or omission of any employee or agent of Landlord shall alter, change or modify any of the provisions hereof.

15.12 **Paragraph Headings and Interpretation of Sections**. The paragraph headings throughout this instrument are for convenience and reference only, and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction or meaning of the provisions of this Lease. The provisions of this Lease shall be construed as a whole, according to their common meaning (except where a precise legal interpretation is clearly evidenced), and not for or against either party. Use in this Lease of the words "including," "such as" or words of similar import, when followed by any general term, statement or matter, shall not be construed to limit such term, statement or matter to the specified item(s), whether or not language of non-limitation, such as "without limitation" or "including, but not limited to," or words of similar import, are used with reference thereto, but rather shall be deemed to refer to all other terms or matters that could fall within a reasonably broad scope of such term, statement or matter.

15.13 **Dispute Resolution**. In the event of a dispute between Landlord and Tenant pursuant to this Lease (other than a dispute relating to the payment of Basic Rent and Escalation Charges) the parties agree that prior to pursuing other available remedies (excluding giving notices of default), they will attempt to directly negotiate resolution of their dispute. If negotiation is unsuccessful, then they agree to participate in at least three hours of mediation to be facilitated by a mediator mutually acceptable to them under the mediation procedures set by the mediator. The mediation session shall be conducted within thirty (30) days of the date on which the mediator receives the request to mediate. The costs of such mediation shall be shared equally by the parties.

15.14 **Waiver of Jury Trial**. Landlord and Tenant hereby each waive trial by jury in any action, proceeding or counterclaim brought by either against the other, on or in respect of any matter whatsoever arising out of or in any way connected with this Lease, the relationship of Landlord and Tenant or Tenant's use or occupancy of the Premises.

15.15 **Time Is of the Essence**. Time is of the essence of each provision of this Lease.

15.16 **Multiple Counterparts**. This Lease may be executed in multiple counterparts, each of which shall be deemed an original and all of which together shall constitute one and the same document.

15.17 **Governing Law**. This Lease shall be governed by the laws of the state in which the Property is located.

IN WITNESS WHEREOF, Landlord and Tenant have caused this Lease to be duly executed, under seal, by persons hereunto duly authorized, as of the date first set forth above.

LANDLORD:

WEST SEYON LLC

By: Illegible
Name:
Title:

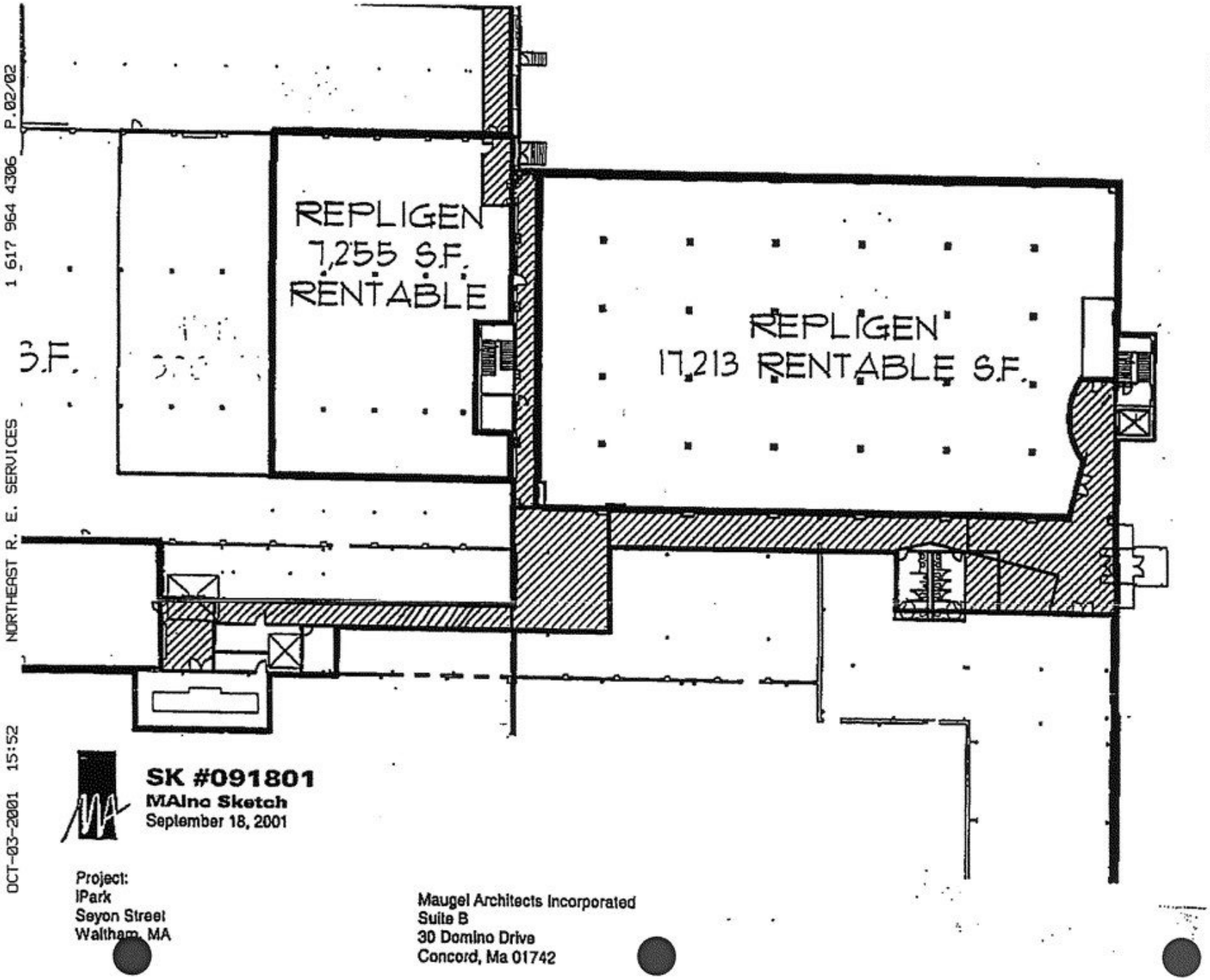
TENANT:

REPLIGEN

By: /s/ Walter Herlihy
Name: Walter Herlihy
Title: President

EXHIBIT A
Location Plan of Premises

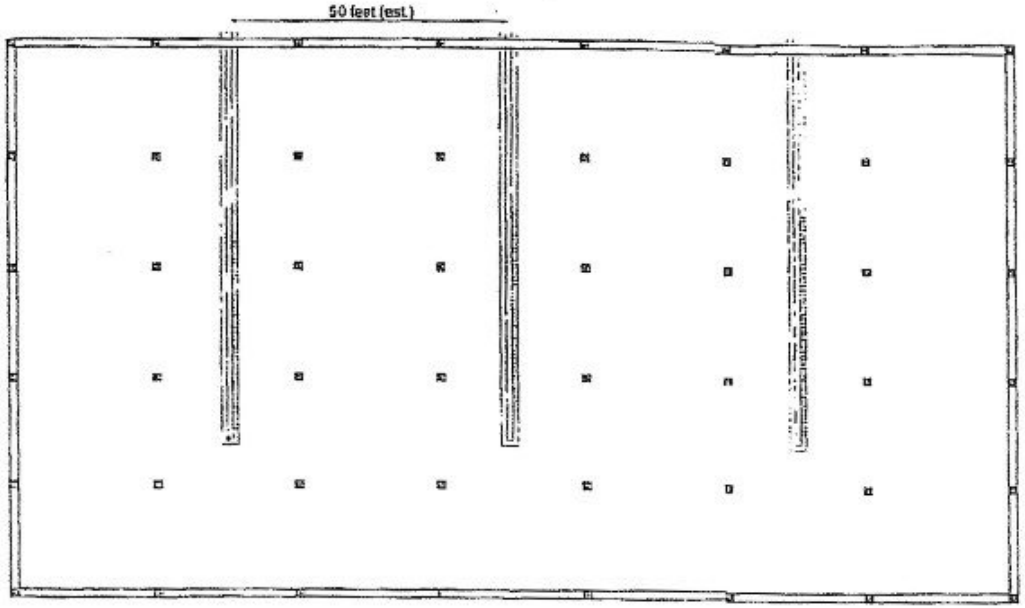
(see attached)

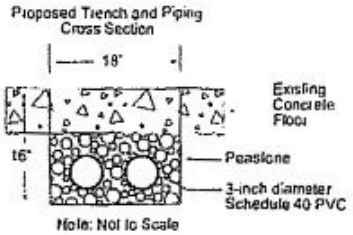


SK #091801
MAino Sketch
September 18, 2001

Project:
IPark
Seyon Street
Waltham, MA

Maugel Architects Incorporated
Suite B
30 Domino Drive
Concord, Ma 01742





* A similar design shall be used in Tenant's premises across the corridor in Building 17

STRUCTURAL COLUMN
3-INCH DIAMETER SCHEDULE 40 PVC PIPE
3-INCH DIAMETER SCHEDULE 40 0.010-INCH SLOT SCREEN

Approximate Scale

GHD Insight Inc

CLIENT: Serecen
PROJECT: 20 Beav... Waltham
TITLE: Sub-Slab Ventilation Pip... Repligen Office Spac...

DESIGNED	DRAWN	CHECKED	APPR...
KDT	KDT	MJW	
SCALE	DATE	FILE	PRO...
1"=20'	9/20/01	Repligen	30...

TOTAL P.05

EXHIBIT B
Site Plan of Building

(see attached)

[Image of Site Plan of Building]

EXHIBIT C
Commencement Date Letter
_____, 2001

[Name of Contact]
[Name of Tenant]
[Address of Tenant]

RE: [*Name of Tenant]*
[Premises Rentable Area and Floor]
[Address of Building]

Dear *[Name of Contact]:*

Reference is made to that certain Lease, dated as of _____, 2001, between *[Landlord]*, as Landlord and *[Tenant]* as Tenant, with respect to Premises on the _____ floor of the above-referenced building. In accordance with Section 4.1 of the Lease, this is to confirm that the Commencement Date of the Term of the Lease occurred on _____, and that the Term of the Lease shall expire on _____.

If the foregoing is in accordance with your understanding, kindly execute the enclosed duplicate of this letter, and return the same to us.

Very truly yours,

[Landlord]

By: _____
Name: _____
Title: _____

Accepted and Agreed:

[Tenant]

By: _____
Name: _____
Title: _____
Date: _____

EXHIBIT D
Operating Expenses

Operating Expenses shall include the following, without limitation:

1. All expenses incurred by Landlord or Landlord's agents which shall be directly related to employment of personnel, including amounts incurred for wages, salaries and other compensation for services, payroll, social security, unemployment and similar taxes, workmen's compensation insurance, disability benefits, pensions, hospitalization, retirement plans and group insurance, uniforms and working clothes and the cleaning thereof, and expenses imposed on Landlord or Landlord's agents pursuant to any collective bargaining agreement for the services of employees of Landlord or Landlord's agents in connection with the operation, repair, maintenance, cleaning, management and protection of the Property, including, without limitation, day and night supervisors, manager, accountants, bookkeepers, janitors, carpenters, engineers, mechanics, electricians and plumbers and personnel engaged in supervision of any of the persons mentioned above; provided that, if any such employee is also employed on other property of Landlord, such compensation shall be suitably prorated among the Property and such other properties.

2. The cost of services, utilities, materials and supplies furnished or used in the operation, repair, maintenance, cleaning, management and protection of the Property.

3. The cost of replacements for tools and other similar equipment used in the repair, maintenance, cleaning and protection of the Property, provided that, in the case of any such equipment used jointly on other property of Landlord, such costs shall be suitably prorated among the Property and such other properties.

4. Where the Property is managed by Landlord or an affiliate of Landlord, a sum equal to the amounts customarily charged by management firms in the Waltham area for similar properties, but in no event more than five percent (5%) of gross annual income, whether or not actually paid, or where managed by other than Landlord or an affiliate thereof, the amounts accrued for management, together with, in either case, amounts accrued for legal and other professional fees relating to the Property, but excluding such fees and commissions paid in connection with services rendered for securing or renewing leases and for matters not related to the normal administration and operation of the Property. Landlord represents that the current Management Fee being paid for the Property is as set forth in Section 1.1 hereof.

5. Premiums for insurance against damage or loss to the Property from such hazards as Landlord shall determine, including, but not by way of limitation, insurance covering loss of rent attributable to any such hazards, and public liability insurance.

6. If, during the Term of this Lease, Landlord shall make a capital expenditure, such capital expenditure shall not be included in Operating Expenses, except that if Landlord makes a capital expenditure to reduce Landlord's Operating Expenses, or to comply with laws or regulations

enacted or promulgated after the date of this Lease, Landlord may include the annual amortized portion of such capital expenditure in Landlord's Operating Expenses for each year after the Landlord makes such capital expenditure until such capital expenditure is fully amortized.

7. Costs for electricity, water and sewer use charges, gas and other utilities supplied to the Property and not paid for directly by tenants.

8. Betterment assessments, provided the same are apportioned equally over the longest period permitted by law, and to the extent, if any, not included in Taxes.

9. Amounts paid to independent contractors for services, materials and supplies furnished for the operation, repair, maintenance, cleaning and protection of the Property.

10. Notwithstanding the foregoing, Operation Expenses shall not include:

(1) wages, salaries or fringe benefits paid to any employees above the grade of building manager, or where employees devote time to properties other than the Property, the portion allocated to such other properties;

(2) leasehold improvements, alterations and decorations which are made in connection with the preparation of any portion of the Property for occupancy by a new tenant, or which improvements, alterations, and decorations are not generally beneficial to all tenants of the Property;

(3) costs incurred in connection with the making of repairs or replacements which are the obligation of another tenant or occupant of the Property;

(4) advertising, marketing, promotional, public relations or brokerage fees, commissions or expenditures;

(5) financing and refinancing costs in respect of any mortgage or security interest placed upon the Property or any portion thereof, including payments of principal, interest, finance or other charges, and any points and commissions in connection therewith;

(6) cost (including, without limitation, attorneys' fees and disbursements) incurred in connection with any judgment, settlement or arbitration award resulting from any tort liability;

(7) rent or other charges payable under any ground or underlying lease;

(8) costs of any item which are reimbursed to Landlord by other tenants or third parties, or which are properly chargeable or attributable to a particular tenant or particular tenants;

(9) any utility or other service used or consumed in the Premises leased or leasable to any tenant or occupant, including, without limitation, gas, electricity, water, sewer, cable, heat and air conditioning, if Tenant's use or consumption of such utility or other services is separately metered or sub-metered at the Premises or Tenant is charged a separate amount therefore;

(10) costs incurred in connection with Landlord's preparation, negotiation, dispute resolution and/or enforcement of leases, including court costs and attorney's fees and disbursements in connection with any summary proceeding to dispossess any tenant, or incurred in connection with disputes with prospective tenants, employees, consultants, management agents, leasing agents, purchasers or mortgagees;

(11) costs of any additions to or expansions of the Property or the Building;

(12) cost of repairs, restoration or replacements occasioned by fire or other casualty or caused by the exercise of the right of eminent domain whether or not insurance proceeds or condemnation award proceeds are recovered or adequate for such purposes;

(13) capital expenditures except those which are specifically permitted above;

(14) the cost of performing, or correcting defects in, or inadequacies of, the Base Building Work or of otherwise correcting defects (including latent defects) in the Property;

(15) the cost to make improvements, alterations and additions to the Property which are required in order to render the same in compliance with laws, rules, orders regulations and/or directives existing as of the date of this Lease;

(16) the cost of environmental monitoring, compliance, testing and remediation performed in, on, about and around the Property;

(17) any costs in the nature of fees, fines or penalties arising out of Landlord's breach of any obligations (contractual or at law and including, without limitation, costs, fines, interest, penalties and costs of litigation incurred as a result of late payment of taxes and/or utility bills), including attorney's fees related thereto;

(18) depreciation, except with respect to capital expenditures; and

(19) any cost resulting form the negligence of Landlord, its agents or its employees.

EXHIBIT E
Rules and Regulations of Building

The following regulations are generally applicable:

1. The public sidewalks, entrances, passages, courts, elevators, vestibules, stairways, corridors or halls shall not be obstructed or encumbered by Tenant (except as necessary for deliveries) or used for any purpose other than ingress and egress to and from the Premises.

2. No awnings, curtains, blinds, shades, screens or other projections shall be attached to or hung in, or used in connection with, any window of the Premises or any outside wall of the Building. Such awnings, curtains, blinds, shades, screens or other projections must be of a quality, type, design and color, and attached in the manner, approved by Landlord.

3. No show cases or other articles shall be put in front of or affixed to any part of the exterior of the Building, nor, if the Building is occupied by more than one tenant, displayed through interior windows into the atrium of the Building, nor placed in the halls, corridors or vestibules, provided that show cases or articles may be displayed through interior windows into the atrium of the Building (if any) with Landlord's prior written approval, such approval not to be unreasonably withheld or delayed so long as such display does not adverse affect the aesthetic integrity of the Building.

4. The water and wash closets and other plumbing fixtures shall not be used for any purposes other than those for which they were designed and constructed, and no sweepings, rubbish, rags, acids or like substances shall be deposited therein. All damages resulting from any misuse of the fixtures shall be borne by the Tenant.

5. Tenant shall not use the Premises or any part thereof or permit the Premises or any part thereof to be used as a public employment bureau or for the sale of property of any kind at auction, except in connection with Tenant's business.

6. Tenant must, upon the termination of its tenancy, return to the Landlord all locks, cylinders and keys to offices and toilet rooms of the Premises.

7. Landlord reserves the right to exclude from the Building after business hours and at all hours on days other than Business Days all persons connected with or calling upon the Tenant who do not present a pass to the Building signed by the Tenant or who are not escorted in the Building by an employee of Tenant. Tenant shall be responsible for all persons for whom it issues any such pass and shall be liable to the Landlord for all wrongful acts of such persons.

8. The requirements of Tenant will be attended to only upon application at the Building Management Office. Employees of Landlord shall not perform any work or do anything outside of their regular duties, unless under special instructions from the office of the Landlord.

9. There shall not be used in any space in the Building, or in the public halls of the Building, either by Tenant or by jobbers or others, in the delivery or receipt of merchandise, any hand trucks, except those equipped with rubber tires and side guards.

10. No vehicles or animals of any kind (other than laboratory animals) shall be brought into or kept in or about the Premises.

11. No tenant shall make, or permit to be made, any unseemly or disturbing noises or disturb or interfere with occupants of this or any neighboring building or premises or those having business with them whether by use of any musical instrument, radio, talking machine, unmusical noise, whistling, singing, or in any other way. No tenant shall throw anything out of the doors, windows or skylights or down the passageways.

12. The Premises shall not be used for lodging or sleeping or for any immoral or illegal purpose.

13. No smoking shall be permitted in the Premises or the Building. Smoking shall only be permitted in smoking areas outside of the Building which have been designated by the Landlord.

14. Landlord shall have the right, exercisable without notice and without liability to any tenant, to change the name and street address of the Building.

15. The rules and regulations set forth in Attachment I to this Exhibit, which is by this reference made a part hereof, are applicable to any Alterations being undertaken by or for Tenant in the Premises pursuant to Section 5.2 of the Lease.

Attachment I to Exhibit E
Rules and Regulations for Tenant Alterations

A. General

(1) All Alterations made by Tenant in, to or about the Premises shall be made in accordance with the requirements of this Exhibit and by contractors or mechanics approved by Landlord, which approval shall not be unreasonably withheld, conditioned or delayed.

(2) Tenant shall, prior to the commencement of any work, submit for Landlord's written approval, complete plans for the Alterations, with full details and specifications for all of the Alterations, in compliance with Section D below.

(3) Alterations must comply with the Building Code applicable to the Property and the requirements, rules and regulations and any other governmental agencies having jurisdiction.

(4) No work shall be permitted to commence before Tenant obtains and furnishes to Landlord copies of all necessary licenses and permits from all governmental authorities having jurisdiction.

(5) All demolition, removals or other categories of work that may inconvenience other tenants or disturb Building operations, must be scheduled and performed before or after normal business hours, and Tenant shall provide Landlord with at least 24 hours' notice prior to proceeding with such work.

(6) All inquiries, submissions, approvals and all other matters shall be processed through [e.g., Landlord's property manager].

(7) All work, if performed by a contractor or subcontractor, shall be subject to reasonable inspection by Landlord's representative.

B. Prior to Commencement of Work

(1) Tenant shall submit to the Building manager a request to perform the work. The request shall include the following enclosures:

(i) A list of Tenant's contractors and/or subcontractors for Landlord's approval.

(ii) Four complete sets of plans and specifications properly stamped by a registered architect or professional engineer.

(iii) A properly executed building permit application form.

(iv) Four executed copies of the Insurance Requirements Agreement in the form attached to this Exhibit as Attachment II and made a part hereof from Tenant's contractor and, if requested by Landlord, from the contractor's subcontractors.

(v) Contractor's and subcontractor's insurance certificates, including an indemnity in accordance with the Insurance Requirements Agreement.

(2) Landlord will return the following to Tenant:

(i) Two sets of plans approved or a disapproved with specific comments as to the reasons therefore (such approval or comments shall not constitute a waiver of approval of governmental authorities).

(ii) Two fully executed copies of the Insurance Requirements Agreement.

(3) Landlord's approval of the plans, drawings, specifications or other submissions in respect of any Alterations shall create no liability or responsibility on the part of Landlord for their completeness, design sufficiency or compliance with requirements of any applicable laws, rules or regulations of any governmental or quasi-governmental agency, board or authority.

(4) Tenant shall obtain a building permit from the Building Department and necessary permits from other governmental agencies. Tenant shall be responsible for keeping current all permits. Tenant shall submit copies of all approved plans and permits to Landlord and shall post the original permit on the Premises prior to the commencement of any work.

C. Requirements and Procedures

(1) All structural and floor loading requirements shall be subject to the prior approval of Landlord's structural engineer.

(2) All mechanical (HVAC, plumbing and sprinkler) and electrical requirements shall be subject to the approval of Landlord's mechanical and electrical engineers, which approval shall not be unreasonably withheld, conditioned or delayed, and all mechanical and electrical work shall be performed by contractors who are engaged by Tenant. When necessary, Landlord will require engineering and shop drawings, which drawings must be approved by Landlord, which approval shall not be unreasonably withheld, conditioned, or delayed before work is started. Drawings are to be prepared by Tenant and all approvals shall be obtained by Tenant.

(3) Elevator service for construction work shall be charged to Tenant at standard Building rates. Prior arrangements for elevator use shall be made with Building manager by Tenant. No material or equipment shall be carried under or on top of elevators. If an operating engineer is required by any union regulations, such engineer shall be paid for by Tenant.

(4) If shutdown of risers and mains for electrical, HVAC, sprinkler and plumbing work is required, such work shall be supervised by Landlord's representative. No work will be performed in Building mechanical equipment rooms without Landlord's approval, which approval shall not be unreasonably withheld, conditioned or delayed, and under Landlord's supervision.

(5) Tenant's contractor shall:

(i) have a superintendent or foreman on the Premises during the progress of the work;

(ii) police the job at all times, continually keeping the Premises orderly;

(iii) maintain cleanliness and protection of all areas, including elevators and lobbies.

(iv) protect the front and top of all peripheral HVAC units and thoroughly clean them at the completion of work;

(v) block off supply and return grills, diffusers and ducts to keep dust from entering into the Building air conditioning system; and

(vi) avoid the unreasonable disturbance of other tenants.

(6) If Tenant's contractor is negligent in any of its responsibilities, Tenant shall be charged for corrective work.

(7) All equipment and installations must be equal to or greater than the standards generally in effect with respect to the remainder of the Building. Any deviation from such standards will be permitted only if indicated or specified on the plans and specifications and approved by Landlord, which approval shall not be unreasonably withheld, conditioned, or delayed.

(8) A properly executed air balancing report signed by a professional engineer shall be submitted to Landlord upon the completion of all HVAC work.

(9) Upon completion of the Alterations, Tenant shall diligently pursue, and upon receipt shall submit to Landlord, a permanent certificate of occupancy and final approval by the other governmental agencies having jurisdiction.

(10) Tenant shall submit to Landlord a final "as-built" set of drawings showing all items of the Alterations in full detail.

(11) Additional and differing provisions in the Lease, if any, will be applicable and will take precedence.

D. Standards for Plans and Specifications.

Whenever Tenant shall be required by the terms of the Lease (including this Exhibit) to submit plans to Landlord in connection with any Alterations, such plans shall include at least the following:

(1) Floor plan indicating location of partitions and doors (details required of partition and door types).

(2) Location of standard electrical convenience outlets and telephone outlets.

(3) Location and details of special electrical outlets; e.g., photocopiers, etc.

(4) Reflected ceiling plan showing layout of standard ceiling and lighting fixtures. Partitions to be shown lightly with switches located indicating fixtures to be controlled.

(5) Locations and details of special ceiling conditions, lighting fixtures, speakers, etc.

(6) Location and specifications of floor covering, paint or paneling with paint colors to be approved by Landlord in its reasonable discretion.

(7) Finish schedule plan indicating wall covering, paint, or paneling with paint colors to be approved by Landlord in its reasonable discretion.

(8) Details and specifications of special millwork, glass partitions, rolling doors and grilles, blackboards, shelves, etc.

(9) Hardware schedule indicating door number keyed to plan, size, hardware required including butts, latchsets or locksets, closures, stops, and any special items such as thresholds, soundproofing, etc. Keying schedule is required.

(10) Verified dimensions of all built-in equipment (file cabinets, lockers, plan files, etc.)

(11) Location and weights of storage files.

(12) Location of any special soundproofing requirements.

(13) Location and details of special floor areas exceeding 50 pounds of live load per square foot.

(14) All structural, mechanical, plumbing and electrical drawings, to be prepared by the Tenant's engineers, necessary to complete the Premises in accordance with Tenant's plans.

(15) All drawings to be uniform size (30" x 46") and shall incorporate standard project electrical and plumbing symbols and be at a scale of 1/8" = 1' or larger.

(16) All drawings shall be stamped by an architect (or, where applicable, an engineer) licensed in the jurisdiction in which the Property is located and without limiting the foregoing, shall be sufficient in all respects for submission to applicable authorization in connection with a building permit application.

Attachment II to Exhibit E
Contractor's Insurance Requirements

Building:

Landlord:

Tenant:

Premises:

The undersigned contractor or subcontractor ("**Contractor**") has been hired by the tenant named above (hereinafter called "**Tenant**") of the Building named above (or by Tenant's contractor) to perform certain work ("**Work**") for Tenant in the Premises identified above. Contractor and Tenant have requested the landlord named above ("**Landlord**") to grant Contractor access to the Building and its facilities in connection with the performance of the Work, and Landlord agrees to grant such access to Contractor upon and subject to the following terms and conditions:

1. Contractor agrees to indemnify and save harmless Landlord and its respective officers, employees and agents and their affiliates, subsidiaries and partners, and each of them, from and with respect to any claims, demands, suits, liabilities, losses and expenses, including reasonable attorneys' fees, arising out of or in connection with the Work (and/or imposed by law upon any or all of them) because of personal injuries, bodily injury (including death at any time resulting therefrom) and loss of or damage to property, whether such injuries to person or property are claimed to be due to the negligence of the Contractor or of the Tenant.

2. Contractor shall provide and maintain at its own expense, until completion of the Work, the following insurance:

(a) Workmen's Compensation and Employers, Liability Insurance covering each and every workman employed in, about or upon the Work, as provided for in each and every statute applicable to Workmen's Compensation and Employers' Liability Insurance.

(b) Comprehensive General Liability Insurance including coverages for Protective and Contractual Liability (to specifically include coverage for the indemnification clause of this Agreement) for not less than the following limits:

Personal Injury:
$3,000,000 per occurrence
$5,000,000 in the aggregate

Property Damage:
$3,000,000 per occurrence, $3,000,000 aggregate

(c) Comprehensive Automobile Liability Insurance (covering all owned, non-owned and/or hired motor vehicles to be used in connection with the Work) for not less than the following limits:

Bodily Injury:
$1,000,000 per occurrence
$1,000,000 in the aggregate

Property Damage:
$1,000,000 per occurrence

Contractor shall furnish a certificate from its insurance carrier or carriers to the Building office before commencing the Work, showing that it has complied with the above requirements regarding insurance and providing that the insurer will give Landlord ten (10) days' prior written notice of the cancellation of any of the foregoing policies.

3. Contractor shall require all of its subcontractors engaged in the Work to provide the following insurance:

(a) Comprehensive General Liability Insurance including Protective and Contractual Liability coverages with limits of liability at least equal to the limits stated in paragraph 2(b).

(b) Comprehensive Automobile Liability Insurance (covering all owned, non-owned and/or hired motor vehicles to be used in connection with the Work) with limits of liability at least equal to the limits stated in paragraph 2(c).

Upon the request of Landlord, Contractor shall require all of its subcontractors engaged in the Work to execute an Insurance Requirements agreement in the same form as this Agreement.

Agreed to and executed this day of , 19 .

Contractor:

By:_____

By:_____

By:_____

EXHIBIT F
Parking Areas

(see attached)

[Image of Parking Area]

EXHIBIT G
Base Building Work

Premises Base Building Work:

1. Landlord will construct a Sub Slab Depressurization System ("SSDS") in substantial accordance with the design and specifications attached hereto as Attachment I to Exhibit G. Final design shall be subject to modifications by Landlord's Licensed Site Professional ("LSP") which shall use generally accepted industry standards in the design and modification of the SSDS.
2. Landlord will demolish the existing non-structural improvements in the Premises, including piping (excluding the main sprinkler hook up), HVAC ductwork and equipment and electrical conduit.
3. Landlord will demolish the north building (west 7) and the top two floors of the premises.
4. Landlord will abate asbestos within the Premises and deliver the Premises vacant.
5. Landlord will provide base building improvements as follows:

- New façade and glazing for the premises substantially in accordance with the attached drawings provided by Maugel Architects (SK #081501d), dated August 15, 2001
- New roof membrane, Carlisle EPDM 0.060 on ½" fiberboard on rigid R20 insulation (15 year warranty)
- Electrical switchgear to tenant space capable of providing 1000 amp/480 volt service.
- All demising walls within premises in accordance with the attached plan by Maugel Architects (SK # 081501b) dated August 15, 2001
- Life safety systems which are fully addressable, wet sprinkler system

Common Facilities Base Building Work:

- New passenger elevator adjacent to new main entrance at the north side of the building
- New bathrooms in accordance with code
- Lobby and common areas in accordance with the attached drawing by Maugel Architects (SK # 081501c) dated August 15, 2001.
- Site landscaping, repaving and restriping as needed

Attachment I to Exhibit G

(see attached)

[Attachment to Attachment I to Exhibit G is Image of SSDS design]

EXHIBIT H
Form Letter of Credit

(NAME OF BANK)
IRREVOCABLE STANDBY LETTER OF CREDIT

Date of Issue: _____ __, 2001 No. ____

APPLICANT: BENEFICIARY:

[*Landlord*]
_____
_____ _____
_____ _____

AMOUNT: $_____

At the request and for the account of _____ (the "**Account Party**"), we hereby establish in your favor our irrevocable Letter of Credit No. ____ in the amount of _____ Dollars ($_____).

This Letter of Credit is issued with respect to that certain lease agreement, by and between you, as Landlord, and the Account Party, as Tenant. Said lease agreement, and any amendments or modifications thereof, is hereinafter referred to as the "**Lease**." Our obligations under this Letter of Credit are solely as set forth herein and are completely independent of the obligations of the Account Party under the Lease. We do not undertake any obligation under the Lease, nor do we undertake any responsibility to ascertain any facts, or to take any other action, with respect to the Lease, and we acknowledge that our obligations under this Letter of Credit shall not be affected by any circumstance, claim or defense of any party as to the enforceability of the Lease or any dispute as to the accuracy of the Statement (as defined below). The references to the Lease in this Letter of Credit are solely to describe the required contents of the Statement.

Funds under this Letter of Credit are available to you against presentation of the following documents at our office at _____ prior to close of business on the expiration date set forth below.

1. The original of this Letter of Credit.

2. Your sight draft on us in an amount not exceeding the amount of this Letter of Credit (less sums previously paid by us hereunder) executed by the person executing the Statement and bearing the number of this Letter of Credit; and

3. A statement (the "**Statement**") executed by a natural person, stating that such person is your duly authorized representative, and that you are entitled to draw upon this Letter of Credit.

The expiration date of this Letter of Credit is _____, provided, however, that the expiration date of this Letter of Credit shall be automatically extended, without notice of amendment, for successive one (1) year periods, unless we give you written notice of our election not to extend the expiration date ("**Notice of Non-Renewal**") not later than sixty (60) days prior to the date this Letter of Credit is scheduled to expire. A Notice of Non-Renewal shall be effective when actually delivered by certified mail, return receipt requested, or courier service to your address set forth above or such other address and/or person as you shall specify to us for such purpose by written notice received by us prior to the time the Notice of Non-Renewal is sent.

This Letter of Credit is transferable in its entirety through us and successive transfers shall be permitted. There will be no charge for the transfer of this Letter of Credit. We will honor complying drafts presented hereunder by a transferee (and cease to honor drafts presented hereunder by you) upon our receipt of the fully executed transfer form attached hereto as **Exhibit 1**.

This Letter of Credit may be drawn upon in one or more drafts not exceeding in the aggregate, the amount available hereunder.

We hereby issue this Letter of Credit in your favor, and we hereby undertake to honor all drafts drawn under and in compliance with the terms of this Letter of Credit.

This Letter of Credit shall be governed by and construed in accordance with the Uniform Customs and Practices for Documentary Credits (1993 Revision) International Chamber of Commerce Publication 500.

_____

Authorized Signature

EXHIBIT 1

[TRANSFER FORM - to be provided by Bank]

EXHIBIT I

Tenant’s Approved Hazardous Materials

(see attached)

Exhibit I- Hazardous Materials

This list is a representative sample of materials used at Repligen. The manufacturing chemicals are used in larger quantities (over 5 liters). The research chemicals are used in smaller quantities, milligrams or grams. Currently, Repligen performs very little radioactive work, but continue to maintain our license.

Manufacturing Chemicals

Acetic Acid
Cupric Sulfate
EDTA
Ethanol 200 Proof
Hydrochloric Acid
Phosphoric Acid
Potassium Chloride
Sodium borohydride
Sodium Carbonate
Sodium Chloride
Sodium Hydroxide Pellets
Sodium Hydroxide Solution 50% W/W
Sodium m-Periodate
Thimerosal
Tris - HCL
Tris Base
Triton X-100

Research Chemicals

Acetone
Acetonitrile
Coomassie Blue
Diaminobenzidine
DMSO
Formic Acid
Guanidine
Hexane
Hydrochloric Acid
Isopropanol
Methanol
Methylene Chloride
Methylethyl ketone
Nitric Acid
Phosphoric Acid
Polyethylene Glycol

Sodium Hydroxide
Sulfuric Acid
Tetrahydrofuran
Tolulene
Urea

Radioactive materials
3H
14C
32P
35s
51Cr
125I

EXHIBIT J

Notice of Lease

Notice is hereby given pursuant to Massachusetts General Laws, Chapter 183, Section 4 of the following lease (the "Lease"):

1.	Landlord:	West Seyon LLC, a Delaware limited liability company.
2.	Tenant:	Repligen Corporation, a Delaware Corporation.
3.	Date of Lease:	_____, 2001.
4.	Premises:	24,468 rentable square feet of space, as more particularly described in the Lease, in the Building known and numbered as 35 Seyon Street, Waltham, Massachusetts, and more particularly described on Exhibit A attached hereto.
5.	Commencement Date:	The later to occur of (i) December 1, 2001, or (ii) the Premises Base Building Substantial Completion Date (as defined in the Lease).
6.	Initial Lease Term:	Ten (10) years.
7.	Extension Rights:	Two (2) options to extend the term for five (5) years each, on the terms and conditions provided for by the Lease.

The foregoing is a summary of certain terms of the Lease for purposes of giving notice thereof, and shall not be deemed to modify or amend the terms of the Lease.

This Notice is executed under seal this __ day of _____, 2001.

LANDLORD: WEST SEYON LLC

By: _____
Name:
Title:

TENANT: REPLIGEN CORPORATION

By: _____
Name:
Title:

COMMONWEALTH OF MASSACHUSETTS

_____, ss. _____ __, 2001

Then personally appeared the above-named _____, and acknowledged the foregoing instrument to be his free act and deed as _____ of _____, before me,

_____
Notary Public
My Commission Expires: _____

COMMONWEALTH OF MASSACHUSETTS

_____, ss. _____ __, 2001

Then personally appeared the above-named _____, and acknowledged the foregoing instrument to be his free act and deed as _____ of _____, before me,

_____
Notary Public
My Commission Expires: _____

EXHIBIT K

ALTERATIONS TO BE RETAINED BY TENANT

(see attached)

EXHIBIT L

ENVIRONMENTAL REPORTS

Inspection and Monitoring Reports, dated July 2000 through December 2000, prepared by GZA GeoEnvironmental, Inc.

Exhibit K Alterations to be kept by the Tenant

Improvements that Repligen would be able to remove at the end of the lease are the following:

Autoclave sterilizer
Backup Generator
Cages
Cubicles
Dishwasher
Fume hoods
Glass washer/drier
Phone system
Reverse osmosis water system
Security system
Steam generator
Walk-in freezers/cold rooms
Water purification system

EXHIBIT M

TENANT'S EXTERIOR SIGNAGE

(see attached)

[Image of Exterior Signage]

EXHIBIT N

TENANT'S LAYOUT PLAN

(see attached)

Landlord hereby consents to the general layout of Tenant's walls in the Premises, as set forth in the attached Exhibit N, however, Landlord reserves further approval rights in the event the attached layout affects in any manner, or may affect in any manner, any Building systems, including, without limitation, mechanical, electrical, and plumbing systems. In addition, Landlord's approval hereto shall not impose upon Landlord any responsibility or liability whatsoever to Tenant, nor shall it be deemed to imply that the Layout Plan conforms with applicable laws and building codes, for which Tenant, at its sole cost and expense, shall be responsible. Landlord and Tenant shall cooperate in integrating all doors in the Premises that open to Common Facilities of the Building with the Common Facilities design. Tenant shall use reasonable efforts to minimize the number of doors opening into the Common Facilities.

FIRST AMENDMENT TO LEASE

THIS FIRST AMENDMENT TO LEASE (the "Amendment") is made and entered into as of the 5th day of July, 2011, by and between TC Saracen, LLC, a Delaware limited liability company ("Landlord"), and Repligen Corporation, a Delaware corporation ("Tenant").

RECITALS

A. Landlord (as successor in interest to West Seyon LLC, a Delaware limited liability company) and Tenant are parties to that certain lease dated October 10, 2001, as amended by a Letter Agreement dated May 7, 2002 (collectively, the "Lease"). Pursuant to the Lease, Landlord has leased to Tenant space currently containing 24,468 rentable square feet (the "Original Premises") on the 1st floor of the building commonly known as 41 Seyon Street located at 41 Seyon Street, Waltham, Massachusetts (the "Building").

B. Tenant has requested that additional space containing approximately 31,226 rentable square feet on the 1st floor of the Building shown on **Exhibit A** hereto (the "Expansion Space") be added to the Premises and that the Lease be appropriately amended. Landlord is willing to do the same on the following terms and conditions.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

I. **Expansion.**

A. Effective as of the date (the "Expansion Effective Date") that is the later to occur of (i) October 1, 2011, and (ii) the date that Landlord delivers the Expansion Space to Tenant broom clean and free and clear of all occupants and the personal property of others, the Premises shall include the Expansion Space, and the size of the Premises, is increased from 24,468 rentable square feet to 55,694 rentable square feet. Landlord represents that the common areas of the Building are code compliant, including, without limitation, compliance with applicable ADA Standards.

B. Landlord shall use reasonable efforts to cause the Expansion Effective Date to occur no later than the Target Delivery Date (defined below). However, if the Expansion Effective Date shall be delayed beyond the Target Delivery Date for any reason, including but not limited to, holding over by V Fitness Group, LLC dba Workout World ("WOW") which is the current occupant of the Expansion Space, such delay shall not subject Landlord to any liability to Tenant except as set forth below in this Section I, nor shall the Extended Termination Date (as hereinafter defined) be extended. Tenant shall confirm the Expansion Effective Date in writing promptly upon request of Landlord. As used herein, the term "Target Delivery Date" shall mean the date that is five (5) months after the mutual execution and delivery of both this First Amendment and an amendment to the lease between Landlord and WOW terminating such lease with respect to the Expansion Space. Landlord shall confirm in writing the date of such mutual execution and delivery promptly after the occurrence thereof.

C. If the Expansion Effective Date has not occurred on or before the date (the "Delivery Penalty Date") that is sixty (60) days after the Target Delivery Date, then Tenant shall receive a credit against Annual Basic Rent in an amount equal to the product of (i) $1,173.12 multiplied by (ii) the number of days that elapse after the Delivery Penalty Date, until the Expansion Effective Date occurs or the Tenant elects to terminate this First Amendment pursuant to Section I.D below, whichever occurs first.

D. Notwithstanding the foregoing, if the Expansion Effective Date has not occurred on or before June 30, 2012, then Tenant may elect to terminate this First Amendment by giving Landlord written notice of such election at any time on or after July 1, 2012, and before the Expansion Effective Date occurs. If Tenant so elects, then this First Amendment shall automatically terminate on the day that is thirty (30) days after Tenant delivers such termination notice to Landlord unless the Expansion Effective Date occurs on or before the expiration of such 30-day period, in which event Tenant's termination election shall automatically become void. If this First Amendment is terminated in accordance with this Section IB, then the term of the Lease shall automatically be extended, upon all of the same terms and conditions of the Lease prior to this First Amendment, until the date that is twenty-four (24) months after the effective date of the termination of this First Amendment pursuant to this Section I.D.

II. **Extension.**

The Term of the Lease is hereby extended until the date that is 11 years after the Expansion Space Rent Commencement Date (as hereinafter defined) (the "Extended Termination Date"), unless sooner terminated in accordance with the terms of the Lease. That portion of the Term commencing on June 1, 2012 (the "Extension Date") and ending on the Extended Termination Date is referred to herein as the "Extended Term". Tenant shall confirm the Extended Termination Date in writing promptly upon request of Landlord.

III. **Basic Rent.**

A. **Original Premises Up To Extension Date.** Up to (but not including) the Extension Date, the Basic Rent with respect to the Original Premises shall be payable as provided in the Lease.

B. **Original Premises From and After Extension Date.** Commencing on the Extension Date, Basic Rent with respect to the Original Premises during the Extended Term shall be payable as follows:

Rental Period	Annual Basic Rent	Monthly Payment
From 6/1/12 through the end of the 6th Expansion Space Lease Year:	$428,190.00	$35,682.50
From the beginning of the 7th Expansion Space Lease Lear through the Extended Termination Date:	$501,594.00	$41,799.50

C. **Expansion Space From Expansion Space Rent Commencement Date Through Extended Termination Date**. The "Expansion Space Rent Commencement Date" is defined as the earlier to occur of: (x) the date on which Tenant substantially completes the Tenant Improvements (as such term is defined in Exhibit B hereto) and Tenant receives a temporary or permanent certificate of occupancy for the Expansion Space, and (y) the date that is 180 days after the Expansion Effective Date. Tenant shall promptly notify Landlord upon the occurrence of (x) above. Commencing on the Expansion Space Rent Commencement Date, Basic Rent with respect to the Expansion Space shall be payable as follows:

Rental Period	Annual Basic Rent	Monthly Payment
1 - 6	$538,648.50	$44,887.38
7 - 11	$624,520.00	$52,043.33

For purposes hereof, an "Expansion Space Lease Year"shall mean a 12 month period beginning on the Expansion Space Rent Commencement Date, or any anniversary of the Expansion Space Rent Commencement Date, except that if the Expansion Space Rent Commencement Date does not fall on the first day of a calendar month, then the first Expansion Space Lease Year shall begin on the Expansion Space Rent Commencement Date, and end on the last day of the month containing the first anniversary of the Expansion Space Rent Commencement Date (and the Basic Rent for such first Expansion Space Lease Year shall be prorated to reflect the additional days included therein), and each succeeding Expansion Space Lease Year shall begin on the day following the last day of the prior Expansion Space Lease Year. From and after the Extension Date, the concept of a "Lease Year" (as defined in the Lease), insofar as it pertains to the Original Premises, will no longer be applicable.

IV. **Letter of Credit.**

Landlord is currently holding a Letter of Credit in the amount of $200,000.00 pursuant to Section 14.8 of the Lease. Landlord shall continue to hold the Letter of Credit during the Extended Term in accordance with the terms set forth in said Section 14.8 of the Lease. If the Letter of Credit has an earlier expiry date, then Tenant shall promptly cause such Letter of Credit to be amended or replaced with a Letter of Credit which has an expiry date of no earlier than 60 days after the Extended Termination Date.

V. **Tenant's Proportionate Share.**

Commencing on the Extension Date, Tenant's Proportionate Share shall be 11.12% (which is based on the ratio of (a) Premises Rentable Area (which is hereby agreed to be 55,694 rentable square feet) to (b) the Property Rentable Area (which is hereby agreed to be 499,869 rentable square feet)).

VI. **Operating Expenses, Taxes and Utilities.**

Commencing on the Extension Date, Tenant shall pay Tenant's Proportionate Share (as amended pursuant to Section V above) of Operating Expenses and Taxes in accordance with the terms of the Lease. Commencing on the Expansion Effective Date, Tenant shall pay for all utilities serving the Expansion Space, as provided in Section 9.3 of the Lease.

VII. **Improvements to Expansion Space.**

A. **Condition of Expansion Space**. Tenant has inspected the Expansion Space and agrees to accept the same "as is" without any agreements, representations, understandings or obligations on the part of Landlord to perform any alterations, repairs or improvements, except as expressly provided in this Amendment.

B. **Responsibility for Improvements to Expansion Space**. Tenant shall perform improvements to the Expansion Space in accordance with the Work Letter attached hereto as Exhibit B.

C. **Landlord's Obligation**. On or before the Expansion Effective Date and as a condition to the occurrence thereof, Landlord shall construct a new, exclusive entryway for WOW. After the completion of such work, Landlord agrees that WOW and its customers and employees will no longer have access to WOW's premises through the existing entryway currently used in common by Tenant and WOW.

VIII. **Right of First Refusal.**

A. **Grant of Right; Conditions**. Tenant shall have the right of first refusal (the "Right of First Refusal") with respect to the approximately 19,900 rentable square feet of space on the 2nd floor of the Building shown on the demising plan attached hereto as **Exhibit C** (the "Refusal Space"). Tenant's Right of First Refusal shall be exercised as follows: When Landlord is prepared to enter into a letter of intent that is acceptable to both Landlord and a prospective tenant other than the existing tenant in the Refusal Space (such prospective tenant, the "Prospect") interested in leasing the Refusal Space, Landlord shall give notice to Tenant (the "Advice") of the terms and conditions under which Landlord is prepared to lease the Refusal Space to such Prospect (and the Advice shall include a copy of the proposed letter of intent, which copy may omit the name of the Prospect, but shall include the intended use of the Refusal Space by the Prospect (e.g., retail, manufacturing, office, etc.)). Tenant may lease the Refusal Space, under such terms, by providing Landlord with notice of exercise

of the Right of First Refusal (the "Notice of Exercise") within 5 Business Days after the date of the Advice, except that Tenant shall have no such Right of First Refusal and Landlord need not provide Tenant with an Advice if, on the date that Landlord would otherwise be obligated to deliver the Advice:

1. there exists an Event of Default; or
2. the Premises, or any portion thereof, has been sublet by Tenant (except pursuant to Section 6.1(b) of the Lease); or
3. the Lease has been assigned by Tenant (except pursuant to Section 6.1(b) of the Lease); or
4. the Tenant is not occupying and conducting business from the Premises.

B. **Terms and Conditions for Refusal Space**. If the Right of First Refusal is duly exercised by Tenant, then, as of the commencement date set forth in the Advice, the Refusal Space shall be considered a part of the Premises subject to all of the terms and conditions set forth in the Lease, except to the extent inconsistent with the terms and conditions in the Advice. The Refusal Space (including improvements and personalty, if any) shall be accepted by Tenant in its condition and as-built configuration existing on the earlier of the date Tenant takes possession of the Refusal Space or the date the term for such Refusal Space commences, unless the Advice specifies work to be performed by Landlord in the Refusal Space, in which case Landlord shall perform such work in the Refusal Space. If Landlord is delayed delivering possession of the Refusal Space due to the holdover or unlawful possession of such space by any party, Landlord shall use reasonable efforts to obtain possession of the space, and the commencement of the term for the Refusal Space shall be postponed until the date Landlord delivers possession of the Refusal Space to Tenant free from occupancy by any party (provided, however, that if the Letter of Intent attached to the Advice provides the Prospect with any remedy for late delivery, then Tenant shall have the right of any such remedy).

C. **Termination of Right of First Refusal**. Subject to the provisions of Sections D and E below, the rights of Tenant hereunder with respect to the Refusal Space shall terminate on the earlier to occur of (i) Tenant's failure to exercise its Right of First Refusal within the 5 Business Day period provided in Section A above (except as provided in Section D below); or (ii) the date Landlord would have provided Tenant an Advice if any of the conditions set forth in Section A Items 1-4 above had not occurred.

D. **Re-Offer of Refusal Space: Passage of Time**. If Tenant does not exercise its Right of First Refusal within the required 5 Business Day period, if Landlord does not enter into a lease for the Refusal Space within 120 days after the expiration of such 5-Business-Day period, then Landlord shall again be obligated to offer the Refusal Space to Tenant in the same manner as set forth in Sections A, B, and C above if Landlord is prepared to enter into a letter-of-intent with another Prospect.

E. **Re-Offer of Refusal Space: Reduction of Net Effective Rent**. Notwithstanding the foregoing, before Landlord enters into a lease (i) for space that is less than ninety percent (90%) of the floor area contemplated by the letter of intent accompanying the Advice, or (ii) at a Net Effective Rent (defined below) that is less than ninety percent (90%) of the Net Effective Rent contemplated by the letter of intent accompanying the Advice, then Landlord shall first give Tenant another Advice with respect to such lease and Tenant shall have a Right of First Refusal with respect thereto on the terms and conditions of this Section VIII. As used herein, the term "Net Effective Rent" means the net present value of the aggregate consideration payable by the lessee under the proposed lease, taking into account all fixed rent and additional rent, any free rent, any tenant improvement or other allowances, and the cost of any leasehold improvements to be performed by Landlord under such lease.

F. **Refusal Space Amendment**. If Tenant duly exercises its Right of First Refusal, Landlord and Tenant shall, within 14 days after Tenant exercises such right, execute an amendment to the Lease adding the Refusal Space to the Premises on the terms set forth in the Advice. If Tenant fails to execute such amendment within such 14-day period, then Tenant's exercise of the Right of First Refusal shall automatically become void and this Section VIII shall thereupon terminate and have no further force or effect.

IX. **Options to Extend.** Tenant shall continue to have the right and option to extend the Term of the Lease for two (2) extended terms of five (5) years each, pursuant to Section 2.4 of the Lease, except that the phrase "ninety-five percent (95%)" shall be inserted before the phrase "Fair Market Rental Value" in clause (ii) of Section 2.4(a) of the Lease.

X. **Signage.**

If Landlord creates any additional monument signage or directory signage within the Building or on the Property, then Tenant shall have the right, at Tenant's sole cost and expense, and subject to Landlord's prior written approval, which approval shall not be unreasonably withheld or delayed, as to size, design, finish and materials, to have Tenant's name placed on such monument signage or directory signage, as the case may be, in a location designated by Landlord. Additionally, if WOW expands its exterior signage at its new entryway to the Building, Tenant shall have the right, at Tenant's election, and at Tenant's sole cost and expense, upon prior notice to Landlord, to modify and expand its existing exterior Building signage at its entryway to the Building, subject to the prior written consent of Landlord and subject to the other provisions of the Lease regarding Tenant's signage and Alterations.

XI. **Parking.** Effective as of the Expansion Effective Date, Tenant shall have the right to use, on a non-exclusive, unreserved basis, 150 parking spaces in the Parking Area ("Parking Spaces"). Tenant's use of the Parking Spaces shall be subject to and in accordance with the terms set forth in Section 2.3 of the Lease, except that the last sentence of said Section 2.3 of the Lease is hereby deleted and is of no further force or effect.

XII. **Non-Disturbance Agreement.** Landlord represents that the only mortgage which encumbers the Property as of the date of this Amendment is a mortgage held by Capmark Bank whose address is Capmark Bank, 116 Welsh Road, Horsham, Pennsylvania 19044, Attention: PLG-Asset Manager, and Redwood Capital Finance Company, LLC whose address is 14241 Dallas Parkway, Suite 490, Dallas, Texas 75254, Attention: Jeffrey Schultz (collectively, the "Existing Holder"). The Existing Holder has entered into a Subordination, Non-Disturbance and Attornment Agreement ("SNDA") with Tenant dated as of September 9, 2008, and recorded with the Middlesex South District Registry of Deeds at Book 51683, Page 191. Landlord agrees to obtain the written consent of the Existing Holder to this First Amendment and to provide Tenant a copy of such consent.

XIII. **Notices.**

The Landlord's Address for notices (pursuant to Section 15.10 of the Lease) is as follows:

TC Saracen, LLC
2 Oliver Street – 6th Floor
Boston, MA 02109
Attention: Ted Saraceno

XIV. **Inapplicable and Deleted Lease Provisions.**

A. Article 4 of the Lease (Commencement and Condition), the 2nd sentence of Section 9.2(a) of the Lease (Tenant's payment of Operating Expenses) and Exhibit G to the Lease (Base Building Work) shall not apply to the Expansion Space.

B. Section 2.5 of the Lease (Right of First Offer) is hereby deleted in its entirety and is of no further force or effect.

C. For the purposes of the provisions of the Lease dealing with the Expansion Space, references in the Lease to the "Commencement Date" shall mean the "Expansion Effective Date", references in the Lease to the "Rent Commencement Date" shall mean the "Expansion Space Rent Commencement Date", references in the Lease to the "Termination Date" shall mean the "Extended Termination Date", and references in the Lease to the "Term" shall mean the "Extended Term". Subject to the foregoing, and except as otherwise provided in this Amendment, the provisions of the Lease (including defined terms) shall apply to the Expansion Space.

XV. **Condition of Effectiveness of Amendment**.

This Amendment shall only be effective if WOW executes and delivers to Landlord an agreement terminating its existing lease with respect to the Expansion Space on or before July 31, 2011. If such agreement is not executed and delivered on or before July 31, 2011, then each of Landlord and Tenant may elect to terminate this First Amendment by giving notice of such election to the other party at any time after August 1, 2011 and before such agreement is executed and delivered. If either party so elects, then this First Amendment shall automatically terminate on the day that is ten (10) business days after

delivery of such termination notice unless, on or before the expiration of such ten (10) business day period, such agreement is executed and delivered, in which event such termination election shall automatically become void. If this First Amendment is terminated pursuant to this Section XV, then the term of the Lease shall be automatically extended to May 31, 2013, on all of the same terms and conditions contained therein prior to this First Amendment.

XVI. **Miscellaneous.**

A. This Amendment sets forth the entire agreement between the parties with respect to the matters set forth herein, and there are no other oral or written representations or agreements. Under no circumstances shall Tenant be entitled to any Rent abatement, improvement allowance, leasehold improvements, or other work to the Premises, including, without limitation, the Expansion Space, or any similar economic incentives that may have originally been provided Tenant in connection with entering into the Lease, unless specifically set forth in this Amendment.

B. Except as herein modified or amended, the provisions, conditions and terms of the Lease shall remain unchanged and in full force and effect.

C. In the case of any inconsistency between the provisions of the Lease and this Amendment, the provisions of this Amendment shall govern and control.

D. Submission of this Amendment by Landlord is not an offer to enter into this Amendment but rather is a solicitation for such an offer by Tenant. Landlord shall not be bound by this Amendment until Landlord has executed and delivered the same to Tenant.

E. The capitalized terms used in this Amendment shall have the same definitions as set forth in the Lease to the extent that such capitalized terms are not otherwise defined in this Amendment.

F. Tenant hereby represents to Landlord that Tenant has dealt with no broker in connection with this Amendment, other than Richards Barry Joyce & Partners (the "Broker"). Tenant agrees to indemnify and hold Landlord, its trustees, members, principals, beneficiaries, partners, officers, directors, employees, mortgagee(s) and agents, and the respective principals and members of any such agents harmless from all claims of any brokers claiming to have represented Tenant in connection with this Amendment other than Broker. Landlord hereby represents to Tenant that Landlord has dealt with no broker in connection with this Amendment, other than the Broker. Landlord agrees to indemnify and hold Tenant, its trustees, members, principals, beneficiaries, partners, officers, directors, employees, and agents, and the respective principals and members of any such agents harmless from all claims of any brokers claiming to have represented Landlord in connection with this Amendment, other than the Broker. Landlord agrees to pay a brokerage commission to the Broker pursuant to a separate agreement between Landlord and the Broker.

G. Each signatory of this Amendment represents hereby that he or she has the authority to execute and deliver the same on behalf of the party hereto for which such signatory is acting.

[SIGNATURES ARE ON FOLLOWING PAGE]

IN WITNESS WHEREOF, Landlord and Tenant have duly executed this Amendment as of the day and year first above written.

WITNESS/ATTEST:

/s/ ERK EARNHART
Name (print): ERK EARNHART
/s/ LU TERRY
Name (print): LU TERRY

LANDLORD:

TC SARACEN, LLC, a Delaware limited liability company, is member

By: TC Saracen Manager, LLC,
a Delaware limited liability company, its Managing Member

By: Trammell Crow Company Acquisitions II, L.P.,
a Delaware limited partnership, its sole member

By: Trammel Crow Acquisitions I-II, GP, L.P.,
a Delaware limited partnership, its general partner

By: Trammell Crow Acquisitions I-II, Inc.
a Delaware corporation, its general partner

By: /s/ Matthew W. Hill
Name: Matthew W. Hill
Title: Sr. Vice President

WITNESS/ATTEST:

/s/ William J Kelly
Name (print): William J Kelly
/s/ Daniel Witt
Name (print): Daniel Witt

TENANT:

REPLIGEN CORPORATION, a Delaware corporation

By: /s/ Walter Herlihy
Name: Walter Herlihy
Title: Chief Executive Officer

EXHIBIT A

OUTLINE AND LOCATION OF EXPANSION SPACE

[Image of Outline and Location of Expansion Space]

EXHIBIT B

WORK LETTER

This Work Letter shall set forth the terms and conditions relating to the construction of the Tenant Improvements (as defined herein) to be made to the Expansion Space. All references in this Work Letter to Articles or Sections of "this Lease" shall mean the relevant portion of the Lease (as amended by the Amendment to which this Work Letter is attached), and all references in this Work Letter to Sections of "this Work Letter" shall mean the relevant portion of this Work Letter. Capitalized terms used in this Work Letter shall have the same meaning as those terms are used and defined in the Lease (as amended by the Amendment), unless such terms are otherwise defined in this Work Letter.

SECTION 1

TENANT'S CONSTRUCTION OBLIGATIONS

Tenant shall be entitled to the Tenant Improvement Allowance (defined below) in connection with its design and construction of the Tenant Improvements. Tenant shall be required, at its sole expense (but subject to receipt of the Tenant Improvement Allowance) to construct the Tenant Improvements (as defined below).

1.1 **Tenant Improvement Allowance.**

1.1.1 **Tenant Improvement Allowance.** Tenant shall be entitled to a one-time improvement allowance (the "**Tenant Improvement Allowance**") in the amount equal to the sum of (a) the product of (i) Forty Dollars ($40), and (ii) the number of rentable square feet of the Expansion Space (i.e., the amount of One Million Two Hundred Forty-Nine Thousand Forty Dollars ($1,249,040.00) based upon 31,226 rentable square feet, plus (b) the sum of Two Hundred Ninety-Six Thousand Six Hundred Forty-Seven Dollars ($296,647.00) for new HVAC equipment, plus (c) the sum of One Hundred Twenty-Four Thousand Nine Hundred Four Dollars ($124,904.00) for the cost of preparing the roof to support the new HVAC equipment, plus (d) the sum of Ninety-Seven Thousand Eight Hundred Seventy-Two and 00/100 Dollars ($97,872.00) (i.e., $4.00 per rentable square foot of the Existing Premises), which may be expended on leasehold improvements in the Existing Premises and/or the Expansion Space for a total Tenant Improvement Allowance of One Million Seven Hundred Sixty-Eight Thousand Four Hundred Sixty-Three Dollars ($1,768,463.00)). The Tenant Improvement Allowance is to reimburse Tenant for the costs relating to the initial design and construction of improvements which Tenant makes to the Expansion Space (including the HVAC equipment and roof improvements described above) in accordance with the provisions of this Work Letter (the "**Tenant Improvements**"). In no event shall Landlord be obligated to make disbursements of the Tenant Improvement Allowance for Tenant Improvements in a total amount which exceeds the amount of One Million Seven Hundred Sixty-Eight Thousand Four Hundred Sixty-Three Dollars ($1,768,463.00).

1.2 **Disbursement of the Tenant Improvement Allowance.**

1.2.1 **Tenant Improvement Allowance Items.** The Tenant Improvement Allowance shall be disbursed by Landlord only for the following items and costs attributable to the Tenant Improvements pursuant to this Work Letter (collectively the "**Tenant Improvement Allowance Items**"):

1.2.1.1 Payment of the fees of the "**Architect**" and the "**Engineers**", as those terms are defined in Section 2.1 of this Work Letter which fees shall not exceed an aggregate amount equal to the product of (i) Six Dollars ($6.00), and (ii) the number of rentable square feet of the Expansion Space;

1.2.1.2 The payment of plan check, permit and license fees relating to construction of the Tenant Improvements;

1.2.1.3 The cost of construction of the Tenant Improvements, including, without limitation, testing and inspection costs, project manager fees, trash removal costs, and contractors' fees and general conditions;

1.2.1.4 The cost of the new HVAC equipment and the cost of preparing the roof of the Building to accommodate the new HVAC system, subject to the respective applicable maximum amounts set forth above for such Tenant Improvements;

1.2.1.5 The cost of any changes to the Construction Drawings or the Tenant Improvements required by applicable law;

1.2.1.6 Tenant Improvement Allowance Items shall expressly exclude, without limitation, the cost of telecommunications equipment, signage, furniture, trade fixtures, and similar moveable personal property, or the cost of moving.

1.2.2 **Disbursement Procedures.** Landlord shall make monthly disbursements of the Tenant Improvement Allowance for the Tenant Improvement Allowance Items and shall authorize the release of monies as follows.

1.2.2.1 **Monthly Disbursements.** From time to time but not more frequently than monthly during the design and construction of the Tenant Improvements (or such other date as Landlord and Tenant may reasonably agree upon), Tenant shall deliver to Landlord: (i) a request for payment of the "**Architect**", as that term is defined in Section 2.1 of this Work Letter, and/or the "**Contractor**", as that term is defined in Section 3.1.1 of this Work Letter, approved by Tenant, in a form to be provided by Landlord and approved by Tenant, which approval shall not be unreasonably withheld or delayed, showing, as applicable, the design services performed or the schedule, by trade, of percentage of completion of such Tenant Improvements, detailing the portion of the work completed and the portion not completed; (ii) invoices from all of "**Tenant's Agents**", as that term is defined in Section 3.1.2 of this Work Letter, for labor rendered and materials delivered to the Expansion Space in connection with the Tenant Improvements; (iii) executed mechanic's lien releases from all of Tenant's Agents which shall comply with the applicable statutory provisions of Massachusetts law; (iv) a calculation showing the amount of the total payment which is to be funded by Landlord (as part of the Tenant Improvement Allowance) and the amount of the total payment which is to be funded by Tenant pursuant to Section 3.2.1 of this Work Letter as part of the Over Allowance Amount; and (v) all other information reasonably requested by Landlord in connection with such draw request, or the work underlying the same. Within thirty (30) days after delivery of such request for payment, Landlord shall deliver a check or wire-transfer payment to Tenant in payment of the lesser of: (A) the amounts so requested by Tenant, as set forth in this Section 1.2.2.1 of this Work Letter, and (B) the balance of any remaining available portion of the Tenant Improvement Allowance. Tenant may direct that Landlord make its payment of the Tenant Improvement Allowance or portions thereof directly to the Contractor. Landlord's payment of such amounts shall not be deemed Landlord's approval or acceptance of the work furnished or materials supplied as set forth in Tenant's payment request.

1.2.2.2 **Other Terms.** Except as otherwise set forth herein, all Tenant Improvement Allowance Items for which the Tenant Improvement Allowance has been made available shall be deemed Landlord's property under the terms of this Lease.

1.2.2.3 **Excess Improvement Allowance.** If, after substantial completion of the Tenant Improvements, there remains undisbursed any portion of the Tenant Improvement Allowance, such undisbursed amount shall not be credited against Rent and need not be funded by Landlord. Further, Landlord is not obligated to fund any portion of the Tenant Improvement Allowance on a date which is later than eighteen (18) months after the Expansion Effective Date. If Landlord fails to pay any installment of the Tenant Improvement Allowance when due in accordance with terms of this Exhibit B, which failures continues for more than thirty (30) days after notice to Landlord thereof, then Tenant may offset the amount of any such unpaid installment against the next installments of Basic Rent due under the Lease.

SECTION 2

CONSTRUCTION DRAWINGS

2.1 **Selection of Architect/Construction Drawings.** Subject to Landlord's approval, which approval shall not be unreasonably withheld, Tenant shall select and retain an architect/space planner (the "**Architect**") to prepare the "**Construction Drawings**", as that term is defined in this Section 2.1. Subject to Landlord's reasonable approval, which approval will not be unreasonably withheld, Tenant or the Architect shall retain structural, mechanical and electrical engineering consultants (collectively, the "**Engineers**") to prepare all plans and engineering working drawings relating to the structural, mechanical, electrical, plumbing, HVAC, lifesafety, and sprinkler work in the Expansion Space which are part of the Tenant Improvements, and including the work required to prepare the roof to accommodate the new HVAC equipment. The plans and drawings to be prepared by Architect and the Engineers hereunder, including specifications for the Tenant Improvements, shall be known collectively as the "**Construction Drawings**". All Construction Drawings shall be subject to Landlord's reasonable approval; provided, however, Landlord shall only disapprove any such Construction Drawing to the extent of a "**Design Problem**", as that term is defined below. Tenant and Architect shall verify, in the field, the dimensions and conditions as shown on the relevant portions of the final Construction Drawings, and Tenant and Architect shall be solely responsible for the same, and Landlord shall have no responsibility in connection therewith. Landlord's review of the Construction Drawings as set forth in this Section 2, shall be for its sole purpose and shall not imply Landlord's review of the same, or obligate Landlord to review the same, for quality, design, compliance with applicable laws, ordinances, regulations or other like matters. Accordingly, notwithstanding that any Construction Drawings are reviewed or approved by Landlord or its space planner, architect, engineers and consultants, and notwithstanding any advice or assistance which may be rendered to Tenant by Landlord or Landlord's space planner, architect, engineers, and consultants, Landlord shall have no liability whatsoever in connection therewith and shall not be responsible for any omissions or errors contained in the Construction Drawings, and Tenant's waiver and indemnity set forth in this Lease shall specifically apply to the Construction Drawings. A "**Design Problem**" is defined as, and shall be deemed to exist if the Tenant Improvements shown on the Construction Drawings (i) would have an impact on the exterior appearance of the Building, (ii) would have a material,

adverse effect on the structure of the Building, (iii) would have a material adverse effect on the systems (HVAC, electrical, plumbing, lifesafety, etc.) of the Building, or the operation and maintenance thereof, or (iv) fail to comply with applicable laws, ordinances or regulations.

2.2 **Final Working Drawings for the Premises.** Tenant and Landlord shall cooperate and coordinate with one another to supply the Engineers with a complete listing of standard and non-standard equipment and specifications, including, without limitation, B.T.U. calculations, electrical requirements and special electrical receptacle requirements for the Expansion Space, to enable the Engineers and the Architect to complete the "**Final Working Drawings**" (as that term is defined below) in the manner as set forth below. Tenant shall promptly cause the Architect and the Engineers to complete the architectural and engineering drawings for the Expansion Space, and Architect shall compile a fully coordinated set of architectural, structural, mechanical, electrical and plumbing working drawings, and all specifications, in a form which is complete to allow subcontractors to bid on the work and to obtain all applicable permits (collectively, the "**Final Working Drawings**") and shall submit the same to Landlord for Landlord's approval. Tenant shall supply Landlord with four (4) copies signed by Tenant of such Final Working Drawings. Landlord shall, within five (5) Business Days after Landlord's receipt of all of the Final Working Drawings, either (i) approve the Final Working Drawings, (ii) approve the Final Working Drawings subject to specified conditions, which conditions must be stated in a reasonably clear and complete manner, and shall only be conditions reasonably intended to address a potential Design Problem, or (iii) disapprove and return the Construction Drawings to Tenant with requested revisions; provided, however, Landlord shall only disapprove such Final Working Drawings to the extent of a Design Problem. If Landlord disapproves the Final Working Drawings, Tenant may resubmit the Final Working Drawings to Landlord at any time, and Landlord shall approve or disapprove the resubmitted Final Working Drawings, based upon the criteria set forth in this Section 2.2, within three (3) Business Days after Landlord receives such resubmitted Final Working Drawings. Such procedure shall be repeated until the Final Working Drawings are approved.

2.3 **Approved Working Drawings for the Premises.** The Final Working Drawings shall be approved by Landlord (the "**Approved Working Drawings**") prior to the commencement of construction of any Tenant Improvements. After approval of the Final Working Drawings by Landlord, Tenant may submit the same to the appropriate municipal authorities for all applicable building permits. If Landlord has approved the Construction Drawings and the Final Working Drawings have been approved by Landlord, but for minor items, Tenant may submit same to the appropriate municipal authorities for all applicable permits, but Tenant does so at its risk and sole cost, and with the understanding that it may need to submit amendments or modifications. Tenant hereby agrees that neither Landlord nor Landlord's consultants shall be responsible for obtaining any building permit or certificate of occupancy for the Expansion Space and that obtaining the same shall be Tenant's responsibility; provided, however, that Landlord shall cooperate with Tenant in executing permit applications and taking such other acts as may be reasonably necessary (at Tenant's expense, except with respect to nominal costs or expenses) to enable Tenant to obtain any such permit or certificate of occupancy. No material changes, modifications or alterations in the Approved Working Drawings may be made without the prior written consent of Landlord, provided, however, that Landlord may only disapprove of any such change to the extent necessary to eliminate a Design Problem; Landlord shall review and approve or disapprove any requested changes, modifications or alterations to the Approved Working Drawings within two (2) Business Days after receipt of a request therefor (which may be oral).

SECTION 3

CONSTRUCTION OF TENANT IMPROVEMENTS

3.1 **Tenant's Selection of Contractors.**

3.1.1 **The Contractor.** A general contractor shall be retained by Tenant to construct the Tenant Improvements. Such general contractor ("**Contractor**") shall be selected by Tenant but subject to the approval of Landlord, which approval will not be unreasonably withheld.

3.1.2 **Tenant's Agents.** All subcontractors ("**Tenant's Agents**") whose contracts exceed One Hundred Fifty Thousand Dollars ($150,000) and all subcontractors who will be working on the roof area (collectively, "**Major Tenant's Agents**") must be approved in writing by Landlord, which approval shall not be unreasonably withheld. If Landlord reasonably disapproves any of any Major Tenant's Agents, Tenant shall submit other proposed Major Tenant Agents for Landlord's written approval, which approval shall not be unreasonably withheld. Nothing contained herein shall be interpreted to imply that subcontractors performing work for or on behalf of the Contractor are agents of the Tenant.

3.2 **Construction of Tenant Improvements by Tenant's Agents.**

3.2.1 **Construction Contract; Cost Budget.** Tenant shall provide Landlord with a copy, for informational purposes only, of (a) Tenant's construction contract with Contractor (the "**Contract**"); (b) a breakdown (the "**Final Cost Budget**"), by trade, of the final costs to be incurred (which may be based upon estimates) or which have been incurred, in connection with the design and construction of the Tenant Improvements, including costs which form a basis for the amount of the Contract (the "**Final Costs**"). The Contract must contain a provision for a holdback of at least ten percent (10%) of each progress payment until at least substantial completion of the work. Prior to submitting its first request for a funding of the Tenant Improvement Allowance, Tenant and Landlord shall identify the amount (the "**Over-Allowance Amount**") equal to the difference between (i) the amount of the Final Costs or projected Final Costs, and (ii) the total amount of the Tenant Improvement Allowance. With regard to any such Over-Allowance Amount, concurrently with Landlord's distribution of the Tenant Improvement Allowance, Tenant shall make payments related to such Over-Allowance Amount out of its own funds, on a pro rata basis with the funding of the Tenant Improvement Allowance. Tenant shall provide Landlord with evidence of its funding of its share concurrently with its draw requests.

3.2.2 **Tenant's Agents.**

3.2.2.1 **General Conditions for Tenant's Agents and Tenant Improvement Work.** Tenant's and Tenant's Agent's construction of the Tenant Improvements shall comply with the following: (i) the Tenant Improvements shall be constructed substantially in accordance with the Approved Working Drawings; (ii) Major Tenant's Agents shall submit schedules of all work relating to the Tenant Improvements to Landlord and Landlord shall cooperate reasonably and use diligent efforts at no out-of-pocket cost to Landlord to enable Major Tenant's Agents to stay on schedule; and (iii) Tenant shall abide by all commercially reasonable rules made by Landlord with respect to the use of freight, loading dock and service elevators, storage of materials, coordination of work with the contractors of Landlord (including

those performing the Landlord's Improvements), and any other matter in connection with this Work Letter; and Landlord shall use diligent efforts to make its facilities available to Tenant and Tenant's Agents and to coordinate Tenant's work with other work in the Building so as to enable Tenant's Agents to stay on schedule. No fees or charges shall be made by Landlord as a result of its coordination oversight or any other involvement (including the approval processes described herein) relating to the construction of the Tenant Improvements.

3.2.2.2 **Indemnity.** Tenant's indemnifications of Landlord set forth in the Lease shall also apply to Tenant's construction of the Tenant Improvements as described in this Work Letter. With regard to Tenant's indemnification, the same shall also apply with respect to any and all costs, losses, damages, injuries and liabilities related in any way to any act or omission of Tenant or Tenant's Agents, or anyone directly or indirectly employed by any of them, or in connection with Tenant's non-payment of any amount, in connection with the Tenant Improvements and/or Landlord's disapproval of all or any portion of any request for payment, except to the extent caused by any omission, fault, negligence or other misconduct of the Landlord.

3.2.2.3 **Requirements of Tenant's Agents.** Each of Tenant's Contractor and Major Tenant's Agents shall guarantee to Tenant and for the benefit of Landlord that the portion of the Tenant Improvements for which it is responsible shall be free from any defects in workmanship and materials for a period of not less than one (1) year from the date of completion thereof. Each of Tenant's Contractor and Major Agents shall be responsible for the replacement or repair, without additional charge, of all work done or furnished in accordance with its contract that shall become defective within one (1) year after the completion of the work performed by such Tenant's Agents. The correction of such work shall include, without additional charge, all additional expenses and damages incurred in connection with such removal or replacement of all or any part of the Tenant Improvements, and/or the Building that may be damaged or disturbed thereby. All such warranties or guarantees as to materials or workmanship of or with respect to the Tenant Improvements shall be contained in the Contract or subcontract and Tenant shall endeavor to require that such guarantees or warranties shall inure to the benefit of both Landlord and Tenant, as their respective interests may appear, and can be directly enforced by either. Tenant covenants to give to Landlord any assignment or other assurances which may be necessary to effect such right of direct enforcement.

3.2.2.4 **Insurance Requirements.**

3.2.2.4.1 **General Coverages.** All of Tenant's Agents shall carry worker's compensation insurance covering all of their respective employees, and shall also carry public liability insurance, including property damage, all with limits, in form and with companies as are required to be carried by Tenant as set forth in this Lease, unless otherwise approved by Landlord in writing.

3.2.2.4.2 **Special Coverages.** Tenant or Tenant's Contractor shall carry "**Builder's All Risk**" insurance in an amount reasonably approved by Landlord covering the construction of the Tenant Improvements, and such other customary insurance as Landlord may reasonably require, it being understood and agreed that the Tenant Improvements shall be continuously insured by Tenant pursuant to this Work Letter and/or Lease following the commencement of construction of such Tenant Improvements. Such insurance shall be in amounts and shall include such extended coverage endorsements as may be reasonably required by Landlord, and in form and with companies as are required to be carried by Tenant as set forth in this Lease.

3.2.2.4.3 **General Terms.** Certificates for all insurance carried pursuant to this Section 4.2.2.4 shall be delivered to Landlord before the commencement of construction of the Tenant Improvements and before the Contractor's equipment is moved onto the site. Tenant will use commercially reasonable efforts to require that all such policies of insurance (and any certificates of insurance provided to Landlord and Existing Holder) contain a provision that the company writing said policy will endeavor to give Landlord and Existing Holder at least thirty (30) days prior written notice of any cancellation of or any material change in the policy. In the event that the Tenant Improvements are damaged by any cause during the course of the construction thereof, Tenant shall immediately repair the same at Tenant's sole cost and expense (applying the insurance proceeds to which Tenant would be entitled following the maintenance of the insurance required hereunder); provided, however, to the extent such insurance proceeds are unavailable due to Landlord's willful misconduct, the same shall be at Landlord's sole cost and expense. Tenant's Agents shall maintain all of the foregoing insurance coverage in force until the Tenant Improvements are fully completed and accepted by Landlord. All policies carried under this Section 3.2.2.4 shall insure Landlord and Tenant, as their interests may appear, Existing Holder as well as Contractor and Tenant's Agents. Such insurance shall provide that it is primary insurance as respects the owner and that any other insurance maintained by owner is excess and noncontributing with the insurance required hereunder. The requirements for the foregoing insurance shall not derogate from the provisions for indemnification of Landlord by Tenant under Section 3.2.2.2 of this Work Letter.

3.2.3 **Commencement of Construction.** Tenant's construction of the Tenant Improvements shall be permitted to commence immediately after the Expansion Effective Date, subject to the terms and conditions of this Work Letter.

3.2.4 **Governmental Compliance.** The construction of the Tenant Improvements shall comply in all respects with applicable laws, ordinances and regulations.

3.2.5 **Inspection by Landlord.** Landlord shall have the right to inspect the Tenant Improvements at all times, provided however, that Landlord's failure to inspect the Tenant Improvements shall in no event constitute a waiver of any of Landlord's rights hereunder nor shall Landlord's inspection of the Tenant Improvements constitute Landlord's approval of the same. Should Landlord disapprove (due to defects in the construction of the same, or material deviation from the specifications and requirements therefore set forth in the Final Working Drawings) any portion of the Tenant Improvements being constructed by Tenant, Landlord shall notify Tenant in writing of such disapproval, shall specify the items disapproved, and shall identify with reasonable specificity the grounds for such disapproval. Any defects or deviations in such Tenant Improvements shall be promptly rectified by Tenant at no expense to Landlord.

3.2.6 **Meetings.** Tenant shall hold regular meetings at reasonable times (but in no event to be required more often than weekly), with the Architect and the Contractor regarding the progress of the preparation of Construction Drawings and the construction of the Tenant Improvements, which meetings shall be on-site, or at another location and at times mutually and reasonably agreed upon by Landlord and Tenant, and Landlord and/or its agents shall receive prior notice of, and shall have the right to attend, all such meetings, and, upon Landlord's request, certain of Tenant's Agents shall attend such meetings. In addition, minutes shall be taken at all such meetings, a copy of which minutes shall be promptly delivered to Landlord. One such meeting each month shall include the review of Contractor's current request for payment.

3.3 **Notice of Completion; Copy of Record Set of Plans.** Within ten (10) days after completion of construction of the Tenant Improvements, Tenant shall cause a Notice of Completion to be recorded in the appropriate office in Middlesex County, Massachusetts in accordance with applicable Massachusetts statutory law, and shall furnish a copy thereof to Landlord upon such recordation. If Tenant fails to do so, Landlord may execute and file the same on behalf of Tenant as Tenant's agent for such purpose, at Tenant's sole cost and expense. At the conclusion of construction, (i) Tenant shall cause the Architect and Contractor (A) to update the Approved Working Drawings as necessary to reflect all changes made to the Approved Working Drawings during the course of construction, (B) to certify to the best of their knowledge that the "record-set" of as-built drawings are true and correct, which certification shall survive the expiration or termination of this Lease, and (C) to deliver to Landlord two (2) sets of CAD format file copies and two (2) sets of hard copies of such record set of drawings within ninety (90) days following issuance of a certificate of occupancy for the Expansion Space, and (ii) Tenant shall deliver to Landlord a copy of all warranties, guaranties, and operating manuals and information relating to the Tenant Improvements.

SECTION 4

MISCELLANEOUS

4.1 **Tenant's Representative.** Tenant has designated William Kelly as Tenant's sole representative with respect to the matters set forth in this Work Letter, who until further notice to Landlord shall have full authority and responsibility to act on behalf of the Tenant as required in this Work Letter. Tenant shall have the right, by notice to Landlord, to appoint additional or replacement representatives.

4.2 **Landlord's Representative.** Landlord has designated Henry St. Hillaire as its sole representative with respect to the matters set forth in this Work Letter, who, until further notice to Tenant, shall have full authority and responsibility to act on behalf of the Landlord as required in this Work Letter. Landlord shall have the right, by notice to Tenant, to appoint additional or replacement representatives.

4.3 **Time of the Essence in This Work Letter.** Time is of the essence. Unless otherwise indicated, all references herein to a "number of days" shall mean and refer to calendar days. If any item requiring approval is timely disapproved by Landlord, the procedure for preparation of the document and approval thereof shall be repeated until the document is approved by Landlord.

4.4 **Coordination.** In constructing the Tenant Improvements, Tenant will use reasonable commercial efforts to avoid interference with any of the existing systems within the Building.

4.5 **Dispute Resolution.** Any controversy, dispute or claim arising in connection with this Work Letter shall be settled by arbitration in Boston, Massachusetts in accordance with the Expedited Arbitration Rules of the American Arbitration Association as then in effect (unless the parties mutually agree otherwise). The decision rendered by the arbitrator or arbitrators shall be final and conclusive upon Landlord and Tenant. To avail itself of the dispute resolution procedures of this Section 4.5, the party demanding arbitration shall file a written notice of such

demand with the other party and with the American Arbitration Association. In connection with resolution of disputes submitted to arbitration hereunder, Landlord and Tenant hereby irrevocably waive any and all rights they may have to resolve such dispute in a manner that is inconsistent with the provisions of this Section 4.5.

EXHIBIT C

REFUSAL SPACE

[Image of Refusal Space]

REPLIGEN CORPORATION
CONTRACT TRACKING AND APPROVAL FORM
Document No: CAP-FM-1001-04
Supercedes: CAP-FM-1001-03

Parties:

Organization/Consultant	Wesst Seyon LLC

Contact Person	Ted Saraceno

Address:	TC Saracen, LLC 2 Oliver Street – 6th Floor Boston, MA 02109 Attention: Ted Saraceno

Phone Number:	

Repligen Responsible Party:	Bill Kelly

Agreement Type (Check One):

☐ Standard One-Way CDA ☐ Non Standard One-Way CDA	☐ Standard Two-Way CDA ☐ Non Standard Two Way CDA
☐ Honorium Letter:	☐ Standard Research Agreement ☐ Non Standard Research Agreement
☐ Standard Consulting ☐ Non Standard Consulting	☐ Standard Clinical Trial Agreement ☐ Non Standard Clinical Trail Agreement
☐ Standard Material Transfer Agreement (MTA) ☐ Non Standard Material Transfer Agreement	☒ Other (Describe): Lease Amendment

* *Non Standard Agreements require prior approval by Vice President, Operations*

Project:		Party Filed Under:	
Effective Date:	June 2011	Expiration Date:	May 2023
Project Amount Requested		Payment Schedule	
Is this project included and approved in the current FY budget? ☒ yes ☐ no If no, exceeds approved budget by $			
If no, please provide explanation and justification of additional expense:			

REPLIGEN CORPORATION
CONTRACT TRACKING AND APPROVAL FORM
Document No: CAP-FM-1001-04
Supercedes: CAP-FM-1001-03

Purchase Order Number:	____

Contract Approval:

Vice President or Chief Executive Officer Illegible	Date 6-13-11
Vice President of Operations (for all non-standard agreements) Illegible	Date 6/15/11
Chief Executive Officer (for all non-standard agreements)	Date

Budget Approval:

VP of the Responsible Department (over $2,000) Illegible	Date 6/15/11
Chief Executive Officer (over $2,000) Illegible	Date Illegible
VP of Finance (over $50,000)	Date

Technology Patent Review Committee (TPRC) Approval (if required):

TPRC Member	Date
Brief description of collaboration:	

Received Executed Original: Date	Sent Partially Executed Original: Date	Sent Fully Executed Original: Date
☐ Regular Mail	☐ Regular Mail	☐ Regular Mail
☐ 2-Day	☐ 2-Day	☐ 2-Day
☐ Overnight	☐ Overnight	☐ Overnight
☐ International Mail	☐ International Mail	☐ International Mail
☐ PDF	☐ PDF	☐ PDF

Filed Date
☐ Corporate File
☐ Finance Dept.
☐ Scanned: [include path where agreement is located]

SECOND AMENDMENT TO LEASE

THIS SECOND AMENDMENT TO LEASE (the "Amendment") is made and entered into as of January 11, 2013, by and between TC Saracen, LLC, a Delaware limited liability company ("Landlord"), and Repligen Corporation, a Delaware corporation ("Tenant").

RECITALS

A. Landlord and Tenant are parties to that certain lease dated October 10, 2001, as amended by a Letter Agreement dated May 7, 2002, and a certain First Amendment to Lease (the "First Amendment") dated as of June 29, 2011 (collectively, the "Lease").

B. Pursuant to the First Amendment, Landlord delivered possession of the Expansion Space (as that term is defined in the First Amendment) to Tenant.

C. By a letter to Landlord dated July 26, 2012 (the "Repligen Letter"), Tenant asserted that the condition of the Expansion Space and the Building did not comply with the terms and conditions of the Lease. Landlord has agreed to perform certain remedial work in the Building on the terms and conditions set forth herein.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

I. Expansion Effective Date; Expansion Space Rent Commencement Date.

Landlord and Tenant acknowledge and agree that: (i) the Expansion Effective Date (as that term is defined in the First Amendment) occurred on November 6, 2011; (ii) the Expansion Space Rent Commencement Date (as that term is defined in the First Amendment) occurred on May 4, 2012; and (iii) the Extended Termination Date (as that term is defined in the First Amendment) is May 31, 2023.

II. Remedial Work.

Landlord agrees to perform at its sole expense the work described on Exhibit A attached hereto (the "Remedial Work"). Landlord shall use commercially reasonable efforts to cause the Remedial Work to be Substantially Complete (as such term is defined below) on or before the date that is sixty (60) days after the date of this Amendment the "Intended Remedial Work Completion Date"). The Remedial Work shall be deemed "Substantially Complete" on the date that (a) the Remedial Work has been substantially completed in accordance with the plans attached hereto as Exhibit A excepting only minor punch list items that will not adversely affect Tenant's ability to commence the Tenant Improvements, (b) all inspections, sign-offs and approvals required from the City of Waltham have been obtained such that the Expansion Space may be legally occupied for the uses permitted under the Lease, subject only to Tenant's performance of the Tenant Improvements as provided in the First Amendment to Lease, and (c) Tenant may commence its Tenant Improvements in the Premises without interruption.

Tenant hereby acknowledges that it is in possession of the Premises (including, without limitation, the Expansion Space) and that Tenant has fully inspected the Premises, the Expansion Space, and the Building to its satisfaction and that, except for performance of

the Remedial Work, Tenant accepts the Building and Expansion Space in its current condition without further requirement for Landlord to perform any alterations or improvements to prepare the Building and Expansion Space for Tenant's occupancy or to comply with the requirements of the Lease (and, without limitation of the foregoing, Tenant acknowledges that the performance of the Remedial Work in accordance with this Amendment shall correct all matters referred to in the Repligen Letter). Notwithstanding the foregoing, Landlord agrees that the performance of the Remedial Work will not relieve Landlord from responsibility for performing Landlord's ongoing maintenance and repair obligations set forth in the Lease.

III. Tenant Improvement Allowance.

A. Section 1.1.1 of Exhibit B to the First Amendment is hereby amended by deleting the same in its entirety and inserting in its place the following:

"1.1.1 "**Tenant Improvement Allowance**. Tenant shall be entitled to a one-time improvement allowance (the "**Tenant Improvement Allowance**") in the amount equal to One Million Seven Hundred Sixty-Eight Thousand Four Hundred Sixty-Three Dollars ($1,768,463.00)). The Tenant Improvement Allowance is to reimburse Tenant for the costs relating to the initial design and construction of improvements which Tenant makes to the Expansion Space, including the installation of new HVAC equipment and work to reinforce the roof of the Building to support such new HVAC equipment, in accordance with the provisions of this Work Letter (the "**Tenant Improvements**"). In no event shall Landlord be obligated to make disbursements of the Tenant Improvement Allowance for Tenant Improvements in a total amount which exceeds the amount of One Million Seven Hundred Sixty-Eight Thousand Four Hundred Sixty-Three Dollars ($1,768,463.00)."

B. Section 1.2.2.3 of Exhibit B to the First Amendment is hereby amended by deleting the second sentence thereof and replacing it with the following:

"Further, Landlord shall have no obligation to fund any portion of the Tenant Improvement Allowance that is not the subject of a request for payment made in accordance with Section 1.2.2.1 above and delivered to Landlord on or before July 6, 2013; and any undisbursed portion of the Tenant Improvement Allowance shall be retained by Landlord; provided that such date shall be extended on a day for day basis for each day that the Remedial Work has not been Substantially Completed after the Intended Remedial Work Completion Date for any reason other than a delay caused by an act or omission of Tenant that continues after notice thereof from Landlord."

IV. Miscellaneous.

A. This Amendment sets forth the entire agreement between the parties with respect to the matters set forth herein, and there are no other oral or written representations or agreements. Under no circumstances shall Tenant be entitled to any Rent abatement, improvement allowance, leasehold improvements, or

other work to the Premises, including, without limitation, the Expansion Space, or any similar economic incentives that may have originally been provided Tenant in connection with entering into the Lease, unless specifically set forth in this Amendment.

B. Except as herein modified or amended, the provisions, conditions and terms of the Lease shall remain unchanged and in full force and effect.

C. In the case of any inconsistency between the provisions of the Lease and this Amendment, the provisions of this Amendment shall govern and control.

D. Submission of this Amendment by Landlord is not an offer to enter into this Amendment but rather is a solicitation for such an offer by Tenant. Landlord shall not be bound by this Amendment until Landlord has executed and delivered the same to Tenant.

E. The capitalized terms used in this Amendment shall have the same definitions as set forth in the Lease to the extent that such capitalized terms are not otherwise defined in this Amendment.

F. Tenant hereby represents to Landlord that Tenant has dealt with no broker in connection with this Amendment. Tenant agrees to indemnify and hold Landlord, its trustees, members, principals, beneficiaries, partners, officers, directors, employees, mortgagee(s) and agents, and the respective principals and members of any such agents harmless from all claims of any brokers claiming to have represented Tenant in connection with this Amendment. Landlord hereby represents to Tenant that Landlord has dealt with no broker in connection with this Amendment. Landlord agrees to indemnify and hold Tenant, its trustees, members, principals, beneficiaries, partners, officers, directors, employees, and agents, and the respective principals and members of any such agents harmless from all claims of any brokers claiming to have represented Landlord in connection with this Amendment.

G. Each signatory of this Amendment represents hereby that he or she has the authority to execute and deliver the same on behalf of the party hereto for which such signatory is acting.

[SIGNATURES ARE ON FOLLOWING PAGE]

IN WITNESS WHEREOF, Landlord and Tenant have duly executed this Amendment as of the day and year first above written.

WITNESS/ATTEST:

Illegible

Name (print): Illegible

Illegible

Name (print): Illegible

LANDLORD:

TC SARACEN, LLC, a Delaware limited liability company, is member

By: TC Saracen Manager, LLC,
a Delaware limited liability company,
its Managing Member

By: Trammell Crow Company Acquisitions II, L.P.,
a Delaware limited partnership, its sole member

By: Trammel Crow Acquisitions I-II, GP, L.P.,
a Delaware limited partnership, its general partner

By: Trammell Crow Acquisitions I-II, Inc. a
Delaware corporation, its general partner

By: /s/
Matthew W. Hill
Name: Matthew W.
Hill
Title: Sr. Vice
President

WITNESS/ATTEST:

Illegible

Name (print): Illegible

Illegible

Name (print): Illegible

TENANT:

REPLIGEN CORPORATION, a Delaware corporation

By: /s/ Daniel Witt

Name: Daniel Witt

Title: Illegible

EXHIBIT A
REMEDIAL WORK

[Image of Remedial Work]

THIRD AMENDMENT TO LEASE

THIS THIRD AMENDMENT TO LEASE (the "Amendment") is made and entered into as of September 26, 2013, by and between Centerpoint Acquisitions LLC, a Delaware limited liability company (as the successor in Interest to TC Saracen, LLC ("Landlord"), and Repligen Corporation, a Delaware corporation ("Tenant").

RECITALS

A. Landlord and Tenant are parties to that certain lease dated October 10, 2001, as amended by a Letter Agreement dated May 7, 2002, a First Amendment to Lease (the "First Amendment") dated as of June 29, 2011, and a Second Amendment to Lease (the "Second Amendment") dated as of January 11, 2013 (collectively, the "Lease").

B. Pursuant to the Second Amendment, Landlord agreed to perform certain remedial work as set forth thereIn and the parties modified certaIn provisions of the First Amendment relating to the Tenant Improvements and the Tenant Improvement Allowance. Landlord and Tenant wish further to modify the provisions of the Lease with respect to the Tenant Improvements and the Tenant Improvement Allowance as set forth below.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

I. **Extension of Time Period to Draw Upon Tenant Improvement Allowance.**

Section 1.2.2.3 of Exhibit B to the First Amendment as previously modified by Section III B of the Second Amendment, is hereby further amended by deleting the second sentence thereof and replacing it with the following:

> "Further, Landlord shall have no obligation to fund any portion of the Tenant Improvement Allowance that is not the subject of a request for payment made in accordance with Section 1.2.2.1 above and delivered to Landlord on or before July 31, 2014; and any undisbursed portion of the Tenant Improvement Allowance shall be retained by Landlord."

II. **Minimum Tenant Investment In Tenant Improvements.**

Notwithstanding anything to the contrary contained in the Lease, Tenant agrees to spend at least Four Million Dollars ($4,000,000), in excess of the Tenant Improvement Allowance, on the performance of the Tenant Improvements. At least Two Million Dollars ($2,000,000) of such amount shall be expended on or before July 31, 2014, and the balance shall be expended before the Extended Termination Date (as that term is defined in the First Amendment). Said expenditure shall include amounts expended for both hard costs and soft costs incurred in the performance of the Tenant Improvements. On or before August 31, 2014, Tenant shall deliver to Landlord copies of third party invoices evidencing the expenditure of such amount.

III. **Completion of Remedial Work**

Tenant acknowledges and agrees that Landlord has completed the Remedial Work in conformance with the requirements of the Second Amendment and Tenant has inspected same and accepts same in Its "as is" condition as of the date of this Amendment.

IV. **Miscellaneous.**

A. This Amendment sets forth the entire agreement between the parties with respect to the matters set forth herein, and there are no other oral or written representations or agreements. Under no circumstances shall Tenant be entitled to any Rent abatement, Improvement allowance, leasehold improvements, or other work to the Premises, including, without limitation, the Expansion Space, or any similar economic incentives that may have originally been provided Tenant in connection with entering into the Lease, unless specifically set forth in this Amendment.

B. Except as herein modified or amended, the provisions, conditions and terms of the Lease shall remain unchanged and in full force and effect.

C. In the case of any inconsistency between the provisions of the Lease and this Amendment, the provisions of this Amendment shall govern and control.

D. Submission of this Amendment by Landlord is not an offer to enter into this Amendment but rather is a solicitation for such an offer by Tenant. Landlord shall not be bound by this Amendment until Landlord has executed and delivered the same to Tenant.

E. The capitalized terms used In this Amendment shall have the same definitions as set forth in the Lease to the extent that such capitalized terms are not otherwise defined in this Amendment.

F. Tenant hereby represents to Landlord that Tenant has dealt with no broker in connection with this Amendment. Tenant agrees to indemnify and hold Landlord, Its trustees, members, principals, beneficiaries, partners, officers, directors, employees, mortgagee(s) and agents, and the respective principals and members of any such agents harmless from all claims of any brokers claiming to have represented Tenant in connection with this Amendment. Landlord hereby represents to Tenant that Landlord has dealt with no broker In connection with this Amendment. Landlord agrees to indemnify and hold Tenant, its trustees, members, principals, beneficiaries, partners, officers, directors, employees, and agents, and the respective principals and members of any such agents harmless from all claims of any brokers claiming to have represented Landlord in connection with this Amendment.

G. Each signatory of this Amendment represents hereby that he or she has the authority to execute and deliver the same on behalf of the party hereto for which such signatory is acting.

IN WITNESS WHEREOF, Landlord and Tenant have duly executed this Amendment as of the day and year first above written.

LANDLORD:

Centerpoint Acquisitions LLC, a Delaware Limited Liability Company, is Sole Member

By: Lorelel Investors, LLC a Massachusetts Limited Liability Company, its Operating Member

By: Illegible
Name: Illegible
Title: Illegible

TENANT:

REPLIGEN CORPORATION, a Delaware corporation

By: /s/ Daniel Witt
Name: Daniel Witt
Title: Sr. V. P. Operations

REPLIGEN CORPORATION
CONTRACT TRACKING AND APPROVAL FORM
Document No: CAP-FM-1001-05
Supercedes: CAP-FM-1001-04

Parties:

Organization/Consultant	Centerpoint Acquisitions LLC (formerly Saracen/West Seyon)
Contact Person	
Address:	41 Seyon Street Waltham MA 02453
Phone Number:	
Repligen Responsible Party:	Daniel Witt

Agreement Type (Check One):

☐ Standard One-Way CDA ☐ Non Standard One-Way CDA	☐ Standard Two-Way CDA ☐ Non Standard Two Way CDA
☐ Honorium Letter:	☐ Standard Research Agreement ☐ Non Standard Research Agreement
☐ Standard Consulting ☐ Non Standard Consulting	☐ Standard Clinical Trial Agreement ☐ Non Standard Clinical Trail Agreement
☐ Standard Material Transfer Agreement (MTA) ☐ Non Standard Material Transfer Agreement	☒ Other (Describe): Fourth Amendment to 41 Seyon Street Lease

* *Non Standard Agreements require prior approval by Sr. Vice President, Operations*

Project:	Lease Additional Space at 41 Seyon St	Party Filed Under:	Centerpoint Acquisitions LLC
Effective Date:		Expiration Date:	
Project Amount Requested		Payment Schedule	
Is this project included and approved in the current FY budget? ☐ yes ☐ no If no, exceeds approved budget by $			
If no, please provide explanation and justification of additional expense:			

REPLIGEN CORPORATION
CONTRACT TRACKING AND APPROVAL FORM
Document No: CAP-FM-1001-05
Supercedes: CAP-FM-1001-04

Purchase Order Number:	____

Contract Approval:

Vice President or Chief Executive Officer Illegible	Date 3-18-14
Sr. Vice President of Operations (for all non-standard agreements) Illegible	Date 3/18/14
Chief Executive Officer (for all non-standard agreements)	Date

Budget Approval:

VP of the Responsible Department (over $2,000) Illegible	Date 3/18/14
Chief Executive Officer (over $2,000) Illegible	Date 3-18-14
VP of Finance (over $50,000)	Date

Received Executed Original: Date	Sent Partially Executed Original: Date	Sent Fully Executed Original: Date
☐ Regular Mail	☐ Regular Mail	☐ Regular Mail
☐ 2-Day	☐ 2-Day	☐ 2-Day
☐ Overnight	☐ Overnight	☐ Overnight
☐ International Mail	☐ International Mail	☐ International Mail
☐ PDF	☐ PDF	☐ PDF

Filed Date
☐ Corporate File
☐ Finance Dept.
☐ Scanned: [include path where agreement is located]

FOURTH AMENDMENT

THIS FOURTH AMENDMENT TO LEASE (the "Amendment") is made and entered into as of the date of final execution ("Effective Date"), by and between CENTERPOINT ACQUISITIONS LLC, a Delaware limited liability company ("Landlord"), and REPLIGEN CORPORATION, a Delaware corporation ("Tenant").

RECITALS

A. Landlord and Tenant are parties to that certain lease dated October 10, 2001, as amended by a Letter Agreement dated May 7, 2002, a First Amendment dated June 29, 2011 ("First Amendment"), a Second Amendment dated as of January 11, 2013, and a Third Amendment dated September 26, 2013, (collectively, the "Lease"). Pursuant to the Lease, Landlord has leased to Tenant space currently containing 55,694 rentable square feet (the "Original Premises") on the 1st floor of the building commonly known as 41 Seyon Street located at 41 Seyon Street, Waltham, Massachusetts (the "Building") for a Term that is scheduled to expire on May 31, 2023.

B. Tenant has, by letter dated February 26, 2014, exercised its Right of First Refusal, pursuant to Section VIII of the First Amendment, to lease additional space containing approximately 19,900 rentable square feet on the 1st and 2nd floor of the Building shown on **Exhibit A, Fourth Amendment**, attached hereto (the "Expansion Space"). Landlord is willing to do the same on the following terms and conditions.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

I. **Expansion and Effective Date.**

Effective as of the Expansion Effective Date (defined below), the Premises, as defined in the Lease, is increased from 55,694 rentable square feet on the 1st floor to 75,594 rentable square feet on the 1st and 2nd floors by the addition of the Expansion Space, and from and after the Expansion Effective Date, the Original Premises and the Expansion Space, collectively, shall be deemed the Premises, as defined in the Lease. The Term for the Expansion Space shall commence on the Expansion Effective Date and end on the date that is eight (8) years and one (1) month after the Expansion Effective Date ("Expansion Termination Date"). The Expansion Space is subject to all the terms and conditions of the Lease except as expressly modified herein and except that Tenant shall not be entitled to receive any allowances, abatements or other financial concessions granted with respect to the Original Premises unless such concessions are expressly provided for herein with respect to the Expansion Space.

A. The Expansion Effective Date shall be the later to occur of (i) August 1, 2014 ("Target Expansion Effective Date") and (ii) the date upon which the Landlord Work (as defined in the Work Letter attached as **Exhibit B** hereto) in the Expansion Space has been substantially completed provided, however, that if Landlord shall be delayed in substantially completing the Landlord Work in the Expansion Space as a result of the occurrence of a Tenant Delay (defined below), then, for purposes of determining the Expansion Effective Date, the date of substantial completion shall be deemed to be the day that said Landlord Work

would have been substantially completed absent any such Tenant Delay(s). A "Tenant Delay" means any act or omission of Tenant or its agents, employees, vendors or contractors that actually delays substantial completion of the Landlord Work, including, without limitation, the following:

1. Tenant's failure promptly to furnish information or approvals after Landlord's reasonable request therefor, including the failure to prepare or approve preliminary or final plans by any applicable due date as otherwise provided, if at all, in this Amendment or the exhibits hereto;

2. Tenant's selection of equipment or materials that have long lead times after first being informed by Landlord that the selection may result in a delay;

3. Changes made by Tenant to the plans and specifications attached hereto as **Exhibit B-1** and approved by Landlord, provided that Landlord has delivered to Tenant an estimate of the additional time period to effect such changes and Tenant has approved such additional period of time;

4. The performance of work in the Expansion Space by Tenant or Tenant's contractor(s) during the performance of the Landlord Work; or

5. If the performance of any portion of the Landlord Work depends on the prior or simultaneous performance of work by Tenant, a delay by Tenant or Tenant's contractor(s) in the completion of such work.

The Expansion Space shall be deemed to be substantially completed on the date that all Landlord Work has been performed (or would have been performed absent any Tenant Delays), other than any minor details of construction, mechanical adjustment or any other matter, the noncompletion of which does not unreasonably interfere with Tenant's use of the Expansion Space and can be completed within thirty (30) days after the date of substantial completion. The parties agree to meet within three (3) Business Days after Landlord's notice of Substantial Completion to review the Expansion Space and agree upon the remaining punch list items to be completed. The adjustment of the Expansion Effective Date and, accordingly, the postponement of Tenant's obligation to pay Rent on the Expansion Space shall be Tenant's sole remedy and shall constitute full settlement of all claims that Tenant might otherwise have against Landlord by reason of the Expansion Space not being ready for occupancy by Tenant on the Target Expansion Effective Date.

B. In addition to the postponement, if any, of the Expansion Effective Date as a result of the applicability of Paragraph I.A. of this Amendment, the Expansion Effective Date shall be delayed to the extent that Landlord fails to deliver possession of the Expansion Space for any other reason (other than Tenant Delays by Tenant), including but not limited to, holding over by prior occupants. Any such delay in the Expansion Effective Date shall not subject Landlord to any liability for any loss or damage resulting therefrom. If the Expansion Effective Date is delayed, the Termination Date under the Lease shall not be similarly extended.

II. **Basic Rent.**

Initial Rate. In addition- to Tenant's obligation to pay Basic Rent for the Original Premises, Tenant shall pay Basic Rent for the Expansion Space as follows:

Lease Year*	Annual Rate Per Square Foot (subject to adjustment as provided below)	Annual Base Rent	Monthly Base Rent
Lease Year 1	$ 18.00	$270,000.00**	$22,500.00
Lease Year 2	$ 18.00	$306,000.00***	$25,500.00
Lease Year 3-5	$ 19.00	$378,100.00****	$31,508.33
Lease Year 6-8	$ 20.00	$398,000.00****	$33,166.67

*For purposes hereof, an "Lease Year" shall mean a 12 month period beginning on the Expansion Effective Date, or any anniversary of the Expansion Effective Date, except that if the Expansion Effective Date does not fall on the first day of a calendar month, then the first Lease Year shall begin on the Expansion Effective Date, and end on the last day of the month containing the first anniversary of the Expansion Effective Date (and the Basic Rent for such first Lease Year shall be prorated to reflect the additional days included therein), and each succeeding Lease Year shall begin on the day following the last day of the prior Lease Year.

**Based on 15,000 square feet
***Based on 17,000 square feet
****Based on 19,900 square feet

All such Basic Rent and Additional Rent payable on account of Taxes, Operating Expenses, and utilities shall be payable by Tenant in accordance with the terms of the Lease.

Tenant shall have no obligation to pay Basic Rent for the first (1st) full calendar month of Lease Year 1.

III. **Additional Security Deposit/Letter of Credit**.

Upon Tenant's execution hereof, Tenant shall deliver to Landlord an additional Security Deposit in the amount of $250,000.00 which is added to and becomes part of the Security Deposit, if any, held by Landlord as provided under Section 14.8 of the Lease as security for payment of Rent and the performance of the other terms and conditions of the Lease by Tenant. Accordingly, simultaneously with the execution hereof, the Letter of Credit shall be increased from $250,000.00 to $450,000.00. Tenant shall provide the additional Security Deposit by delivery to Landlord of an additional Letter of Credit in the amount of the increase (i.e., $250,000.00), or an amendment to the Letter of Credit increasing it to the increased amount (i.e., $450,000.00) or a substitute Letter of Credit in the increased amount, whereupon Landlord shall return the original Letter of Credit. The provisions of Section 14.8(c) no longer apply to the Security Deposit and are hereby deleted from the Lease.

IV. **Tenant's Proportionate Share.**

For the period commencing with the Expansion Effective Date and ending on the Expansion Termination Date, Tenant's Proportionate Share for the entire Premises, including the Original Premises and Expansion Space shall be 15.12%.

V. **Intentionally Omitted.**

VI. **Improvements to Expansion Space.**

A. **Condition of Expansion Space.** Tenant has inspected the Expansion Space and agrees to accept the same "as is" without any agreements, representations, understandings or obligations on the part of Landlord to perform any alterations, repairs or improvements, except as may be expressly provided otherwise in this Amendment.

B. **Responsibility for Improvements to Expansion Space.** Landlord shall perform improvements to the Expansion Space in accordance with the Work Letter attached hereto as **Exhibit B**.

VII. **Early Access to Expansion Space.**

During any period that Tenant shall be permitted to enter the Expansion Space prior to the Expansion Effective Date, Tenant shall comply with all terms and provisions of the Lease, except those provisions requiring payment of Basic Rent or Additional Rent as to the Expansion Space. If Tenant takes possession of the Expansion Space prior to the Expansion Effective Date for any reason whatsoever (other than the performance of work in the Expansion Space with Landlord's prior approval), such possession shall be subject to all the terms and conditions of the Lease and this Amendment, and Tenant shall pay Basic Rent and Additional Rent as applicable to the Expansion Space to Landlord on a per diem basis for each day of occupancy prior to the Expansion Effective Date.

VIII. **Electricity with Respect to Expansion Space**. Landlord shall, as part of Landlord's Work, install a submeter in the Expansion Space to measure the consumption of electricity in the Expansion Space and Tenant shall reimburse Landlord for the cost of such electric current (at the same rate per kilowatt hour paid by Landlord to the utility provider from time to time) as measured by the submeter within thirty (30) days after delivery of Landlord's invoice therefor.

IX. **Roof Terrace.** Tenant shall have the right, at Tenant's sole cost and expense, to construct a roof terrace on the roof of the Building ("Roof Terrace"), provided that (a) no Default of Tenant has occurred and remains uncured hereunder, (b) Landlord approves in writing the location, size and appearance of the Roof Terrace, which approval may be withheld or conditioned at Landlord's sole discretion, (c) the Roof Terrace is in compliance with all applicable laws, codes and ordinances and Tenant has obtained all governmental permits and approvals required in connection therewith, (d) the installation, maintenance and removal of the Roof Terrace (including, without limitation, the repair and cleaning of the

roof of the Building upon removal of the Roof Terrace) is performed at Tenant's expense in accordance with the terms and conditions governing alterations pursuant to Section 5.2 of the Lease and Landlord's reasonable regulations. If Landlord has approved same, Landlord agrees to cooperate with Tenant for the construction and permitting of the Roof Terrace.

Landlord shall have the right to prescribe reasonable rules and regulations for Tenant's use of the Roof Terrace from time to time. Such rules shall in any event include, without limitation, that no cooking of any sort shall be permitted on the Roof Terrace, that no one shall lean over the edge of the Roof Terrace at any time, that nothing shall be hung on or displayed from the Roof Terrace railings, that no one shall throw, sweep, shovel or otherwise dispose of anything over the edge of the Roof Terrace, and that all items placed in the Roof Terrace shall be secured such that the same cannot be blown off the Roof Terrace by high winds. If Landlord notifies Tenant in writing that a violation of the Roof Terrace rules and regulations has occurred, and thereafter the same or a similar violation occurs beyond applicable notice and cure periods, Landlord shall have the right to revoke Tenant's right to use the Roof Terrace. If Tenant constructs the Roof Terrace, Tenant shall, at Tenant's cost and expense, be responsible for (i) cleaning, repairing and maintaining the Roof Terrace throughout the Term of the Lease and (ii) for performing any maintenance, repairs, or replacement to the Building made necessary or advisable by reason of the presence thereon of the Roof Terrace or the installation of same.

X. **Signage.** Landlord shall, at Landlord's cost and expense, install standard Building signage at the entrance to the Expansion Space. The initial listing of Tenant's name shall be at Landlord's cost and expense. Any changes, replacements or additions by Tenant to such directory shall be at Tenant's sole cost and expense.

Tenant shall have the right to replace the existing Tenant sign on the north facade of the Building with a larger sign in accordance with plans and specifications therefor approved in advance, in writing by Landlord, which approval shall not be unreasonably withheld, subject in any event to the terms and conditions of Section 5.1(b)(ii) of the Lease.

XI. **Options to Extend.** Tenant's right and option to extend the Term of the Lease pursuant to Section 2.4 of the Lease, as amended by Section IX of the First Amendment, shall apply to the Expansion Space, except that the Basic Rent for the Extension Term with respect to the Expansion Space shall be equal to 100% of the Fair Market Rental Value of the Expansion Space. The parties acknowledge that the Expansion Termination Date does not coincide with the Extended Termination Date (as that term is defined in the First Amendment) and, therefore, agree that the time period for the exercise of the option and the periods of the extended Terms will differ with respect to the Original Premises and the Expansion Space.

XII. **Right of First Offer**.

A. Grant of Option; Conditions. Tenant shall have the one time right of first offer (the "Right of First Offer") with respect to any available space in the Building.

Tenant's Right of First Offer shall be exercised as follows: at any time after Landlord has determined that available space (the "Offering Space") exists, then, before leasing such Offering Space to a party other than the existing tenant thereof or any party holding existing rights in such Offering Space as of the date of this Amendment. Landlord shall give Tenant written notice (the "Advice") of the terms under which Landlord is prepared to lease the Offering Space to Tenant. Tenant may lease such Offering Space in its entirety only, under such terms, by delivering written notice of exercise to Landlord (the "Notice of Exercise") within 5 Business Days after the date of the Advice, except that Tenant shall have no such Right of First Offer and Landlord need not provide Tenant with an Advice, if:

(i) Tenant is in default under the Lease beyond any applicable cure periods at the time that Landlord would otherwise deliver the Advice; or

(ii) the Premises, or any portion thereof, is sublet at the time Landlord would otherwise deliver the Advice (except pursuant to Section 6.1(b)); or

(iii) the Lease has been assigned prior to the date Landlord would otherwise deliver the Advice (except pursuant to Section 6.1(b)); or

(iv) Tenant is not occupying the Premises on the date Landlord would otherwise deliver the Advice; or

(v) the Offering Space is not intended for the exclusive use of Tenant during the Term; or

(vi) the existing tenant in the Offering Space is interested in extending or renewing its lease for the Offering Space or entering into a new lease for such Offering Space; or

(vii) Tenant has previously leased Offering Space pursuant to this Right of First Offer; or

(viii) Landlord has previously delivered an Advice to Tenant and Tenant has not timely delivered a Notice of Exercise with respect thereto (subject, however, to the provisions of Section C below).

B. Terms for Offering Space.

(ix) The term for the Offering Space shall commence upon the commencement date stated in the Advice and thereupon such Offering Space shall be considered a part of the Premises, provided that all of the terms stated in the Advice shall govern Tenant's leasing of the Offering Space and only to the extent that they do not conflict with the Advice, the terms and conditions of this Lease shall apply to the Offering Space.

(x) Tenant shall pay Basic Rent and Additional Rent for the Offering Space in accordance with the terms and conditions of the Advice.

(xi) The Offering Space (including improvements and personalty, if any) shall be accepted by Tenant in its condition and as-built configuration existing on the earlier of the date Tenant takes possession of the Offering Space or as of the date the term for such Offering Space commences, unless the Advice specifies any work to be performed by Landlord in the Offering Space, in which case Landlord shall perform such work in the Offering Space, If Landlord is delayed delivering possession of the Offering Space due to the holdover or unlawful possession of such space by any party, Landlord shall use reasonable efforts to obtain possession of the space, and the commencement of the term for the Offering Space shall be postponed until the date Landlord delivers possession of the Offering Space to Tenant free from occupancy by any party.

C. Termination of Right of First Offer. The rights of Tenant hereunder with respect to the Offering Space shall terminate on the earliest to occur of: (i) Tenant's failure to exercise its Right of First Offer within the 5 Business Day period provided in Section A above; (iii) the date Landlord would have provided Tenant an Advice if Tenant had not been in violation of one or more of the conditions set forth in Section A above, and (iii) the date that Tenant exercises its Right of First Offer with respect to any portion of the Offering Space. Notwithstanding the foregoing, in the event that the Right of First Offer terminates pursuant to clause (i) above, Landlord shall not lease the Offering Space to another party (other than the current occupant thereof) at a Net Effective Rent (defined below) less than ninety percent (90%) of the Net Effective Rent set forth in the Advice without first giving Tenant another Advice at such lower Net Effective Rent. The term "**Net Effective Rent**" shall mean the net present value as reasonably determined by Landlord of the aggregate consideration, determined on an average annual basis, payable to Landlord under the proposal at issue (i.e., either the Advice or the offer to another party, as the case may be), taking into account all base rent, additional rent, free rent, construction or other allowances, the cost of any work performed in the Offering Space by Landlord at its expense, the length of lease term, and all other relevant economic terms.

D. Offering Amendment. If Tenant exercises its Right of First Offer, Landlord shall prepare an amendment (the "Offering Amendment") adding the Offering Space to the Premises on the terms set forth in the Advice and reflecting the changes in the Base Rent, Rentable Square Footage of the Premises, Tenant's Pro Rata Share and other appropriate terms. A copy of the Offering Amendment shall be sent to Tenant within a reasonable time after Landlord's receipt of the Notice of Exercise executed by Tenant, and Tenant shall execute and return the Offering Amendment to Landlord within 15 days thereafter, but an otherwise valid exercise of the Right of First Offer shall be fully effective whether or not the Offering Amendment is executed.

E. Subordination. Notwithstanding anything herein to the contrary, Tenant's Right of First Offer is subject and subordinate to the expansion rights (whether such rights are designated as a right of first offer, right of first refusal, expansion option or otherwise) of any tenant of the Building existing on the date hereof, which rights are identified on **Exhibit D**.

XIII. **Parking.** In addition to Tenant's parking rights pursuant to Section 2.3 of the Lease, as amended by Section XI of the First Amendment, Tenant shall have the right to use, on a nonexclusive, unreserved basis, 69 parking spaces in the Parking Area. In addition to such unreserved spaces, Tenant shall have the right to use, on a reserved basis, 5 parking spaces near the North entrance to the Building in the location as shown on **Exhibit C**, Fourth Amendment, attached hereto. Landlord reserves the right, in connection with any future reconfiguration of the Parking Area, to relocate such reserved spaces to a comparable location in the reconfigured Parking Area.

XIV. **Interior Stairs.** Tenant shall have the right, at Tenant's sole cost and expense, to interior connecting stairs between the portions of the Premises on the first and second floors ("Stairwell"), provided that (a) the Stairwell is in compliance with all applicable laws, codes and ordinances and Tenant has obtained all governmental permits and approvals required in connection therewith, (b) the installation, maintenance and removal of the Stairwell is performed at Tenant's expense in accordance with plans and specifications therefor that had been approved in writing, in advance by Landlord, which approval shall not be unreasonably withheld and the terms and conditions governing alterations pursuant to Section 5.2 of the Lease and Landlord's reasonable regulations, and (c) Tenant has deposited with Landlord, as an additional Security Deposit, an amount reasonably estimated by Landlord to equal the cost of removing the Stairwell and restoring the affected area of the Premises to its condition immediately preceding the installation of the Stairwell. If Landlord has approved same, Landlord agrees to cooperate with Tenant for the construction and permitting of the Stairwell. Unless Landlord otherwise elects by written notice given at least 120 days prior to the expiration date of the Term for the Expansion Space, Tenant shall remove the Stairwell and restore the floor slab opening in compliance with applicable codes.

XV. **Notices.** For all purposes of the Lease, the notice address for Landlord is as follows:

Saracen Properties LLC
41 Seyon Street
Suite 200
Waltham, MA 02453

XVI. **Inapplicable, Deleted and Confirmed Lease Provisions.**

A. Article 4 of the Lease (Commencement and Condition), Exhibit G to the Lease (Base Building Work), Exhibit B to the First Amendment (Work Letter) and Exhibit C to the First Amendment (Refusal Space) shall have no applicability with respect to this Amendment.

B. Whereas, Tenant exercised its Right of First Refusal pursuant to Section VIII of the First Amendment and Exhibit C to the First Amendment (Refusal Space), Section VIII of the First Amendment and Exhibit C to the First Amendment are hereby deleted and are of no further force or effect.

XVII. Landlord agrees to obtain from the holder of the existing mortgage on the Property a subordination, non-disturbance, and attornment agreement substantially in the form attached hereto as **Exhibit E**.

XVIII. **Miscellaneous.**

A. This Amendment sets forth the entire agreement between the parties with respect to the matters set forth herein. There have been no additional oral or written representations or agreements. Under no circumstances shall Tenant be entitled to any Rent abatement, improvement allowance, leasehold improvements, or other work to the Premises, or any similar economic incentives that may have been provided Tenant in connection with entering into the Lease, unless specifically set forth in this Amendment.

B. Except as herein modified or amended, the provisions, conditions and terms of the Lease shall remain unchanged and in full force and effect.

C. In the case of any inconsistency between the provisions of the Lease and this Amendment, the provisions of this Amendment shall govern and control.

D. Submission of this Amendment by Landlord is not an offer to enter into this Amendment but rather is a solicitation for such an offer by Tenant. Neither party shall be bound by this Amendment until both parties have executed and delivered the same to the other party.

E. The capitalized terms used in this Amendment shall have the same definitions as set forth in the Lease to the extent that such capitalized terms are defined therein and not redefined in this Amendment.

F. Tenant hereby represents to Landlord that Tenant has dealt with no broker in connection with this Amendment. Tenant agrees to indemnify and hold Landlord, its trustees, members, principals, beneficiaries, partners, officers, directors, employees, mortgagee(s) and agents, and the respective principals and members of any such agents (collectively, the "Landlord Related Parties") harmless from all claims of any broker claiming to have represented Tenant in connection with this Amendment. Landlord hereby represents to Tenant that Landlord has dealt with no broker in connection with this Amendment. Landlord agrees to indemnify and hold Tenant, its trustees, members, principals, beneficiaries, partners, officers, directors, employees, and agents, and the respective principals and members of any such agents (collectively, the "Tenant Related Parties") harmless from all claims of any brokers claiming to have represented Landlord in connection with this Amendment.

G. Each signatory of this Amendment represents hereby that he or she has the authority to execute and deliver the same on behalf of the party hereto for which such signatory is acting.

[SIGNATURES ARE ON FOLLOWING PAGE]

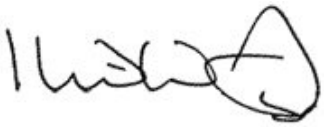
IN WITNESS WHEREOF, Landlord and Tenant have duly executed this Amendment as of the day and year first above written.

WITNESS/ATTEST:

Name (print): Lisa D. Arya
[Illegible]
Name (print): [Illegible]

LANDLORD:

CENTERPOINT ACQUISITIONS LLC, a Delaware limited liability company



By:
Name: [Illegible]
Title: [Illegible]

WITNESS/ATTEST:

Name (print): 03-14-14
[Illegible]
Name (print): 03-14-14

TENANT:

REPLIGEN CORPORATION,
a Delaware corporation
By:

Name: Daniel Witt
Title: [Illegible]
Date: March 14, 2014

EXHIBIT A

OUTLINE AND LOCATION OF EXPANSION SPACE

[Image of Outline and Location of Expansion Space]

EXHIBIT B

WORK LETTER

This Exhibit is attached to and made a part of the Amendment by and between CENTERPOINT ACQUISITIONS LLC, a Delaware limited liability company (successor in interest to TC Saracen, LLC) ("Landlord"), and REPLIGEN CORPORATION, a Delaware corporation ("Tenant") for space in the Building located at 41 Seyon Street, Waltham, Massachusetts.

As used in this Workletter, the "Premises" shall be deemed to mean the Expansion Space as defined in the attached Amendment.

A. Landlord has previously presented to Tenant the plan prepared by LaFreniere Architects, dated February 13, 2014, attached hereto as Exhibit B-1 (the "Initial Plan"). Tenant shall deliver to Landlord as soon as reasonably possible after the Effective Date any comments and revisions Tenant would like to the Initial Plan and the parties shall review and discuss such comments and revisions in good faith in order to agree upon a mutually acceptable plan for the initial improvements in the Expansion Space. Tenant's proposed revisions shall use Building Standard methods, materials and finishes and be at least comparable in utility for general office space as provided in the Initial Plan. Within fifteen (15) Business Days after the Effective Date the parties shall agree upon plans and specifications incorporating Tenant's revisions that were mutually acceptable to the parties and otherwise consistent with Initial Plan (the "Plans"). In the event that the parties are unable to agree in good faith on all or any particular changes or revisions, the Initial Plan shall control and shall constitute the "Plans" for all purposes. The improvements to be performed by Landlord in accordance with the Plans, as further developed and refined into the Construction Drawings (as defined below) are hereinafter referred to as the "Landlord Work." It is agreed that construction of the Landlord Work is intended to be "turn-key" and will be completed at Landlord's sole cost and expense in accordance with the Construction Drawings using Building Standard methods, materials and finishes. Landlord shall enter into a direct contract for the Landlord Work with a general contractor selected by Landlord. In addition, Landlord shall have the right to select and/or approve of any subcontractors used in connection with the Landlord Work. Landlord's Work shall be performed in accordance with the approved Construction Drawings and in compliance with all applicable laws. Landlord's supervision or performance of any work for or on behalf of Tenant shall not be deemed a representation by Landlord that the improvements constructed in accordance with the Plans and any revisions thereto will be adequate for Tenant's use.

B. Landlord shall cause the Plans to be developed into construction level plans and specifications for Landlord Work (the "Construction Drawings") and shall deliver the iterations of the Construction Drawings to Tenant for Tenant's review and approval, which approval shall not be unreasonably withheld, conditioned or delayed so long as the subject Construction Drawings are consistent with the Plans and prior iterations of the Construction Drawings, and Landlord may disregard any disapproval that is not based on the fact that the subject Construction Drawings are inconsistent with the Plans and prior iterations of the Construction Drawings or do not comply with law (excluding Tenant Change Orders (as defined below) approved by Landlord). If Tenant fails to respond to the Construction Drawings within three (3) Business Days after delivery of same to Tenant, Tenant shall be deemed to have approved the same. If Tenant shall request any revisions to the Plans or Construction Drawings, Landlord shall have such revisions

prepared and, unless such requested revisions are for purposes of compliance with applicable laws or to conform to the Plans or prior iterations of the Construction Drawings, Tenant shall reimburse Landlord for the cost of preparing any such revisions to the Plans or Construction Drawings, within thirty (30) days after receipt of an invoice. If Tenant shall request any revisions that are not consistent with the Plans or Construction Drawings ("Tenant Change Orders"), promptly upon completion of the revisions, Landlord shall notify Tenant in writing of the estimated impact to the Target Expansion Effective Date and the modifications to the costs of Landlord Work, if any, resulting from such Tenant Change Orders. Tenant, within three (3) Business Days, shall notify Landlord in writing whether it desires to proceed with such Tenant Change Orders. In the absence of such written authorization, Landlord shall have the option to continue work on the Premises disregarding the requested Tenant Change Orders. Tenant shall be responsible for any Tenant Delay in completion of the Premises resulting from such Tenant requested Tenant Change Orders, which Tenant Delay shall include, without limitation, the time period reasonably required for Landlord to prepare any required revisions to the Construction Drawings and the period that elapses after Landlord delivers such revised Construction Drawings until Tenant approves or disapproves same. If such Tenant Change Orders result in an increase in the cost of Landlord Work, such increased costs, plus any applicable state sales or use tax thereon, shall be payable by Tenant within thirty (30) days after receipt of an invoice. Notwithstanding anything herein to the contrary, all revisions to the Plans shall be subject to the approval of Landlord, which approval shall not be unreasonably withheld, conditioned or delayed, provided that the Landlord Work as so modified is, in Landlord's sole but reasonable discretion, generically reusable for office uses after the termination of the Lease, unless Tenant removes such non-generically reusable improvements and restores the affected area of the Premises to the condition indicated by Exhibit B-1 prior to the expiration of the Term of the Lease and deposits with Landlord, as an additional Security Deposit, an amount reasonably estimated by Landlord to equal the cost of removing such non-generically reusable improvements and restoring the affected area of the Premises to the condition indicated by **Exhibit B-1**. Landlord shall respond to such request for revisions within five (5) Business Days.

C. This Exhibit shall not be deemed applicable to any additional space added to the Premises at any time or from time to time, whether by any options under the Lease or otherwise, or to any portion of the original Premises or any additions to the Premises in the event of a renewal or extension of the original Term of the Lease, whether by any options under the Lease or otherwise, unless expressly so provided in the Lease or any amendment or supplement to the Lease.

EXHIBIT B-1

PLANS

[Image of Floor Plans]

EXHIBIT C

TENANT'S RESERVED PARKING SPACES

[Image of Reserved Parking Spaces]

EXHIBIT D

RIGHTS OF OTHERS PRIOR TO TENANT'S ROFO RIGHTS

NONE

EXHIBIT E

FORM OF SNDA

SUBORDINATION, NON-DISTURBANCE AND ATTORNMENT AGREEMENT

_____,
Tenant

AND

CANADIAN IMPERIAL BANK OF COMMERCE,
acting through its New York Branch,
as Administrative Agent

County:	**Middlesex**
State:	**Massachusetts**
Premises:	**41 Seyon Street, 43 Foundry Avenue and 190 Willow Street Waltham, Massachusetts**

Dated: as of_____ , 201__

Record and return by mail to:

Morrison & Foerster LLP
1290 Avenue of the Americas
New York, New York 10104
Attention: Christopher S. Delson, Esq.

Exhibit E, Fourth Amendment

SUBORDINATION, NON-DISTURBANCE AND ATTORNMENT AGREEMENT

THIS AGREEMENT made as of this ____ day of _____, 201____, by and among _____ **(**"**Landlord**"), **CANADIAN IMPERIAL BANK OF COMMERCE**, acting through its New York Branch ("**Administrative Agent**"), as Administrative Agent for the Lenders (defined below), and_____ ("**Tenant**").

RECITALS:

A. Tenant has executed that certain lease dated _____ [as amended by written agreements dated _____ and _____] ([collectively, with the amendment{s} thereto,] the "**Lease**"), with [_____, predecessor-in-title to] Landlord, as lessor, covering the premises described in the Lease consisting of approximately a _____ square foot space (the **"Premises"**) in that certain building located at [_____][1], Waltham, Massachusetts (the **"Property"**) and more particularly described in Exhibit A attached hereto and made a part hereof by this reference; and

B. Certain lenders (the "**Lenders**") have made (or agreed to make) a loan to Landlord secured by a mortgage encumbering the Property and an assignment of Landlord's interest in the Lease (said mortgage, together with any amendments, renewals, increases, modifications, substitutions or consolidations of either of them, collectively, the "**Security Instrument**") in favor of Administrative Agent on behalf of the Lenders; and

C. Tenant and Administrative Agent desire to confirm their understanding with respect to the Lease and the Security Instrument, and to have Landlord confirm its agreement therewith.

NOW, THEREFORE, in consideration of the covenants, terms, conditions, and agreements contained herein, the parties hereto agree as follows:

1. The Lease and any extensions, modifications or renewals thereof, including but not limited to any option to purchase, right of first refusal to purchase or right of first offer to purchase the Property or any portion thereof, if any, is and shall continue to be subject and subordinate in all respects to the Security Instrument and the lien created thereby.

2. Tenant agrees to deliver to Administrative Agent, in the manner set forth in Paragraph 13 of this Agreement, a copy of any notice of default sent to Landlord by Tenant. If Landlord fails to cure such default within the time provided in the lease, Administrative Agent shall have the right, but not the obligation, to cure such default on behalf of Landlord within thirty (30) calendar days after the time provided for Landlord to cure such default in the Lease has expired or, if such default cannot be cured within that time, within a reasonable period provided Administrative Agent is proceeding with due diligence to cure such default. In such event, Tenant shall not terminate the Lease while such remedies are being diligently pursued by Administrative Agent. Further, Tenant shall not terminate the Lease on the basis of any default by Landlord which is incurable by Administrative Agent (such as, for example, the bankruptcy of Landlord or breach of any representation by Landlord), provided Administrative Agent is proceeding with due diligence to commence an action to appoint a receiver or to obtain title to the Property by foreclosure, deed in lieu of foreclosure, or otherwise (collectively, "**Foreclosure**"). Subject to Administrative Agent's obligations under Section 3 below, Tenant hereby agrees that no action taken by Administrative Agent to enforce any rights under the Security Instrument or related security documents, by reason of any default thereunder

[1] Insert as applicable: 41 Seyon Street, 43 Foundry Avenue or 190 Willow Street

(including, without limitation, the appointment of a receiver, any Foreclosure or any demand for rent under any assignment of rents or leases) shall give rise to any right of Tenant to terminate the Lease nor shall such action invalidate or constitute a breach of any of the terms of the Lease.

3. So long as Tenant is not in default under the Lease beyond applicable notice and cure periods, Administrative Agent shall not disturb Tenant's possession and occupancy of the Premises and Tenant's other rights under the Lease during the term of the Lease.

4. If Administrative Agent or its nominee or designee, or another purchaser of the Property upon a Foreclosure (any such person or entity, a "Successor Owner") succeeds to the interest of Landlord under the Lease, subject to Tenant's performance of its obligations under the Lease within applicable notice and cure periods, the Lease will continue in full force and effect. Thereupon, Successor Owner shall recognize the Lease and Tenant's rights thereunder and Tenant shall make full and complete attornment to Successor Owner as substitute landlord upon the same terms, covenants and conditions as provided in the Lease, including, but not limited to, any option to purchase, right of first refusal to purchase or right of first offer to purchase the Property as may be provided in the Lease. Notwithstanding the foregoing, Tenant agrees that any such option, right of first refusal or right of first offer to purchase the Property or any portion thereof, as may be provided in the Lease shall not apply to any Foreclosure, as defined herein, and shall not apply to any transfer of the Property by Successor Owner following such Foreclosure. In consideration of the foregoing, Administrative Agent agrees that any such option, right of first refusal or right of first offer shall not be terminated by any Foreclosure or conveyance of the Property by Successor Owner following such Foreclosure; rather, any such option, right of first refusal or right of first offer shall remain as an obligation of any party acquiring the Property following the conveyance of the Property by Successor Owner following such Foreclosure. Furthermore, Tenant expressly confirms to Administrative Agent that any acquisition of title to all or any portion of the Property pursuant to Tenant's exercise of any option, right of first refusal or right of first offer contained in the Lease shall result in Tenant taking title subject to the lien of the Security Instrument.

5. Tenant agrees that, if Successor Owner shall succeed to the interest of Landlord under the Lease, Successor Owner shall not be:

(a) liable for any prior act or omission of Landlord or any prior landlord or consequential damages arising therefrom; or

(b) subject to any offsets or defenses which Tenant might have as to Landlord or any prior landlord unless Administrative Agent has failed to cure any default by Landlord as herein provided; or

(c) required or obligated to credit Tenant with any rent or additional rent for any rental period beyond the then current month which tenant might have paid Landlord; or

(d) bound by any amendments or modifications of the Lease made without Administrative Agent's or Successor Owner's prior written consent; or

(e) liable for refund of all or any part of any security deposit unless such security deposit shall have been actually received by Administrative Agent.

6. Tenant agrees that, without the prior written consent of Administrative Agent in each case, Tenant shall not (a) amend, modify, terminate or cancel the Lease or any extensions or renewals thereof, or tender a surrender of the Lease (except in each case that, upon a default by Landlord under the Lease, Tenant may exercise its rights under the Lease after giving to Administrative Agent the notice and cure period required by this Agreement), (b) make a prepayment of any rent or additional rent more than one (1) month in advance of the due date thereof, or (c) subordinate or permit the subordination of the Lease to any lien subordinate to the Security Instrument. Any such purported action without such consent shall be void as against the holder of the Security Instrument.

7. To the extent that the Lease shall entitle Tenant to notice of the existence of any Security Instrument and the identity of any mortgagee or any ground lessor, this Agreement shall constitute such notice to Tenant with respect to the Security Instrument and Administrative Agent.

8. Upon and after the occurrence of a default under the Security Instrument, which is not cured after any applicable notice and/or cure periods, Administrative Agent shall be entitled, but not obligated, to require that Tenant pay all rent under the Lease as directed by Administrative Agent, which payment shall, to the extent made, satisfy the obligations of Tenant under the Lease. Landlord agrees to hold Tenant harmless with respect to any such payments made by Tenant to Administrative Agent.

9. Nothing in this Agreement shall impose upon Administrative Agent any liability for the obligations of Landlord under the Lease unless and until Administrative Agent takes title to the Property. Anything herein or in the Lease to the contrary notwithstanding, in the event that a Successor Owner shall acquire title to the Property or the portion thereof containing the Premises, Successor Owner shall have no obligation, nor incur any liability, beyond Successor Owner's then interest, if any, in the Property, and Tenant shall look exclusively to such interest, if any, of Successor Owner in the Property for the payment and discharge of any obligations imposed upon Successor Owner hereunder or under the Lease, and Successor Owner is hereby released or relieved of any other liability hereunder and under the Lease. Tenant agrees that, with respect to any money judgment which may be obtained or secured by Tenant against Successor Owner, Tenant shall look solely to the estate or interest owned by Successor Owner in the Property, and Tenant will not collect or attempt to collect any such judgment out of any other assets of Successor Owner.

10. Except as specifically provided in this Agreement, Administrative Agent shall not, by virtue of this Agreement, the Security Instrument or any other instrument to which Administrative Agent may be party, be or become subject to any liability or obligation to Tenant under the Lease or otherwise.

11. **EACH OF TENANT, ADMINISTRATIVE AGENT AND LANDLORD HEREBY IRREVOCABLY WAIVE ALL RIGHT TO TRIAL BY JURY IN ANY ACTION, PROCEEDING OR COUNTERCLAIM ARISING OUT OF OR RELATING TO THIS AGREEMENT.**

12. The provisions of the Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns. The words, "Administrative Agent", "Landlord" and "Tenant" shall include their respective heirs, legatees, executors, administrators, beneficiaries, successors and assigns.

13. All notices and all other communication with respect to this Agreement shall be directed as follows: if to Administrative Agent, 200 West Madison Avenue, Suite 2610, Chicago, Illinois 60606, Attention: Real Estate Group, or such other address as Administrative Agent may designate in writing to Tenant; and, if to Tenant, at the address set forth in the Lease or at such other address as tenant may designate in writing to Administrative Agent. All notices shall be in writing and shall be (a) hand-delivered, (b) sent by United States express mail or by private overnight courier, or (c) served by certified mail postage prepaid, return receipt requested, to the appropriate address set forth above. Notices served as provided in (a) and (b) shall be deemed to be effective upon delivery or upon refusal thereof. Any notice served by certified mail shall be deposited in the United States mail with postage thereon fully prepaid and shall be deemed effective on the day of actual delivery as shown by the addressee's return receipt or the expiration of three business days after the date of mailing, whichever is earlier in time.

14. This Agreement contains the entire agreement between the parties and no modifications shall be binding upon any party hereto unless set forth in a document duly executed by or on behalf of such party.

15. This Agreement may be executed in multiple counterparts, all of which shall be deemed originals and with the same effect as if all parties had signed the same document. All of such counterparts shall be construed together and shall constitute one instrument.

[Remainder of Page Intentionally Left Blank; Signature Page Follows]

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement as of the day and year first above written.

CANADIAN IMPERIAL BANK OF COMMERCE,
acting through its New York Branch, as Administrative Agent for the Lenders

By: _____
Name:
Title:

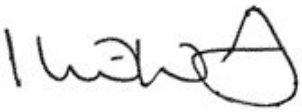
[TENANT]

By: _____
Name:
Title:

AGREED AND CONSENTED TO:

LANDLORD

CENTERPOINT ACQUISITIONS, LLC,
a Delaware limited liability company

By: 
Name: **[Illegible]**
Title: **[Illegible]**

ACKNOWLEDGEMENT

STATE OF_____)
) SS.
COUNTY OF_____)

On the ____ day of _____in the year 201__, before me, the undersigned, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that [s/he] executed the same in his capacity as Authorized Signatory, of **CANADIAN IMPERIAL BANK OF COMMERCE,** acting through its New York Branch as Administrative Agent for the Lenders, and that by [her/his] signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public

My commission expires: _____

_____

ACKNOWLEDGEMENT

STATE OF_____)
) SS.
COUNTY OF_____)

I, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY that _____ as_____ of **CENTERPOINT ACQUISITIONS, LLC**, a Delaware limited liability company, appeared before me this day in person and acknowledged that he signed and delivered said instrument as his own free and voluntary act and as the free and voluntary act of said entities for the uses and purposes therein set forth.

_____
Notary Public

My commission expires: _____

_____

ACKNOWLEDGEMENT

STATE OF_____)
) SS.
COUNTY OF_____)

I, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY that _____ as_____ of _____, a _____ appeared before me this day in person and acknowledged that he signed and delivered said instrument as his own free and voluntary act and as the free and voluntary act of said _____, for the uses and purposes therein set forth.

_____
Notary Public

My commission expires: _____

EXHIBIT A

Legal Description of Property

Lot A (UNREGISTERED LAND)

A certain parcel of land in Waltham, Middlesex County, Massachusetts, westerly of Seyon Street, northerly of Boston and Maine Railroad, easterly of Willow Street and southerly of Grove Street, being shown as Lot A on a plan entitled "CenterPoint Project Merger of Plan of Land in Waltham, Massachusetts, Middlesex County", dated January 28, 2013, prepared by DGT Survey Group, to be recorded with Middlesex South Registry of Deeds herewith, and being more particularly described as follows:

Beginning at the intersection of the westerly side of Seyon Street with the northerly side of the former Boston and Maine railroad location, thence running:

N 52-08-34 W	203.28 feet	to a point of curvature; thence
Westerly	20.00 feet	by a curve to the left of 1750.76 foot radius to a point of non-tangency, the last two courses being by land now or formerly of Boston & Maine Corporation; thence
S 37-12-10 W	16.50 feet	in part by said land of the former Boston & Maine Corporation and in part by land now or formerly of Colonial Shopping Center, Inc. to a point of non-tangency; thence
Westerly	119.43 feet	by a curve to the left of 1734.26 foot radius to a point of compound curvature, being by said land of Colonial Shopping Center; thence
Westerly	457.86 feet	by a curve to the left of 1121.09 foot radius to a point of non-tangency, being in part by said land of Colonial Shopping Center, Inc. and in part by land now or formerly of Anthony G. Cardillo, Jr. and Joseph J. Cardillo; thence
N 78-04-22 W	25.15 feet	thence
N 73-45-26 W	66.87 feet	to a point of non-tangency, the last two courses being by said land of Anthony G. Cardillo, Jr. et al; thence
Westerly	114.07 feet	by a curve to the left of 1310.85 foot radius to a point of non-tangency; thence
N 85-43-49 W	110.48 feet	to a point of non-tangency; thence
Westerly	21.28 feet	by a curve to the left of 1318.10 foot radius to a point of tangency; thence
S 87-10-56 W	53.54 feet	to the easterly side of Willow Street, the last four courses being by land now or formerly of Sadle M. Cardillo and Anthony G. Cardillo, Jr.; the last eleven courses being also by said Boston and Maine railroad location; thence
N 26-44-06 E	172.66 feet	by Willow Street; thence

S 63-36-26 E	35.87 feet	by land now or formerly of Raytheon Company; thence
S 62-06-32 E	64.14 feet	thence
N 26-44-06 E	1.68 feet	the last two courses being by land now or formerly of Willow Street Trust; thence
S 63-36-26 E	2.07 feet	thence
N 25-08-10 E	73.58 feet	thence
N 63-36-26 W	100.02 feet	to the easterly side of Willow Street, the last three courses being by land of said Raytheon Company; thence
N 26-44-06 E	185.87 feet	by Willow Street to a point of curvature at Foundry Avenue; thence
Easterly	15.60 feet	by a curve to the right of 10.00 foot radius to a point of non- tangency; thence
S 63-52-04 E	454.36 feet	the last two courses being by the southerly side of Foundry Avenue; thence
N 26-07-56 E	40.00 feet	by the easterly end of Foundry Avenue; thence
N 63-52-04 W	192.40 feet	by the northerly side of Foundry Avenue; thence
N 26-17-50 E	293.83 feet	in part by land now or formerly of John Sottile, in part by land now or formerly of Noviens Lane Nominee Trust, in part by the easterly end of Noviens Lane, in part by land now or formerly of Pak Chau Chan and Chan Vuong and in part by land now or formerly of Anjo Realty Trust; thence
S 62-14-54 E	250.01 feet	thence
S 62-14-54 E	32.02 feet	thence
S 63-59-24 E	8.00 feet	thence
S 62-54-32 E	316.29 feet	to a stone bound with drill hole; thence
N 25-58-32 E	619.17 feet	to the southerly side of Grove Street, the last five courses being by land now or formerly of Standard Thomson Corporation; thence
S 67-07-36 E	516.92 feet	to a point of curvature; thence
Easterly	90.21 feet	by a curve to the left of 1942.98 foot radius to a rounding at Seyon Street, the last two courses being by Grove Street; thence
Easterly and southerly	59.26 feet	by a curve to the right of 30.00 foot radius by said rounding at Seyon Street to the westerly side of Seyon Street; thence
S 43-23-26 W	753.60 feet	thence
S 40-33-56 W	553.97 feet	to the point of beginning, the last two courses being by Seyon Street.

TOGETHER WITH rights contained in the following:

A. Bridge Switchgear and Fire Loop Easement Agreement dated February 28, 2001 recorded with said Deeds in Book 32455, Page 291 and filed with said Land Court as Document No. 1164263; as affected by First Amendment to Bridge, Switchgear and Fire Loop Easement Agreement dated December 16, 2005 recorded with said Deeds in Book 46700, Page 38.

B. Grant of Easement made by and among Colonial Shopping Center, Inc., I-Park West Seyon LLC and Raytheon Company dated November 17, 2005 recorded with said Deeds in Book 46652, Page 431.

C. Access Easement Agreement made by and between Grove Willow LLC and Raytheon Company dated as of December 30, 1999 and recorded with said Deeds in Book 31018, Page 1 as affected by the following:

Amendment to Access Easement Agreement dated December 19, 2005 and recorded with said Deeds in book 46712, Page 292.

Second Amendment to Access Easement Agreement dated December 18, 2007 and recorded with said Deeds in Book 50547, Page 37.

Affidavit dated December 31, 2007 and recorded with said Deeds in Book 50547, Page 40.

Amendment to Access Easement Agreement concerning 3.46 Acre Parcel dated March 27, 2008 and recorded with said Deeds in Book 51404, Page 1.

Amendment to Access Easement Agreement Concerning LIG Parcel dated April 3, 2008 and recorded with said Deeds in Book 52219, Page 319.

Third Amendment to Access Easement Agreement dated June 12, 2009 and recorded with said Deeds in Book 53017, Page 468.

FIFTH AMENDMENT

THIS FIFTH AMENDMENT (the "**Amendment**") is made and entered into as of May 29, 2019 (the "**Effective Date**"), by and between **HRE-S CENTERPOINT, LLC**, a Delaware limited liability company ("**Landlord**") and **REPLIGEN CORPORATION**, a Delaware corporation ("**Tenant**").

RECITALS

A. West Seyon LLC (as a predecessor-in-interest to Landlord) and Tenant entered into that certain Lease dated as of October 10, 2001 (the "**Original Lease**"), as amended by that certain Letter Agreement dated May 7, 2002 (the "**Letter Agreement**"), that certain First Amendment to Lease dated as of June 29, 2011 (the "**First Amendment**"), that certain Second Amendment to Lease dated as of January 11, 2013 (the "**Second Amendment**"), that certain Third Amendment to Lease dated as of September 26, 2013 (the "**Third Amendment**") and a certain Fourth Amendment dated as of March 14, 2014 (the "**Fourth Amendment**"; together with the Original Lease, the Letter Agreement, the First Amendment, Second Amendment and Third Amendment, the "**Lease**"). Pursuant to the Lease, Landlord has leased to Tenant space currently containing approximately 75,594 rentable square feet and depicted on **Exhibit A-1** attached hereto (the "**Original Premises**") within the building commonly known as 41 Seyon Street, Waltham, Massachusetts (the "**Building**").

B. Tenant has requested that additional space containing (x) approximately 17,680 rentable square feet described as Suite No. 700 of the Building shown on **Exhibit A-2** hereto (the "**Phase 1 Expansion Space**") and (y) approximately 14,861 rentable square feet described as Suite No. 600 of the Building shown on **Exhibit A-3** hereto (the "**Phase 2 Expansion Space**"; together with the Phase 1 Expansion Space, the "**Fifth Amendment Expansion Space**") to be added to the Original Premises, and Landlord is willing to do the same on the following terms and conditions.

C. The Term of the Lease (other than with respect to the Fourth Amendment Expansion Space, as hereinafter defined) is set to expire on May 31, 2023 ("**Prior Termination Date**"), and the parties desire to extend the term of the Lease with respect to the Fifth Amendment Expansion Space (but not the Original Premises) to the Fifth Amendment Expansion Space Termination Date (as hereinafter defined), all on the following terms and conditions.

D. The Term of the Lease with respect to the Fourth Amendment Expansion Space (hereinafter defined) is set to expire on August 31, 2022 ("**FAES Prior Termination Date**"), and the parties desire to extend the term of the Lease with respect to such portion of the Original Premises to May 31, 2023, all on the following terms and conditions.

NOW, THEREFORE, in consideration of the above recitals which by this reference are incorporated herein, the mutual covenants and conditions contained herein and other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

1. **Definitions**. The capitalized terms used in this Amendment shall have the same definitions as set forth in the Lease to the extent that such capitalized terms are defined therein and not redefined in this Amendment. When used herein the following terms shall have the following meanings:

    a. The "**Base Building Condition**" shall mean the condition of the Fifth Amendment Expansion Space as set forth on **Exhibit B** attached hereto, and otherwise in "as-is" condition.

b. The "**Controllable Expenses**" shall mean all Operating Expenses other than (i) Taxes, (ii) utility charges, (iii) insurance charges imposed by third party utility and insurance companies, respectively, (iv) snow and ice removal, and (v) wages, salaries and other compensation and benefits paid to Landlord's employees, agents or contractors engaged in the operation, management, maintenance (including, but not limited to, janitorial and cleaning services) or security of the Building or Property, but only to the extent such wages, salaries and other compensation are incurred as a result of union labor or government mandated requirements including, but not limited to, prevailing wage laws and similar requirements.

c. The "**Fourth Amendment Expansion Space**" shall mean that certain approximately 19,900 square foot portion of the Original Premises referenced in the Fourth Amendment.

d. The "**FAES Extension Period**" shall mean the period commencing on the day immediately after the FAES Prior Termination Date and expiring on the Prior Termination Date.

e. The "**Fifth Amendment Expansion Space Termination Date**" shall mean the last day of the month in which occurs the day prior to the tenth (10th) anniversary of the Phase 2 Expansion Effective Date.

f. The "**Extension Date**" shall mean the day immediately following the Prior Termination Date.

g. The "**Landlord's Work**" shall mean the work described on **Exhibit C** attached hereto.

h. The "**Phase 1 Expansion Effective Date**" shall mean the earlier to occur of (i) November 1, 2019 and (ii) the date on which the later of the following occurs (x) the Tenant Improvements in the Phase 1 Expansion Space are substantially completed and (y) a temporary or permanent certificate of occupancy is issued for the Phase 1 Expansion Space.

i. The "**Phase 1 Expansion Early Access Date**" shall mean the Effective Date.

j. The "**Phase 2 Expansion Effective Date**" shall be the earlier to occur of (i) 150 days following the delivery of the Phase 2 Expansion Space in the Base Building Condition and with the Landlord's Work for the Phase 2 Expansion Space substantially completed and (ii) the date on which the later of the following occurs (x) the Tenant Improvements in the Phase 2 Expansion Space are substantially completed and (y) a temporary or permanent certificate of occupancy is issued for the Phase 2 Expansion Space.

k. The "**Phase 2 Expansion Early Access Date**" shall mean the date that the Landlord delivers the Phase 2 Expansion Space in the Base Building Condition and with the Landlord's Work for the Phase 2 Expansion Space substantially completed.

l. The "**Tenant Improvements**" shall mean any Alterations desired to be completed by Tenant in the Fifth Amendment Expansion Space or the Original Premises.

m. The "**Property Rentable Area**" shall mean the rentable square feet of the Property and is hereby stipulated between Landlord and Tenant to be 404,943 square feet, subject to adjustment pursuant to Section 10 below.

n. The "**Building Rentable Area**" shall mean the rentable square feet of the Building and is hereby stipulated between Landlord and Tenant to be 259,935 square feet, subject to adjustment pursuant to Section 10 below.

2. **Extension; Termination.**

2.01 The Term of the Lease with respect to the Fifth Amendment Expansion Space only shall expire on the Fifth Amendment Expansion Space Termination Date, unless sooner terminated in accordance with the terms of the Lease. Such extension shall be on all the terms and conditions of the Lease, as modified by this Amendment.

2.03 The Term of the Lease with respect to the Fourth Amendment Expansion Space only is hereby extended to expire on the Prior Termination Date, unless sooner terminated in accordance with the terms of the Lease. Such extension shall be on all the terms and conditions of the Lease, as modified by this Amendment.

2.04 For the avoidance of doubt, if the Lease (as amended hereby) terminates or expires with respect to the Original Premises but not the Fifth Amendment Expansion Space, then:

a. Tenant shall vacate and surrender possession of the Original Premises to Landlord in accordance with the terms of the Lease (failing Landlord shall have all of Owner's rights and remedies under the Lease and at law and in equity on account of such failure, including those under Article 12 of the Original Lease). As part of such surrender obligations, Tenant, at its sole cost and expense, shall upon or prior to such termination or expiration, (i) restore, to a Building standard condition, any demising wall that, as of the Effective Date, exists between the Phase 2 Expansion Space and the portion of the Original Premises located on Level 1 of the Building, and (ii) otherwise perform such work as is necessary to physical segregate the Phase 2 Expansion Space from such portion of the Original Premises.

b. Article XII. of the Fourth Amendment shall be of no further force or effect from and after such expiration or termination.

3. **Fifth Amendment Expansion Space Effective Date.**

3.01 Effective as of the Phase 1 Expansion Effective Date, the Premises, as defined in the Lease, is increased from 75,594 rentable square feet to 93,274 rentable square feet by the addition of the Phase 1 Expansion Space, and from and after the Phase 1

Expansion Effective Date, the Original Premises and the Phase 1 Expansion Space, collectively, shall, for all purposes of the Lease (as amended by this Amendment), be deemed the Premises, as defined in the Lease. The Phase 1 Expansion Space and the leasing thereof shall be subject to all the terms and conditions of the Lease except as expressly modified herein and except that Tenant shall not be entitled to receive any work, allowances, abatements or other financial concessions granted with respect to the Original Premises unless such work, allowances, abatements or concessions are expressly provided for herein with respect to the Phase 1 Expansion Space.

3.02 Effective as of the Phase 2 Expansion Effective Date, the Premises, as defined in the Lease, is increased from 93,274 rentable square feet to 108,135 rentable square feet by the addition of the Phase 2 Expansion Space, and from and after the Phase 2 Expansion Effective Date, the Premises (i.e., the Original Premises and the Phase 1 Expansion Space) and the Phase 2 Expansion Space, collectively, shall, for all purposes of the Lease (as amended by this Amendment), be deemed the Premises, as defined in the Lease. The Phase 2 Expansion Space shall be subject to all the terms and conditions of the Lease except as expressly modified herein and except that Tenant shall not be entitled to receive any work, allowances, abatements or other financial concessions granted with respect to the Original Premises unless such work, allowances, abatements, concessions are expressly provided for herein with respect to the Phase 2 Expansion Space.

3.03 Effective as of November 1, 2019, the number of parking spaces in the Parking Area that Tenant will be permitted to use on a non-exclusive, unreserved basis in accordance with the Lease shall be a total of 297. In the event the rentable square footage of the Premises is decreased, the number of parking spaces in the Parking Area that Tenant will be permitted to use on a non-exclusive unreserved basis shall be reduced proportionally.

4. **Basic Rent.**

4.01 **Original Premises.** The Basic Rent due under the Lease payable by Tenant with respect to the Original Premises (including, with respect to the Fourth Amendment Expansion Space, for the period from the day after the FAES Prior Termination Date through the Termination Date) is set forth on **Exhibit D-1** attached hereto and incorporated herein by this reference.

4.02 **Phase 1 Expansion Space Basic Rent From the Phase 1 Expansion Effective Date through the Fifth Amendment Expansion Space Termination Date.** As of the Phase 1 Expansion Effective Date, the Basic Rent payable with respect to the Phase 1 Expansion Space for the balance of the Term of the Lease is set forth on **Exhibit D-2** attached hereto and incorporated herein by this reference.

4.03 **Phase 2 Expansion Space Basic Rent From the Phase 2 Expansion Effective Date through the Fifth Amendment Expansion Space Termination Date.** As of the Phase 2 Expansion Effective Date, the Basic Rent payable with respect to the Phase 2 Expansion Space for the balance of the Term of the Lease is set forth on **Exhibit D-3** attached hereto and incorporated herein by this reference.

5. **Additional Security Deposit.** No additional security deposit shall be required in connection with this Amendment. For the avoidance of doubt, if the Lease (as amended hereby) terminates or expires with respect to the Original Premises, Tenant shall still be required to maintain the security deposit described in Section III of the Fourth Amendment for so long as the Lease (as amended by this Amendment) remains in effect with respect to the Fifth Amendment Expansion Space or any portion thereof.

6. **Tenant's Proportionate Share.**

6.01 For the period commencing with the Effective Date and ending on the day immediately prior to the Phase 1 Expansion Effective Date, Tenant's Proportionate Share with respect to Taxes and Operating Expenses is 18.67% (excluding Operating Expenses which pertain solely to the Building (as reasonably determined by Landlord), in which case, Tenant's Proportionate Share shall be 29.08% with respect to such Operating Expenses pertaining solely to the Building).

6.02 For the period commencing with the Phase 1 Expansion Effective Date and ending on the day immediately prior to the Phase 2 Expansion Effective Date, Tenant's Proportionate Share with respect to Taxes and Operating Expenses is 23.09% (excluding Operating Expenses which pertain solely to the Building (as reasonably determined by Landlord), in which case, Tenant's Proportionate Share shall be 35.88% with respect to such Operating Expenses pertaining solely to the Building).

6.03 For the period commencing with the Phase 2 Expansion Effective Date and ending on the Fifth Amendment Expansion Space Termination Date, Tenant's Proportionate Share with respect to Taxes and Operating Expenses is 26.77% (excluding Operating Expenses which pertain solely to the Building (as reasonably determined by Landlord), in which case, Tenant's Proportionate Share shall be 41.60% with respect to such Operating Expenses pertaining solely to the Building); provided, however, in the event the Term of the Lease with respect to the Original Premises is not extended pursuant to the terms of the Lease, then from and after Extension Date Tenant's Proportionate Share with respect to Taxes and Operating Expenses is 8.04% (excluding Operating Expenses which pertain solely to the Building (as reasonably determined by Landlord), in which case, Tenant's Proportionate Share shall be 12.52% with respect to such Operating Expenses pertaining solely to the Building).

6.04 Notwithstanding the foregoing or anything otherwise set forth in this Section 6 to the contrary, in the event Landlord elects to remeasure the Premises, the Property Rentable Area and/or the Building Rentable Area in accordance with the terms of Section 10 below, Tenant Proportionate Share with respect to Operating Expenses and Taxes shall be adjusted to equal a fraction, the numerator of which shall be the rentable square feet of the Premises (as may be adjusted due to such remeasurement) and the denominator of which shall be (x) the Property Rentable Area (as may be adjusted due to such remeasurement) with respect to Operating Expenses (excluding Operating Expenses which pertain solely to the Building (as reasonably determined by Landlord)) and Taxes and (y) the Building Rentable Area (as may be adjusted due to such remeasurement) with respect to Operating Expenses which pertain solely to the Building (as reasonably determined by Landlord).

7. **Additional Rent.**

7.01 For purposes of calculating Tenant's Proportionate Share of Operating Expenses, (x) the Controllable Expenses for each full Operating Year after the Effective Date shall not increase by more than four percent (4.0%) of the Controllable Expenses for the immediately preceding Operating Year (on a cumulative basis), and (y) the property management fee included in Operating Expenses for any period shall not exceed three percent (3%) of the gross collections from the Property for such period.

7.02 Notwithstanding the foregoing or anything contained in the Lease or this Amendment to the contrary, Landlord and Tenant acknowledge and agree that the cost and expense of the construction of any amenity center constructed by Landlord and the initial installations contained therein shall be borne solely by Landlord and shall not be included in Operating Expenses; provided however, the actual Operating Expenses incurred for the operation of the amenity center shall be included in Operating Expenses; provided further that Operating Expenses associated with the operation of the amenity center shall only be included in the calculation of Controllable Expenses following the first full calendar year of operation of such amenity center.

7.03 Except as otherwise modified by this Amendment, all Basic Rent, Additional Rent or any other sums or charges due under the Lease shall be payable by Tenant in accordance with the terms thereof.

8. **Condition of Fifth Amendment Expansion Space; Landlord's Work; Allowance.**

8.01. **Condition of Fifth Amendment Expansion Space.** Tenant agrees to accept the Fifth Amendment Expansion Space (i.e., the Phase 1 Expansion Space and the Phase 2 Expansion Space) in the condition detailed in **Exhibit B**, and otherwise its "as-is" condition, without any agreements, representations, understandings or obligations to accept on the part of Landlord to perform any alterations, repairs or improvements, except as may be expressly provided otherwise in Section 8.02 or **Exhibit B** of this Amendment.

8.02. **Landlord's Work.** Landlord, at its sole cost and expense, shall complete the Landlord's Work as detailed in **Exhibit C** using Building standard materials; provided, however, any delay in the completion of the Landlord's Work shall not render Landlord liable for any damages or afford Tenant any right to any offset or abatement of Basic Rent or Additional Rent. Notwithstanding the foregoing or anything otherwise set forth herein or in the Lease to the contrary, the costs and expenses incurred by Landlord in connection with the completion of the Landlord's Work shall be excluded from Operating Expenses. Landlord and Landlord's contractor(s) shall be permitted to access the Fifth Amendment Expansion Space and the Original Premises in order to complete the Landlord's Work. Tenant covenants and agrees not to materially interfere with Landlord or Landlord's contractor(s) in connection with the completion of the Landlord's Work.

8.03 **Allowance.** Landlord shall provide to Tenant, an allowance of (x) up to Sixty and No/100 Dollars ($60.00) per rentable square foot of the Fifth Amendment Expansion Space (the "**ES Allowance"**), (y) up to 12/100 Dollars ($0.12) per rentable square

foot of the Fifth Amendment Expansion Space (the "**SP Allowance**") and (z) up to Two and 50/100 Dollars ($2.50) per rentable square foot of the Fifth Amendment Expansion Space (the "**Bathroom Allowance**"; together with the ES Allowance and the SP Allowance, the "**Allowance**"), subject to the terms and conditions set forth herein. The Allowance shall be used by Tenant to pay for the cost of Tenant's construction of the Tenant Improvements, including, without limitation, hard construction costs, soft costs (such as permitting, architectural and engineering fees) voice and data wiring and cabling costs and furniture, fixtures and equipment expenses; provided, however, the Bathroom Allowance shall be used only for Tenant Improvements in the bathroom(s) for the Phase 2 Expansion Space. All Tenant Improvements shall be (a) subject to all other terms and conditions of the Lease; (b) based on plans previously approved by Landlord, which consent shall not be unreasonably withheld, conditioned or delayed; (c) performed in a good and workmanlike manner by contractors previously approved by Landlord, such approval shall not be unreasonably withheld, and (d) be in compliance with all applicable laws and regulations. Any approval (including deemed approval) by Landlord in connection with the Tenant Improvements shall be subject to the terms and conditions of the Lease. The Allowance shall be payable directly to Tenant by Landlord and Landlord shall disburse the Allowance to Tenant on a periodic basis (but no more than once per month) within 30 days after receipt from Tenant of: (i) reasonable documentation of payment by Tenant for materials and labor, as the case may be, with respect to the Tenant Improvements that are the subject of such requisition; (ii) partial lien waivers or final lien waivers, as applicable, from any contractors or laborers hired by Tenant to perform any Tenant Improvements in the Fifth Amendment Expansion Space and/or Original Premises; (iii) prior to the final requisition only, a certificate of occupancy or equivalent document issued by a local government agency or building department certifying the Tenant Improvements compliance with applicable building codes and other laws, and indicating the Phase 1 Expansion Space, and/or Original Premises (as applicable) to be in a condition suitable for occupancy; and (iv) any other information or materials reasonably requested by Landlord with respect to the requisition or Tenant Improvements in question. Any portion of the Allowance which has not been properly requisitioned by Tenant on or before the last day of the twenty-fourth (24th) calendar month following the Phase 2 Expansion Effective Date shall be deemed forfeited by Tenant and Landlord shall have no further obligation with respect thereto. Notwithstanding the foregoing, Landlord shall not be obligated to pay any Allowance (and Tenant shall not be permitted to submit any requisition for any portion of the Allowance) at any time when there exists a default by Tenant under the Lease, beyond applicable notice and cure periods. Notwithstanding anything to the contrary contained in the Lease, in no event shall Tenant be obligated to pay Landlord a supervisory or oversight fee for the completion of the Tenant Improvements, nor shall Tenant be obligated to provide any secure assurances for the completion of the same.

9. **Early Access to Fifth Amendment Expansion Space**.

9.01 Tenant may take possession of or enter the Phase 1 Expansion Space at any time during the period commencing on the Phase 1 Expansion Early Access Date and expiring on the date immediately preceding the Phase 1 Expansion Effective Date, which possession or entry shall be upon and subject to (and thus, in connection with such possession or entry, Tenant shall comply with) all the terms and conditions of the Lease (including, without limitation, all insurance

and indemnification provisions of the Lease); provided, however, except for the cost of services requested by Tenant (e.g., after hours HVAC service), Tenant shall not be required to pay Rent for the Phase 1 Expansion Space for any such entry or possession during which Tenant has entered, or is in possession of, the Phase 1 Expansion Space for the sole purpose of performing improvements or installing Tenant's fixtures, furniture and equipment.

9.02 Subject to the terms of this Section 9.02, Tenant may take possession of or enter the Phase 2 Expansion Space at any time during the period commencing on the Phase 2 Expansion Early Access Date and expiring on the date immediately preceding the Phase 2 Expansion Effective Date, which possession or entry shall be upon and subject to (and thus, in connection with such possession or entry, Tenant shall comply with) all the terms and conditions of the Lease (including, without limitation, all insurance and indemnification provisions of the Lease); provided, however, except for the cost of services requested by Tenant (e.g., after hours HVAC service), Tenant shall not be required to pay Rent for the Phase 2 Expansion Space for any such entry or possession during which Tenant has entered, or is in possession of, the Phase 2 Expansion Space for the sole purpose of performing improvements or installing Tenant's fixtures, furniture and equipment. Notwithstanding the foregoing, Landlord shall not be liable for a failure to deliver possession of the Phase 2 Expansion Space due to the holdover or unlawful possession of such space by another party; provided, however, Landlord shall use reasonable efforts to obtain possession of any such space.

10. **Options to Extend.** Tenant's right and option to extend the Term of the Lease pursuant to Section 2.4 of the Original Lease, as amended by Section IX of the First Amendment (subject to the immediately following sentence), shall remain and apply to the Original Premises (but not to the Fifth Amendment Expansion Space). Notwithstanding anything to the contrary in the Lease or First Amendment, Landlord and Tenant confirm that the Basic Rent for the Original Premises during the applicable Extended Term shall be equal to 96.3% of the Fair Market Rental Value of the Original Premises for the applicable Extension Term. For the avoidance of doubt, Landlord and Tenant agree and acknowledge that any such extension options shall apply to the Term of the Lease with respect to the Original Premises only and not the Fifth Amendment Expansion Space. In the event Tenant exercises any such extension option in accordance with the terms of the Lease, Landlord shall have the right to remeasure the Premises, the Property Rentable Area and/or the Building Rentable Area in accordance with the then current Building Owners and Managers Association (BOMA) international standard method of floor measurement. Any adjustments to the Building, Premises or Tenant's Proportionate Share shall be promptly documented in an amendment to the Lease.

11. **Modified Provisions.**

11.01 **Capital Replacements and Repairs.** Subject to the terms of Section 7.1(b) of the Original Lease Section 7.2 of the Original Lease, Landlord shall be responsible to maintain the structural and mechanical aspects of the Building to a Class A standard. In the event a capital replacement is required during the Term, Landlord will complete the capital replacement and to the extent allowable pursuant to Exhibit D of the Original Lease, shall amortize the cost of such replacement over its useful life (as reasonably determined by Landlord in accordance with generally accepted accounting principles) as part of the Operating Expenses.

11.02 As of the Effective Date, the provisions listed below shall be amended as follows:

a. The threshold for cosmetic alterations set forth in the second sentence of Section 5.2(a) of the Original Lease shall be changed from "$20,000.00 in cost each instance" to "$100,000.00 in cost each instance".

b. Section 12.1 (Holding Over) shall be deleted and replaced with the following: "Tenant shall pay Landlord for each day Tenant retains possession of the Premises or part of them after termination of this Lease by lapse of time or otherwise at the rate ("**Holdover Rate**") which shall be Two Hundred Percent (200%) of the amount of the monthly installment of Base Rent for the last month prior to the date of such termination, plus all Additional Rent, prorated on a daily basis, and also, if such holding over continues for more than thirty (30) days, Tenant shall pay all damages sustained by Landlord by reason of such retention after termination of this Lease, including without limitation, consequential damages. In any such event, a tenancy at sufferance at the Holdover Rate shall be deemed to have been created. In any event, no provision of this Section shall be deemed to waive Landlord's right of reentry or any other right under this Lease or at law."

c. The following shall be added as Section 10.5 of the Original Lease: "To the fullest extent permitted by law, but subject to the terms of this Lease, including without limitation, the Section 10.4, Landlord will protect, indemnify, and hold Tenant and Tenant's officers, directors, shareholders, managers, partners, members, trustees, and agents (collectively "**Tenant Parties**"), harmless from and against all liabilities, obligations, claims, damages, penalties, actions, forfeitures, losses, causes of action, costs, and expenses (including without limitation, reasonable attorneys' fees and expenses), imposed upon or incurred by or asserted against Tenant and/or any Tenant Parties by any third party by reason of Landlord's or Landlord's officers, directors, shareholders, managers, partners, members, trustees, and agents (collectively "**Landlord Parties**") gross negligence or willful misconduct. In case any action, suit, or proceeding is brought against Tenant and/or Tenant Parties by reason of any such occurrence covered by Landlord's indemnity under this Section 10.5, Landlord will, at Landlord's expense, resist and defend such action, suit, or proceeding, or cause the same to be resisted and defended by counsel reasonably approved by Tenant (it being agreed that counsel selected by Landlord's insurer shall be acceptable to Tenant)."

12. **Miscellaneous.**

12.01. This Amendment and the attached exhibits, which are hereby incorporated into and made a part of this Amendment, set forth the entire agreement between the parties with respect to the matters set forth herein. There have been no additional oral or written representations or agreements. Under no circumstances shall Tenant be entitled to any Rent abatement, improvement allowance, leasehold improvements, or other work to the Premises, or any similar economic incentives that may have been provided Tenant in connection with entering into the Lease, unless specifically set forth in this Amendment. Tenant agrees that neither Tenant nor its agents or any other parties acting on behalf of Tenant shall disclose any matters set forth in this Amendment or disseminate or distribute any information concerning the terms, details or conditions hereof to any person, firm or entity without obtaining the express written consent of Landlord; provided, however, nothing contained in this Amendment is intended to prohibit Tenant from filing this Amendment with the Securities and Exchange Commission ("**SEC**") to the extent that Tenant is required to do so pursuant to applicable SEC requirements.

12.02. Except as modified by this Amendment, the Lease and all covenants, agreements, terms and conditions thereof shall remain in full force and effect and are hereby in all respects ratified and confirmed.

12.03. In the case of any inconsistency between the provisions of the Lease and this Amendment, the provisions of this Amendment shall govern and control.

12.04. Submission of this Amendment by Landlord is not an offer to enter into this Amendment but rather is a solicitation for such an offer by Tenant. Landlord shall not be bound by this Amendment until Landlord has executed and delivered the same to Tenant.

12.05. The parties agree to sign a form of subordination, non-disturbance, and attornment agreement in the form attached hereto as **Exhibit E** (the "**Form SNDA**") from Landlord's Existing Holder. Tenant agrees and acknowledges that any subordination, non-disturbance, and attornment agreement requested by Tenant from Landlord or Landlord's mortgagee shall be in the form of the Form SNDA.

12.06. Tenant hereby represents to Landlord that Tenant has dealt with no broker in connection with this Amendment, except for Matt Adams and Torin Taylor on behalf of Newmark Knight Frank ("**Tenant's Broker**"). Tenant agrees to indemnify and hold Landlord, its trustees, members, principals, beneficiaries, partners, officers, directors, employees, mortgagee(s) and agents, and the respective principals and members of any such agents (collectively, the "**Landlord Related Parties**") harmless from all claims of any brokers claiming to have represented Tenant in connection with this Amendment, except for Tenant's Broker. Landlord hereby represents to Tenant that Landlord has dealt with no broker in connection with this Amendment, except for Matt Malatesta, Brendan Daly, and Mark Roth on behalf of Newmark Knight Frank ("**Landlord's Broker**"). Landlord agrees to indemnify and hold Tenant, its trustees, members, principals, beneficiaries, partners, officers, directors, employees, and agents, and the respective principals and members of any such agents (collectively, the "**Tenant Related Parties**") harmless from all claims of any brokers claiming to have represented Landlord in connection with this Amendment, except for Landlord's Broker.

12.07. Each signatory of this Amendment represents hereby that he or she has the authority to execute and deliver the same on behalf of the party hereto for which such signatory is acting.

12.08. Tenant acknowledges and agrees that in using or occupying the Premises (including the Fifth Amendment Expansion Premises) for the purpose anticipated under the Lease and this Amendment, Tenant shall not violate the terms and provisions of that certain Notice of Activity and Use Limitation recorded with respect to the Property on May 1, 1997 in Book 27260, Page 252 at the Middlesex County Registry of Deeds and that certain Notice of Activity and Use Limitation recorded with respect to the Property on January 9, 2012 in Book 58247, Page 561 at the Middlesex County Registry of Deeds (collectively, the "**AULs**").

12.09. In its ownership, operation and management of the Building and the Property, Landlord shall not violate the terms and provisions of the AULs. Landlord has further disclosed to Tenant, and Tenant herein acknowledges, that Landlord Related Parties have and will continue throughout the Term of the Lease, to conduct certain environmental remediation of the Property at Landlord's sole cost and expense (and not included in Operating Expenses), including but not limited to the operation of, maintenance and periodic monitoring associated with the existing subsurface depressurization (SSD) system (the "**SSD System**") as well as further mitigation and/or remediation measures that may be deemed necessary as based on operation and monitoring of the SSD System in accordance with applicable laws and Environmental Laws (herein the "**Landlord's Environmental Work**"). Additionally, Landlord shall, at no cost to Tenant (and excluded from Operating Expenses), remove or remediate to the extent required by applicable laws any Hazardous Materials on the Property in violation of Environmental Laws that existed prior to and/or on the date Tenant occupied any portion of the Premises, except to the extent such Hazardous Materials were caused by Tenant or any of Tenant's officers, employees, contractors, sublessees or agents, in which case Tenant shall be responsible for the removal or remediation of the same as set forth above. In connection therewith, Landlord shall use reasonable efforts to minimize the impact of such remediation on Tenant's use and occupancy of the Premises and any use of the Parking Area. Landlord covenants and agrees to regularly maintain the SSD System at Landlord's sole cost and expense (and not as a part of Operating Expenses or other contribution by Tenant). In the event that Landlord fails to maintain the SSD System or such SSD System fails to perform adequately, function and operate as designed and as a direct result therefrom (or as a result of any pre-existing environmental condition at the Property), Tenant is unable to occupy the Premises for the use permitted by the Lease (the "**SSD System Interruption**"), then for each day following Landlord's receipt of Tenant's written notice of the onset of such SSD System Interruption until such time that the SSD System Interruption has ceased (i.e., the SSD System is in working order) Tenant shall be entitled to an abatement of Basic Rent and Additional Rent. Landlord shall indemnify, defend and hold Tenant and Tenant's agents, employees and contractors harmless from and against any and all claims, actions, causes of action, liabilities, obligations, damages, penalties, forfeitures, losses, costs or expenses (including, without limitation, reasonable attorneys' fees and costs), or death of or injury to any person

or damage to any property whatsoever, to the extent arising from: (i) the presence of Hazardous Materials in the Premises or the Building or on the Property that existed prior to and/or on the date Tenant first occupied any portion of the Premises (except to the extent such Hazardous Materials were caused by Tenant or any of Tenant's officers, employees, contractors, sublessees or agents), and/or (ii) the use, storage, transportation, release or disposal of Hazardous Materials by Landlord or any Landlord's agents, employees or contractors in or into the air, water or soil or in, on, or about the Premises, Building, or the Property.

12.10 Tenant and Landlord each represent and warrant to the other, as of the date hereof, to such party's knowledge, there exist no valid abatements, causes of action, counterclaims, disputes, defenses, offsets, credits, deductions, or claims against the enforcement of any of the terms and conditions of the Lease against the other party.

[SIGNATURES ARE ON FOLLOWING PAGE]

IN WITNESS WHEREOF, Landlord and Tenant have duly executed this Amendment as of the day and year first above written.

LANDLORD:

HRE-S CENTERPOINT, LLC,
a Delaware limited liability company

By: /s/ Eric W. Kaup
Name: Eric W. Kaup
Title: Secretary

TENANT:

REPLIGEN CORPORATION, a Delaware corporation

By: /s/ Steve Curran
Name: Steve Curran
Title: VP Operations

EXHIBIT A-1

INTENTIONALLY OMITTED

EXHIBIT A-2

INTENTIONALLY OMITTED

EXHIBIT A-3

INTENTIONALLY OMITTED

EXHIBIT B

BASE BUILDING CONDITION

- **Phase 1 Expansion Space**
    - Landlord will deliver Phase 1 Expansion Space in broom clean "As is" condition.
    - Note the following "As-Is" condition of the Phase 1 Expansion Space, includes:
        - interior surfaces of exterior walls are generally finished in drywall; taped, bedded and sanded, with minor exceptions in some areas;
        - ceilings are generally open;
        - interior columns are generally unfinished in all open areas for tenant convenience and design consideration;
        - all base building systems servicing the Phase 1 Expansion Space (including without limitation, a Rooftop HVAC Unit), subject to any Landlord Work to be completed as noted herein, in good working order with reasonable useful life remaining for such equipment;
        - 400 AMP electrical service (17 watts per SF); and
        - lighting and all other Tenant finishes to be completed by Tenant in conjunction with Tenant fit-out using the Allowance.

- **Phase 2 Expansion Space**
    - Landlord will deliver Phase 2 Expansion Space in broom clean "As is" condition as of the Effective Date, reasonable wear and tear excepted; provided, however, all personal property, including any furniture, fixtures and equipment which the existing tenant is entitled and/or required to remove shall be removed.
    - Note the following "As-Is" condition for Phase 2 Expansion Space, includes:
        - ceilings are generally open;
        - interior columns are generally unfinished in all open areas for tenant convenience and design consideration;
        - all base building systems, subject to any Landlord Work to be completed as noted herein, servicing the Phase 2 Expansion Space in good working order with reasonable useful life remaining for such equipment;
        - 300 AMP electrical service (13 watts per SF); and
        - lighting and all other Tenant finishes to be completed by Tenant in conjunction with Tenant fit-out using the Allowance.

EXHIBIT C

LANDLORD'S WORK

Landlord's Work is comprised of the following:

Phase 1 Expansion Space

- Connection point installed for fire alarm system servicing the Phase 1 Expansion Space (completed).
- The complete core fire detection system shall be installed, operating and tested in accordance with NFPA requirements (completed).
- Landlord will deliver code compliant restrooms in Phase 1 Expansion Space (completed).
- Landlord will provide a flat floor surface in suitable condition for Tenant Improvements (i.e. free of all trip hazards, etc.).

Phase 2 Expansion Space

- Connection point installed for fire alarm system servicing the Phase 1 Expansion Space (completed).
- The complete core fire detection system shall be installed, operating and tested in accordance with NFPA requirements (completed).
- Landlord will provide a flat floor surface in suitable condition for Tenant Improvements (i.e. free of all trip hazards, etc.) for the Expansion Premises. Landlord will also fill in the trench drains in Phase 2 Expansion Space flush with the floor.
- Landlord will be responsible for the removal and remediation of any hazardous materials, including excavation of soils for any future additional loading docks.
- Landlord will provide and install (if not already installed) Rooftop HVAC Unit(s) to adequately heat and cool the Phase 2 Expansion Space to a commercial standard for office space. Rooftop units will be ready for Tenant connections (i.e. stubbed/dropped into interior). HVAC distribution shall be part of Tenant Improvements.

EXHIBIT D-1

ORIGINAL PREMISES BASIC RENT SCHEDULE

Months of Term	Total SF	Rent PSF	Annual Basic Rent	Monthly Basic Rent
Effective Date through August 31, 2022	75,594	$ 20.16	$1,524,114.00	$ 127,009.50
September 1, 2022 through October 31, 2022	75,594	$ 23.06	$1,743,014.00	$ 145,251.17
November 1, 2022 through Prior Termination Date	75,594	$ 23.32	$1,762,914.00	$ 146,909.50

EXHIBIT D-2

PHASE 1 EXPANSION SPACE BASIC RENT SCHEDULE

Months of Term	Total SF	Rent PSF	Annual Basic Rent	Monthly Basic Rent
Phase 1 Expansion Effective Date through October 31, 2020	10,000	$ 29.00	$290,000.00*	$ 24,166.67*
November 1, 2020 through October 31, 2021	17,680	$ 30.00	$530,400.00	$ 44,200.00
November 1, 2021 through October 31, 2022	17,680	$ 31.00	$548,080.00	$ 45,673.33
November 1, 2022 through October 31, 2023	17,680	$ 32.00	$565,760.00	$ 47,146.67
November 1, 2023 through October 31, 2024	17,680	$ 33.00	$583,440.00	$ 48,620.00
November 1, 2024 through October 31, 2025	17,680	$ 34.00	$601,120.00	$ 50,093.33
November 1, 2025 through October 31, 2026	17,680	$ 35.00	$618,800.00	$ 51,566.67
November 1, 2026 through October 31, 2027	17,680	$ 36.00	$636,480.00	$ 53,040.00
November 1, 2027 through October 31, 2028	17,680	$ 37.00	$654,160.00	$ 54,513.33
November 1, 2028 through October 31, 2029	17,680	$ 38.00	$671,840.00	$ 55,986.67
November 1, 2029 through Fifth Amendment Expansion Space Termination Date	17,680	$ 39.00	$689,520.00	$ 57,460.00

* **Basic Rent Abatement**. Notwithstanding the foregoing and so long as Tenant is not in default under the terms of the Lease, beyond applicable notice and cure periods, Tenant shall be entitled to an abatement of Basic Rent with respect to the Phase 1 Expansion Space accruing from the Phase 1 Expansion Effective Date through the last day of the fifth (5^{th}) calendar month thereafter (the "**Basic Rent Abatement Period**"). The total amount of Basic Rent with respect to the Phase 1 Expansion Space that is abated during the Basic Rent Abatement Period shall be referred to herein as the "**Abated Rent**".

EXHIBIT D-3

PHASE 2 EXPANSION SPACE BASIC RENT SCHEDULE

Months of Term	Total SF	Rent PSF	Annual Basic Rent	Monthly Basic Rent
Phase 2 Expansion Effective Date through October 31, 2020	14,861	$ 29.00	$430,969.00	$ 35,914.08
November 1, 2020 through October 31, 2021	14,861	$ 30.00	$445,830.00	$ 37,152.50
November 1, 2021 through October 31, 2022	14,861	$ 31.00	$460,691.00	$ 38,390.92
November 1, 2022 through October 31, 2023	14,861	$ 32.00	$475,552.00	$ 39,629.33
November 1, 2023 through October 31, 2024	14,861	$ 33.00	$490,413.00	$ 40,867.75
November 1, 2024 through October 31, 2025	14,861	$ 34.00	$505,274.00	$ 42,106.17
November 1, 2025 through October 31, 2026	14,861	$ 35.00	$520,135.00	$ 43,344.58
November 1, 2026 through October 31, 2027	14,861	$ 36.00	$534,996.00	$ 44,583.00
November 1, 2027 through October 31, 2028	14,861	$ 37.00	$549,857.00	$ 45,821.42
November 1, 2028 through October 31, 2029	14,861	$ 38.00	$564,718.00	$ 47,059.83
November 1, 2029 through Fifth Amendment Expansion Space Termination Date	14,861	$ 39.00	$579,579.00	$ 48,298.25

EXHIBIT E

FORM SNDA

SUBORDINATION, NON-DISTURBANCE AND ATTORNMENT AGREEMENT

_____,
Tenant

AND

CANADIAN IMPERIAL BANK OF COMMERCE,
acting through its New York Branch,
as Administrative Agent

County: **Middlesex**
State: **Massachusetts**

Premises: **41 Seyon Street and 43 Foundry Avenue**
Waltham, Massachusetts

Dated: as of _____, 201_

Record and return by mail to:

Morrison & Foerster LLP
250 West 55th Street
New York, New York 10019
Attention: Thomas McGovern

SUBORDINATION, NON-DISTURBANCE AND ATTORNMENT AGREEMENT

THIS AGREEMENT made as of this day of , 2019, by and among **HRE-S CENTERPOINT, LLC**, a Delaware limited liability company ("**Landlord**"), **CANADIAN IMPERIAL BANK OF COMMERCE**, acting through its New York Branch ("**Administrative Agent**"), as Administrative Agent for the Lenders (defined below), and ("**Tenant**").

RECITALS:

A. Tenant has executed that certain Lease dated as of October 10, 2001, as amended by that certain Letter Agreement dated May 7, 2002, that certain First Amendment to Lease dated as of June 29, 2011, that certain Second Amendment to Lease dated as of January 11, 2013, that certain Third Amendment to Lease dated as of September 26, 2013, that certain Fourth Amendment dated as of March 14, 2014, and that certain Fifth Amendment dated as of May , 2019 (collectively, with the amendment} thereto, the "**Lease**"), with West Seyon LLC, predecessor-in-title to Landlord, as lessor, covering the premises described in the Lease consisting of approximately a 93,274 rentable square foot space (the "**Premises**") in that certain building located at 41 Seyon Street, Waltham, Massachusetts (the "**Property**") and more particularly described in Exhibit A attached hereto and made a part hereof by this reference; and

B. Certain lenders (the "**Lenders**") have made (or agreed to make) a loan to Landlord secured by a mortgage encumbering the Property and an assignment of Landlord's interest in the Lease (said mortgage, together with any amendments, renewals, increases, modifications, substitutions or consolidations of either of them, collectively, the "**Security Instrument**") in favor of Administrative Agent on behalf of the Lenders; and

C. Tenant and Administrative Agent desire to confirm their understanding with respect to the Lease and the Security Instrument, and to have Landlord confirm its agreement therewith.

NOW, THEREFORE, in consideration of the covenants, terms, conditions, and agreements contained herein, the parties hereto agree as follows:

1. The Lease and any extensions, modifications or renewals thereof, including but not limited to any option to purchase, right of first refusal to purchase or right of first offer to purchase the Property or any portion thereof, if any, is and shall continue to be subject and subordinate in all respects to the Security Instrument and the lien created thereby.

2. Tenant agrees to deliver to Administrative Agent, in the manner set forth in Paragraph 13 of this Agreement, a copy of any notice of default sent to Landlord by Tenant. If Landlord fails to cure such default within the time provided in the lease, Administrative Agent shall have the right, but not the obligation, to cure such default on behalf of Landlord within thirty (30) calendar days after the time provided for Landlord to cure such default in the Lease has expired or, if such default cannot be cured within that time, within a reasonable period provided Administrative Agent is proceeding with due diligence to cure such default. In such event, Tenant shall not terminate the Lease while such remedies are being diligently pursued by Administrative Agent. Further, Tenant shall not terminate the Lease on the basis of any default by Landlord which is incurable by Administrative Agent (such as, for example, the bankruptcy of Landlord or breach of any representation by Landlord), provided Administrative Agent is proceeding with due diligence to commence an action to appoint a receiver or to obtain title to the Property by foreclosure, deed in lieu of foreclosure, or otherwise (collectively, "Foreclosure"). Tenant hereby agrees that no action taken by Administrative Agent to enforce any rights under the Security Instrument or related security documents, by reason of any default thereunder (including, without limitation, the appointment of a receiver, any Foreclosure or any demand for rent under any assignment of rents or leases) shall give rise to any right of Tenant to terminate the Lease nor shall such action invalidate or constitute a breach of any of the terms of the Lease.

3. So long as Tenant is not in default under the Lease, beyond all applicable notice and cure periods, Administrative Agent shall not disturb Tenant's possession and occupancy of the Premises during the term of the Lease.

4. If Administrative Agent or its nominee or designee, or another purchaser of the Property upon a Foreclosure (any such person or entity, a "Successor Owner") succeeds to the interest of Landlord under the Lease, so long as Tenant is not in default under the Lease, beyond all applicable notice and cure periods, the Lease will continue in full force and effect. Thereupon, Successor Owner shall recognize the Lease and Tenant's rights thereunder and Tenant shall make full and complete attornment to Successor Owner as substitute landlord upon the same terms, covenants and conditions as provided in the Lease, including, but not limited to, any option to purchase, right of first refusal to purchase or right of first offer to purchase the Property as may be provided in the Lease. Notwithstanding the foregoing, Tenant agrees that any such option, right of first refusal or right of first offer to purchase the Property or any portion thereof, as may be provided in the Lease shall not apply to any Foreclosure, as defined herein and shall not apply to any transfer of the Property by Successor Owner following such Foreclosure. In consideration of the foregoing, Administrative Agent agrees that any such option, right of first refusal or right of first offer shall not be terminated by any Foreclosure or conveyance of the Property by Successor Owner following such Foreclosure; rather, any such option, right of first refusal or right of first offer shall remain as an obligation of any party acquiring the Property following the conveyance of the Property by Successor Owner following such Foreclosure. Furthermore, Tenant expressly confirms to Administrative Agent that any acquisition of title to all or any portion of the Property pursuant to Tenant's exercise of any option, right of first refusal or right of first offer contained in the Lease shall result in Tenant taking title subject to the lien of the Security Instrument.

5. Tenant agrees that, if Successor Owner shall succeed to the interest of Landlord under the Lease, Successor Owner shall not be:

a. liable for any prior act or omission of Landlord or any prior landlord or consequential damages arising therefrom, provided the foregoing shall not relieve Successor Owner for damages arising out of any continuation of any default of Landlord, or of the obligation to cure such default, after the Successor Owner takes title to the Property, provided that Successor Owner receives written notice of such default and the opportunity to cure as may be set forth in the Lease; or

b. subject to any offsets or defenses which Tenant might have as to Landlord or any prior landlord unless Administrative Agent has failed to cure any default by Landlord as herein provided; or

c. required or obligated to credit Tenant with any rent or additional rent for any rental period paid to Landlord more than thirty (30) days in advance; or

d. except for the amendments and modifications described in the recitals, bound by any amendment or modification of the Lease made without Lenders' prior written consent and not otherwise permitted under the Security Instrument, provided, however, that Lenders' consent shall not be required for nonmaterial amendments or modifications that are made, consistent with the terms of the Lease applicable thereto, in connection with rights expressly granted to Tenant under the Lease; or

e. liable for refund of all or any part of any security deposit unless such security deposit shall have been actually received by Administrative Agent.

6. Tenant agrees that, without the prior written consent of Administrative Agent in each case, Tenant shall not (a) amend, modify, terminate or cancel the Lease or any extensions or renewals

thereof, except to the extent consistent with the terms of the Lease applicable thereto, or tender a surrender of the Lease (except in each case that, upon a default by Landlord under the Lease, Tenant may exercise its rights under the Lease after giving to Administrative Agent the notice and cure period required by this Agreement, or except in connection with the exercise of any enumerated rights of Tenant in connection with a casualty expressly set forth in the Lease), (b) make a prepayment of any rent or additional rent more than one (1) month in advance of the due date thereof, or (c) subordinate or permit the subordination of the Lease to any lien subordinate to the Security Instrument. Any such purported action without such consent shall be void as against the holder of the Security Instrument.

7. To the extent that the Lease shall entitle Tenant to notice of the existence of any Security Instrument and the identity of any mortgagee or any ground lessor, this Agreement shall constitute such notice to Tenant with respect to the Security Instrument and Administrative Agent.

8. Upon and after the occurrence of a default under the Security Instrument, which is not cured after any applicable notice and/or cure periods, Administrative Agent shall be entitled, but not obligated, to require that Tenant pay all rent under the Lease as directed by Administrative Agent, which payment shall, to the extent made, satisfy the obligations of Tenant under the Lease. Landlord agrees to hold Tenant harmless with respect to any such payments made by Tenant to Administrative Agent.

9. Nothing in this Agreement shall impose upon Administrative Agent any liability for the obligations of Landlord under the Lease unless and until Administrative Agent takes title to the Property. Anything herein or in the Lease to the contrary notwithstanding, in the event that a Successor Owner shall acquire title to the Property or the portion thereof containing the Premises, Successor Owner shall have no obligation, nor incur any liability, beyond Successor Owner's then interest, if any, in the Property, and Tenant shall look exclusively to such interest, if any, of Successor Owner in the Property for the payment and discharge of any obligations imposed upon Successor Owner hereunder or under the Lease, and Successor Owner is hereby released or relieved of any other liability hereunder and under the Lease. Tenant agrees that, with respect to any money judgment which may be obtained or secured by Tenant against Successor Owner, Tenant shall look solely to the estate or interest owned by Successor Owner in the Property, and Tenant will not collect or attempt to collect any such judgment out of any other assets of Successor Owner.

10. Except as specifically provided in this Agreement, Administrative Agent shall not, by virtue of this Agreement, the Security Instrument or any other instrument to which Administrative Agent may be party, be or become subject to any liability or obligation to Tenant under the Lease or otherwise.

11. EACH OF TENANT, ADMINISTRATIVE AGENT AND LANDLORD HEREBY IRREVOCABLY WAIVE ALL RIGHT TO TRIAL BY JURY IN ANY ACTION, PROCEEDING OR COUNTERCLAIM ARISING OUT OF OR RELATING TO THIS AGREEMENT.

12. The provisions of the Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns. The words, "Administrative Agent", "Landlord" and "Tenant" shall include their respective heirs, legatees, executors, administrators, beneficiaries, successors and assigns.

13. All notices and all other communication with respect to this Agreement shall be directed as follows: if to Administrative Agent, 200 West Madison Avenue, Suite 2610, Chicago, Illinois 60606, Attention: Real Estate Group, or such other address as Administrative Agent may designate in writing to Tenant; and, if to Tenant, at the address set forth in the Lease or at such other address as tenant may designate in writing to Administrative Agent. All notices shall be in writing and shall be (a) hand-delivered, (b) sent by United States express mail or by private overnight courier, or (c) served by certified mail postage prepaid, return receipt requested, to the appropriate address set forth above. Notices served as provided in (a) and (b) shall be deemed to be effective upon delivery or upon refusal thereof. Any

notice served by certified mail shall be deposited in the United States mail with postage thereon fully prepaid and shall be deemed effective on the day of actual delivery as shown by the addressee's return receipt or the expiration of three business days after the date of mailing, whichever is earlier in time.

14. This Agreement contains the entire agreement between the parties and no modifications shall be binding upon any party hereto unless set forth in a document duly executed by or on behalf of such party.

15. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts. This Agreement shall terminate and be of no further force or effect on the earlier to occur of (i) the discharge or termination of the mortgage, and (ii) the expiration or termination of the Lease (provided that any such termination was not in violation of the terms of the Lease or this Agreement).

16. This Agreement may be executed in multiple counterparts, all of which shall be deemed originals and with the same effect as if all parties had signed the same document. All of such counterparts shall be construed together and shall constitute one instrument.

[Remainder of Page Intentionally Left Blank; Signature Page Follows]

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement as of the day and year first above written.

CANADIAN IMPERIAL BANK OF COMMERCE, acting through its New York Branch, as Administrative Agent for the Lenders

By: _____
Name:
Title:

REPLIGEN CORPORATION, a Delaware corporation

By: _____
Name:
Title:

AGREED AND CONSENTED TO:

LANDLORD

HRE-S CENTERPOINT, LLC,
a Delaware limited liability company

By: _____
Name: _____
Title: _____

ACKNOWLEDGEMENT

STATE OF _____)
) SS.
COUNTY OF _____)

On the __ day of ____ in the year 201__, before me, the undersigned, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that [s/he] executed the same in his capacity as Authorized Signatory, of **CANADIAN IMPERIAL BANK OF COMMERCE**, acting through its New York Branch as Administrative Agent for the Lenders, and that by [her/his] signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public

My commission expires: _____

ACKNOWLEDGMENT

STATE OF _____)
) SS.
COUNTY OF _____)

I, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY that _____ as _____ of **HRE-S CENTERPOINT, LLC**, a Delaware limited liability company, appeared before me this day in person and acknowledged that he signed and delivered said instrument as his own free and voluntary act and as the free and voluntary act of said entities for the uses and purposes therein set forth.

_____
Notary Public

My commission expires: _____

ACKNOWLEDGEMENT

COMMONWEALTH OF MASSACHUSETTS)
) SS.
COUNTY OF _____)

I, a Notary Public in and for said County, in the Commonwealth aforesaid, DO HEREBY CERTIFY that _____ as _____ of Repligen Corporation, a Delaware corporation, appeared before me this day in person and acknowledged that he or she signed and delivered said instrument as his or her own free and voluntary act and as the free and voluntary act of said _____, for the uses and purposes therein set forth.

_____
Notary Public

My commission expires: _____

EXHIBIT A TO SNDA

Legal Description of Property

Parcel 1

The land in Waltham, Middlesex County, Massachusetts, situated on Seyon Street and Foundry Street, and being shown as the "Remaining Lot Area" on a plan entitled, "ANR Subdivision Plan in Waltham, Massachusetts" prepared by DGT Survey Group dated March 1, 2017, and recorded with the Middlesex South District Registry of Deeds as Plan No. 288 of 2017.

ALSO DESCRIBED AS SURVEYOR'S LEGAL DESCRIPTION:

A CERTAIN PARCEL OF LAND IN WALTHAM, MIDDLESEX COUNTY, MASSACHUSETTS, WESTERLY OF SEYON STREET, NORTHERLY OF BOSTON AND MAINE RAILROAD, EASTERLY OF WILLOW STREET AND SOUTHERLY OF GROVE STREET, BEING SHOWN AS "REMAINING LOT AREA" ON A PLAN ENTITLED "190 WILLOW STREET, ANR SUBDIVISION PLAN IN WALTHAM, MASSACHUSETTS, MIDDLESEX COUNTY", DATED MARCH 1, 2017, PREPARED BY DGT SURVEY GROUP, RECORDED WITH MIDDLESEX SOUTH REGISTRY OF DEEDS (PLAN 288 OF 2017) AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE WESTERLY SIDE OF SEYON STREET WITH THE NORTHERLY SIDE OF THE BOSTON AND MAINE RAILROAD LOCATION, THENCE RUNNING N 52-08-34 W 203.28 FEET TO A POINT OF CURVATURE; THENCE WESTERLY 20.00 FEET BY A CURVE TO THE LEFT OF 1750.76 FOOT RADIUS TO A POINT OF NON-TANGENCY, THE LAST TWO COURSES BEING BY LAND NOW OR FORMERLY OF BOSTON & MAINE CORPORATION; THENCE S 37-12-10 W 16.50 FEET IN PART BY SAID LAND OF BOSTON & MAINE CORPORATION AND IN PART BY LAND NOW OR FORMERLY OF COLONIAL SHOPPING CENTER, INC. TO A POINT OF NON-TANGENCY; THENCE WESTERLY 119.43 FEET BY A CURVE TO THE LEFT OF 1734.26 FOOT RADIUS TO A POINT OF COMPOUND CURVATURE, BEING BY SAID LAND OF COLONIAL SHOPPING CENTER, INC.; THENCE WESTERLY 234.26 FEET BY A CURVE TO THE LEFT OF 1121.09 FOOT RADIUS TO A POINT OF NON-TANGENCY, BY SAID LAND OF COLONIAL SHOPPING CENTER, INC.; THENCE N 26-07-16 E 132.80 FEET THENCE N 63-52-29 W 325.01 FEET THENCE S 85-47-56 E 169.05 FEET TO A POINT BY LAND NOW OR FORMERLY OF ANTHONY G. CARDILLO, JR., THE LAST 3 COURSES BEING BY LAND NOW OR FORMERLY OF STORAGE ACQUISITION WALTHAM WILLOW STREET, LLC; THENCE N 63-36-26 W 100.02 FEET BY LAND OF ANTHONY G. CARDILLO, JR., TO THE EASTERLY SIDE OF WILLOW STREET; THENCE N 26-44-06 E 185.87 FEET BY WILLOW STREET TO A POINT OF CURVATURE AT FOUNDRY AVENUE; THENCE EASTERLY 15.60 FEET BY A CURVE TO THE RIGHT OF 10.00 FOOT RADIUS TO A POINT OF NON-TANGENCY; THENCE S 63-52-04 E 454.36 FEET THE LAST TWO COURSES BEING BY THE SOUTHERLY SIDE OF FOUNDRY AVENUE; THENCE N26-07-56 E 40.00 FEET BY THE EASTERLY END OF FOUNDRY AVENUE; THENCE N 63-52-04 W 192.40 FEET BY THE NORTHERLY SIDE OF FOUNDRY AVENUE; THENCE N 26-17-50 E 293.83 FEET IN PART BY LAND NOW OR FORMERLY OF JOHN SOTTILE, IN PART BY LAND NOW OR FORMERLY OF NAVIENS LANE NOMINEE TRUST, IN PART BY THE EASTERLY END OF NAVIENS LANE, IN PART BY LAND NOW OR FORMERLY OF PAK CHAU CHAN AND CHAN VUONG AND IN PART BY LAND NOW OR FORMERLY OF ANJO REALTY TRUST; THENCE S 62-14-54 E 250.01 FEET TO A STONE BOUND; THENCE S 62-14-54 E 32.02 FEET THENCE S 63-59-24 E 8.00 FEET TO A STONE BOUND; THENCE S 64-11-52 E 316.29 FEET TO A STONE BOUND WITH DRILL HOLE; THENCE N 25-58-32 E 612.17 FEET TO THE SOUTHERLY SIDE OF THE 1971 LAYOUT OF GROVE STREET, THE LAST FIVE COURSES BEING BY LAND NOW

OR FORMERLY OF STANDARD THOMSON CORPORATION; THENCE S 67-07-36 E 516.92 FEET TO A POINT OF CURVATURE; THENCE EASTERLY 90.21 FEET BY A CURVE TO THE LEFT OF 1942.98 FOOT RADIUS TO A ROUNDING AT SEYON STREET, THE LAST TWO COURSES BEING BY GROVE STREET; THENCE EASTERLY AND SOUTHERLY 59.26 FEET BY A CURVE TO THE RIGHT OF 30.00 FOOT RADIUS BY SAID ROUNDING AT SEYON STREET TO THE WESTERLY SIDE OF SEYON STREET; THENCE S 43-23-26 W 753.60 FEET BY THE WESTERLY SIDE OF SEYON STREET; THENCE S 40-33-56 W 553.97 FEET TO THE POINT OF BEGINNING, THE LAST TWO COURSES BEING BY SEYON STREET.

SAID PARCEL CONTAINS 927,673 SQ. FT. OR 21.296 ACRES MORE OR LESS.

PROPERTY ADDRESS: 41 Seyon Street and 43 Foundry Street, Waltham, MA

Exhibit 21.1

SUBSIDIARIES OF THE REGISTRANT

Subsidiary Name	Subsidiary Jurisdiction
Repligen Sweden AB	Sweden
Repligen GmbH	Germany
Repligen Singapore Pte. Ltd.	Singapore
Repligen Europe B.V.	Netherlands
Repligen (Shanghai) Biotechnology Co. Ltd.	China
Repligen Japan LLC	Japan
Repligen India Private Limited	India
Repligen Korea Co. Ltd.	South Korea
Spectrum Lifesciences, LLC	United States
C Technologies, Inc.	United States

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statements (Form S-8 No. 333-224978) pertaining to the 2018 Stock Option and Incentive Plan of Repligen Corporation,

(2) Registration Statements (Form S-8 No. 333-196456) pertaining to the Amended and Restated 2012 Stock Option and Incentive Plan of Repligen Corporation,

(3) Registration Statements (Form S-8 No. 333-157168) pertaining to the Second Amended and Restated 2001 Stock Plan of Repligen Corporation, and

(4) Registration Statement (Form S-3 No. 333-231098) of Repligen Corporation

of our reports dated February 26, 2020 with respect to the consolidated financial statements of Repligen Corporation and the effectiveness of internal control over financial reporting of Repligen Corporation, included in this Annual Report (Form 10-K) of Repligen Corporation for the year ended December 31, 2019.

/s/ Ernst & Young LLP

Boston, Massachusetts
February 26, 2020

Exhibit 31.1

CERTIFICATION

I, Tony Hunt, certify that:

1. I have reviewed this Annual Report on Form 10-K 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: February 26, 2020

/s/ TONY J. HUNT

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

Exhibit 31.2

CERTIFICATION

I, Jon K. Snodgres, certify that:

1. I have reviewed this Annual Report on Form 10-K 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: February 26, 2020

/s/ JON K. SNODGRES

Jon K. 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 Annual Report of Repligen Corporation (the "Company") on Form 10-K for the period ending December 31, 2019 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.

This certification is being provided pursuant to 18 U.S.C. 1350 and is not to be deemed a part of the Report, nor is it to be deemed to be "filed" for any purpose whatsoever.

Date: February 26, 2020 By: /S/ TONY J. HUNT

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

Date: February 26, 2020 By: /S/ JON K. SNODGRES

Jon K. Snodgres
Chief Financial Officer
(Principal financial officer)