VERTEX PHARMACEUTICALS INC / MA

FORM 10-K
(Annual Report)

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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, 2016

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 000-19319

Vertex Pharmaceuticals Incorporated

(Exact name of registrant as specified in its charter)

Massachusetts	**04-3039129**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
50 Northern Avenue, Boston, Massachusetts	**02210**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code **(617) 341-6100**

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

Title of Each Class	**Name of Each Exchange on Which Registered**
Common Stock, $0.01 Par Value Per Share	The NASDAQ Global Select Market

Securities registered pursuant to Section 12(g) of the Exchange 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 Exchange Act. Yes ☐ No ☒

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

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of the registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10 K. ☒

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

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

(Do not check if a smaller reporting company)

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

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant (without admitting that any person whose shares are not included in such calculation is an affiliate) based on the last reported sale price of the common stock on June 30, 2016 (the last trading day of the registrant's second fiscal quarter of 2016) was $21.1 billion . As of February 10, 2017 , the registrant had 248,438,127 shares of common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement for the 2017 Annual Meeting of Shareholders to be held on June 8, 2017 are incorporated by reference into Part III of this Annual Report on Form 10-K.

VERTEX PHARMACEUTICALS INCORPORATED

ANNUAL REPORT ON FORM 10-K

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"We," "us," "Vertex" and the "Company" as used in this Annual Report on Form 10-K refer to Vertex Pharmaceuticals Incorporated, a Massachusetts corporation, and its subsidiaries.

PART I

ITEM 1. BUSINESS

OVERVIEW

We are in the business of discovering, developing, manufacturing and commercializing medicines for serious diseases. We use precision medicine approaches with the goal of creating transformative drugs for patients in specialty markets. Our business is focused on developing and commercializing therapies for the treatment of cystic fibrosis, or CF, and advancing our research and development programs in other indications, while maintaining our financial strength.

Cystic Fibrosis

Our two marketed medicines are ORKAMBI and KALYDECO, which together are approved to treat approximately 40% of the 75,000 CF patients in North America, Europe and Australia. ORKAMBI (lumacaftor in combination with ivacaftor) is approved as a treatment for approximately 25,000 patients who have two copies (homozygous) of the F508del mutation in their cystic fibrosis transmembrane conductance regulator, or *CFTR,* gene. KALYDECO (ivacaftor) is approved for the treatment of approximately 4,000 CF patients who have the G551D mutation or other specified mutations in their *CFTR* gene. Our goal is to develop treatment regimens that will provide benefits to as many patients with CF as possible and will enhance the benefits that currently are being provided to patients taking our medicines.

CF Development Programs

We have multiple development programs in the field of CF, including:

- Tezacaftor (VX-661) is a corrector compound that we are evaluating in a Phase 3 development program in combination with ivacaftor in multiple CF patient populations who have at least one copy of the F508del mutation in their *CFTR* gene. We expect data from this Phase 3 development program in the first half of 2017. If supported by data from the Phase 3 development program, we plan to submit a New Drug Application, or NDA, to the United States Food and Drug Administration, or FDA for tezacaftor in combination with ivacaftor in the second half of 2017.

- VX-152, VX-440, VX-659 and VX-445 are next-generation CFTR corrector compounds that we are evaluating as part of combination treatment regimens. We have initiated Phase 2 clinical trials of VX-152 and VX-440 and expect data from these clinical trials in the second half of 2017. We have initiated Phase 1 clinical trials of VX-659 and VX-445.

- VX-371 is an investigational epithelial sodium channel, or ENaC, inhibitor that is being evaluated in a Phase 2 development program and which we exclusively licensed from Parion Sciences, Inc., or Parion, in 2015.

Research and Development Programs

We are engaged in a number of other research and mid- and early-stage development programs, including programs in the areas of pain and neurology. We also have entered into third-party collaborations pursuant to which we are engaged in the discovery and development of nucleic acid-based therapies for a variety of diseases, including CF. We plan to continue investing in our research programs and fostering scientific innovation in order to identify and develop transformative medicines. Our current research programs include programs targeting cystic fibrosis, adrenoleukodystrophy, alpha-1 antritrypsin deficiency, sickle cell disease and polycystic kidney disease. We believe that pursuing research in diverse areas allows us to balance the risks inherent in drug development and may provide drug candidates that will form our pipeline in future years.

CYSTIC FIBROSIS

Background

CF is a rare, life-threatening genetic disease affecting approximately 75,000 people in North America, Europe and Australia. CF is caused by a defective or missing CFTR protein resulting from mutations in the *CFTR* gene. To develop CF, children must inherit two defective *CFTR* genes, which are referred to as alleles - one from each parent. There are more than 1,900 known mutations in the *CFTR* gene, some of which result in CF. The vast majority of patients with CF carry at least one of the two of the most prevalent mutations, the F508del mutation and the G551D mutation.

The F508del mutation results in a defect in the CFTR protein in which the CFTR protein does not reach the surface of cells in sufficient quantities. The G551D mutation results in a defect in the CFTR protein in which the defective CFTR protein reaches the surface of a cell but does not efficiently transport chloride ions across the cell membrane. The absence of working CFTR proteins results in poor flow of salt and water into and out of cells in a number of organs, including the lungs. As a result, thick, sticky mucus builds up and blocks the passages in many organs, leading to a variety of symptoms. In particular, mucus builds up and clogs the airways in the lungs, causing chronic lung infections and progressive lung damage. Ivacaftor, a CFTR potentiator, increases the open probability of the CFTR protein channels on the cell surface increasing the flow of salt and water into and out of the cell. CFTR correctors, such as lumacaftor, tezacaftor, VX-152, VX-440, VX-659 and VX-445 help CFTR proteins reach the cell surface. We believe that ENaC inhibitors, such as VX-371, may help maintain mucus hydration and accelerate pulmonary mucus clearance.

We use the brand name for our products when we refer to the product that has been approved and with respect to the indications on the approved label. Otherwise, including in discussions of our CF development programs, we refer to our compounds by their scientific (or generic) name.

ORKAMBI (lumacaftor in combination with ivacaftor)

ORKAMBI is an orally-administered combination therapy comprised of lumacaftor, a CFTR corrector, and ivacaftor, a CFTR potentiator, that is approved in the United States, European Union, Australia and Canada for the treatment of patients with CF twelve years of age and older who are homozygous for the F508del mutation in their *CFTR* gene. In the United States, ORKAMBI is also approved for the treatment of patients with CF six to eleven years of age who are homozygous for the F508del mutation in their *CFTR* gene.

In the fourth quarter of 2016, we announced the results of a Phase 3 clinical trial designed to support European approval of lumacaftor in combination with ivacaftor in patients with CF six to eleven years of age who are homozygous for the F508del mutation in their *CFTR* gene. The clinical trial met its primary endpoint of absolute change in lung clearance index, or $LCI_{2.5}$, through 24 weeks of treatment, demonstrating a statistically significant improvement in $LCI_{2.5}$ among patients treated with ORKAMBI compared to placebo. Based on these results, we plan to submit a Marketing Authorization Application, or MAA, line extension to the European Medicines Agency, or EMA, seeking approval of lumacaftor in combination with ivacaftor in this patient population in the European Union in the first half of 2017.

We are conducting a Phase 3 clinical trial for lumacaftor in combination with ivacaftor in patients with CF two to five years of age who are homozygous for the F508del mutation in their *CFTR* gene. We expect enrollment in the first part of this clinical trial to be complete in mid-2017. The first part of the two-part clinical trial is evaluating safety and pharmacokinetics to inform dose selection for the second part of the clinical trial. The primary endpoint of the second part of the clinical trial is safety and tolerability, with multiple efficacy measurements as secondary endpoints.

KALYDECO (ivacaftor)

KALYDECO (ivacaftor) is an orally-administered CFTR potentiator that is approved in the United States, European Union, Australia and Canada for the treatment of certain patients with CF who have specific mutations in their *CFTR* gene. In the United States, KALYDECO is approved for the treatment of patients with CF two years of age and older who have one of the following mutations in their *CFTR* gene: G551D, G178R, S549N, S549R, G551S, G1244E, S1251N, S1255P, G1349D and R117H. In the European Union, KALYDECO is approved for the treatment of patients with CF (i) two years of age and older who have one of the following mutations in their *CFTR* gene: G551D, G178R, S549N, S549R, G551S, G1244E, S1251N, S1255P and G1349D and (ii) eighteen years of age and older who have the R117H mutation in their *CFTR* gene.

We have initiated a Phase 3 clinical trial for ivacaftor in patients with CF less than two years of age to evaluate the effect of ivacaftor on markers of CF disease in young children. The clinical trial utilizes a weight-based dose of ivacaftor granules that can be mixed in soft foods or liquids. The clinical trial is enrolling patients with one of the ten *CFTR* gene mutations for which KALYDECO is currently approved.

Tezacaftor (VX-661) in Combination with Ivacaftor

Tezacaftor is an orally-administered CFTR corrector drug candidate that we are evaluating in a Phase 3 development program in combination with ivacaftor in multiple CF patient populations who have at least one copy of the F508del mutation in their CFTR gene. We expect data from this Phase 3 development program in the first half of 2017. If supported

by data from the Phase 3 development program, we plan to submit a NDA to the FDA for tezacaftor in combination with ivacaftor in the second half of 2017.

The ongoing clinical trials in this Phase 3 development program are:

- *Two copies of the F508del in their CFTR gene* : We have completed enrollment in this clinical trial and expect data from this clinical trial to be available in the first half of 2017;
- *One copy of the F508del mutation in their CFTR gene and a second mutation in their CFTR gene that results in residual CFTR function* : We have completed enrollment in this clinical trial and expect data from this clinical trial to be available in the first half of 2017; and
- *One copy of the F508del mutation in their CFTR gene and a second mutation in their CFTR gene that results in a gating defect in the CFTR protein* : We plan to complete enrollment in this clinical trial in the first half of 2017. Data from this clinical trial are not expected to be included in the initial regulatory applications for tezacaftor in combination with ivacaftor.

In the third quarter of 2016, we completed an interim futility analysis of efficacy data from the first part of a fourth clinical trial in patients with one copy of the F508del mutation in their *CFTR* gene and a second mutation that results in minimal CFTR function. The analysis showed that the combination of tezacaftor and ivacaftor did not result in a pre-specified improvement in lung function in this patient group. The independent Data Safety Monitoring Board, or DSMB, recommended that we stop the clinical trial and not initiate enrollment in the second part of this clinical trial. There were no safety concerns noted in the DSMB's review of the data. We subsequently reviewed the data and concurred with the DSMB's assessment. We have closed this clinical trial based on the recommendation of the DSMB. The planned NDA for tezacaftor in combination with ivacaftor will include safety data from this clinical trial.

In addition to evaluating the efficacy of the combination regimen, these Phase 3 clinical trials will provide safety data on the combination of tezacaftor and ivacaftor to support the planned development of a triple combination regimen that includes a next-generation corrector in combination with tezacaftor and ivacaftor.

In addition to the Phase 3 development program described above, we also are conducting a Phase 3 open-label clinical trial evaluating the safety and tolerability of tezacaftor in combination with ivacaftor in patients with CF six to eleven years of age who have either (i) two copies of the F508del mutation in their *CFTR* gene or (ii) one copy of the F508del mutation in their *CFTR* gene and a second mutation in their *CFTR* gene that has clinically demonstrated to be responsive to ivacaftor, including gating and residual function mutations.

Next-generation CFTR Corrector Compounds

We are developing next-generation CFTR corrector compounds that we plan to evaluate as part of triple combination treatment regimens. We have initiated Phase 2 clinical trials of:

- VX-440 to evaluate the safety and efficacy of four-week dosing of VX-440 in combination with tezacaftor and ivacaftor in approximately 40 patients with CF who have one copy of the F508del mutation in their *CFTR* gene and a second mutation that results in minimal CFTR function and approximately 25 patients with CF who have two copies of the F508del mutation in their *CFTR* gene; and
- VX-152 to evaluate the safety and efficacy of two-week dosing of VX-152 in combination with tezacaftor and ivacaftor in approximately 35 patients with CF who have one copy of the F508del mutation in their *CFTR* gene and a second mutation that results in minimal CFTR function and approximately 25 patients with CF who have two copies of the F508del mutation in their *CFTR* gene.

Data from these clinical trials are expected in the second half of 2017 and if successful, are intended to support the potential initiation of Phase 3 development of VX-440 and a longer-duration Phase 2b or registrational program for VX-152.

We have initiated a Phase 1 clinical trial of VX-659, an additional next-generation corrector, to evaluate single ascending doses, multiple ascending doses and triple combination dosing in healthy volunteers and will include an arm to evaluate triple combination dosing in patients with CF who have one copy of the F508del mutation in their *CFTR* gene and a second mutation that results in minimal CFTR function. This clinical trial is enrolling healthy volunteers, and we expect to begin

enrolling CF patients in this clinical trial in the first half of 2017. Dosing of a fourth next generation corrector, VX-445, began in the first quarter of 2017. Pending data from these Phase 1 clinical trials, we plan to begin Phase 2 development for one or both of these additional next-generation correctors in the second half of 2017.

ENaC Inhibition

In 2015, we entered into a collaboration with Parion to develop investigational ENaC inhibitors, including VX-371, for the potential treatment of CF and other pulmonary diseases. Preclinical evaluation in human bronchial epithelial, or HBE, cells from patients with CF who have two copies of the F508del mutation in their *CFTR* gene showed that the addition of VX-371 to lumacaftor in combination with ivacaftor resulted in an additional increase in both airway surface liquid and cilia beat frequency compared to baseline and to the use of VX-371 or lumacaftor in combination with ivacaftor alone. Improvements in airway surface liquid height and cilia beat frequency are believed to be measures of increased hydration of the cell surface.

In the second quarter of 2016, Parion completed a Phase 2 clinical trial in 142 patients with CF with no restriction on the mutations in their *CFTR* gene. The primary endpoint of the clinical trial was safety as compared to patients on placebo. Secondary endpoints evaluated the effect on mean absolute forced expiratory volume in one second, or FEV_1 and patient-reported respiratory symptoms as reported in the CF questionnaire-revised, or CFQ-R. The clinical trial met its primary safety endpoint and data from the clinical trial showed that VX-371 was generally well-tolerated. There were no statistically significant changes in FEV_1 or CFQ-R for patients who received VX-371.

In the first quarter of 2016, we initiated a Phase 2a clinical trial evaluating VX-371 in combination with ORKAMBI, both with and without the addition of hypertonic saline, in patients with CF twelve years of age and older who have two copies of the F508del mutation in their *CFTR* gene. The primary endpoints of this clinical trial are safety and mean absolute change from baseline in FEV_1 at day 28 as compared to patients on placebo. We expect data from this clinical trial to be available in the second half of 2017.

RESEARCH AND DEVELOPMENT PROGRAMS

Our approach to project selection and drug design aims to enhance our ability to discover and develop drug candidates by combining transformative insights into the causes of serious diseases with innovative approaches to therapeutics. Historically, our approach to drug discovery has focused on the research and development of small molecule drugs, which has been validated through our success in moving novel small molecule drug candidates into clinical trials and obtaining marketing approvals for ORKAMBI, KALYDECO and INCIVEK (telapravir). Recently, we have expanded our research capabilities to include additional innovative therapeutic approaches with a focus on nucleic acid-based therapies. We believe that attempting to identify multiple approaches to the treatment of diseases enhances our potential to develop treatment options that, either as monotherapies or combination therapies, are transformational in nature.

We focus our research activities on developing products that would be prescribed by specialist physicians for the treatment of rare or life-threatening diseases. We begin by applying our knowledge of human genetics and human biology and focus on validated targets that have shown a causal relationship with respect to serious diseases. We generate biological assays to query the underlying biology of disease and utilize clinical biomarkers as tools to predict clinical response. We leverage our expertise in assay automation, medicinal and process chemistry, modeling and informatics, drug metabolism and pharmacokinetics, toxicology, material sciences and formulation to develop, select and advance drug candidates that have the potential to offer transformative benefits and have an efficient path to approval. Our current research programs include programs targeting cystic fibrosis, pain, adrenoleukodystrophy, alpha-1 antritrypsin deficiency, sickle cell disease and polycystic kidney disease.

To augment our internal research programs, we seek to collaborate with biopharmaceutical and technology companies, leading academic research institutions, government laboratories, foundations and other organizations as needed to advance research in our areas of therapeutic interest as well as to access technologies needed to execute on our strategy. We have established such relationships with organizations around the world and intend to extend and leverage that experience to further our research efforts to discover transformational medicines for serious diseases.

In addition to our continuing research efforts in CF, our research and mid- and early-stage development programs currently include VX-371 for the treatment of primary ciliary dyskinesia, VX-150 for the treatment of pain and VX-210 for the treatment of acute cervical spinal cord injury. We are also collaborating with CRISPR Therapeutics AG, or CRISPR, on

the discovery and development of potential new treatments aimed at the underlying genetic causes of human diseases using CRISPR-Cas9 gene editing technology and Moderna Therapeutics, Inc., or Moderna, to identify and develop messenger ribonucleic acid, or mRNA, therapeutics for the treatment of CF.

COMMERCIAL ORGANIZATION

Our commercial organization focuses on supporting sales of ORKAMBI and KALYDECO in the markets where such products are approved. Our sales and marketing organizations are responsible for promoting products to health care providers and obtaining reimbursement for products from third-party payors, including governmental organizations in the United States and non-U.S. markets.

Our U.S. field-based CF commercial team is comprised of a small number of individuals whom we believe will be sufficient to support future needs. We focus our CF marketing efforts in the United States on a relatively small number of physicians and health care professionals who write most of the prescriptions for CF medicines. Many of these physicians and health care professionals are located at a limited number of accredited centers in the United States focused on the treatment of CF. In international markets, we have a small sales force that promotes KALYDECO and ORKAMBI in jurisdictions where these products are approved.

We market our products through personal interactions with individual physicians, advertising, sending direct mail, public relations activities and other activities. In addition, our government affairs and public policy group advocates for policies that promote life sciences innovation and increase awareness of the diseases on which we are focusing, with state and federal legislatures, government agencies, public health officials and other policy-makers. We also have established programs in the United States that provide our products to qualified uninsured or underinsured patients at no charge or at a reduced charge, based on specific eligibility criteria.

COLLABORATIONS

We have entered into collaborations with pharmaceutical and other companies and organizations that provide us financial and other resources, including capabilities in research, development, manufacturing and sales and marketing, and licenses to intellectual property. These collaborations have provided us with drug candidates and/or important financial and non-financial resources that have contributed to our products and a number of the drug candidates in our current development pipeline. We may seek to license or acquire drugs, drug candidates and other technologies that have the potential to add to our pipeline or to provide us with new commercial opportunities. In particular, we are focusing on drug candidates for the treatment of patients with CF and other third-party drug candidates that could be developed for specialty markets. Furthermore, we may seek collaborators to support, develop and/or commercialize some of our current drug candidates and/or additional drug candidates that may emerge from our research activities.

Cystic Fibrosis Foundation Therapeutics Incorporated

We began working with the Cystic Fibrosis Therapeutics Incorporated, or CFFT, in 1998. We entered into a collaboration agreement with CFFT in 2004 and have amended it several times to support research and development activities. Pursuant to the collaboration agreement, as amended, we have agreed to pay tiered royalties ranging from single digits to sub-teens on any approved drugs first synthesized and/or tested during a research term on or before February 28, 2014, including KALYDECO, ORKAMBI, lumacaftor and tezacaftor and royalties ranging from low single digits to mid-single digits on potential sales of certain compounds first synthesized and/or tested between March 1, 2014 and August 31, 2016. For combination products, such as ORKAMBI, sales are allocated equally to each of the active pharmaceutical ingredients in the combination product. Pursuant to an amendment entered into in the fourth quarter of 2016, the CFFT paid us an upfront program award of $75.0 million and agreed to provide development funding to us of up to $6.0 million annually.

For ivacaftor, lumacaftor and tezacaftor, we will have royalty obligations to CFFT until the expiration of patents covering that compound. We have patents in the United States and European Union covering the composition-of-matter of ivacaftor that expire in 2027 and 2025, respectively, subject to potential patent life extensions. We have patents in the United States and European Union covering the composition-of-matter of lumacaftor that expire in 2030 and 2026, respectively, subject to potential patent life extensions. We have patents in the United States and European Union covering the composition-of-matter of tezacaftor that expire in 2027 and 2028, respectively, subject to potential patent life extensions.

Parion Sciences, Inc.

In 2015, we entered into a strategic collaboration and license agreement with Parion pursuant to which we are collaborating with Parion to develop ENaC inhibitors, including VX-371 and VX-551, for the potential treatment of CF and other pulmonary diseases.

We are leading development activities for VX-371 and are responsible for all costs, subject to certain exceptions, related to its development and commercialization. We also will lead development activities for VX-551, which is in pre-clinical development. Under the terms of the agreement, we received worldwide development and commercial rights to VX-371 and VX-551 for the potential treatment of CF and all other pulmonary diseases and have the option to select additional compounds discovered in Parion's research program. Parion received an $80.0 million up-front payment and has the potential to receive up to an additional (i) $490.0 million in development and regulatory milestone payments for development of ENaC inhibitors in CF, including $360.0 million related to global filing and approval milestones, (ii) $370.0 million in development and regulatory milestones for VX-371 and VX-551 in non-CF pulmonary indications and (iii) $230.0 million in development and regulatory milestones if we elect to develop an additional ENaC inhibitor from Parion's research program. Parion will receive tiered royalties on potential sales of licensed products that range from the low double digits to mid-teens as a percentage of sales. In the second quarter of 2016, we paid Parion a $5.0 million development milestone related to VX-371.

We may terminate the agreement upon 90 days' notice to Parion prior to any licensed product receiving marketing approval or upon 180 days' notice after a licensed product has received marketing approval. Parion may terminate the agreement upon 30 days' notice if Vertex experiences a change of control prior to the initiation of the first Phase 3 clinical trial for a licensed product, subject to our right to receive specified royalties on any subsequent commercialization of licensed products. The agreement also may be terminated by either party for a material breach by the other, subject to notice and cure provisions. Unless earlier terminated, the agreement will continue in effect until the expiration of our royalty obligations, which expire on a country-by-country basis on the later of (i) the date the last-to-expire patent covering a licensed product expires or (ii) ten years after the first commercial sale in the country.

CRISPR Therapeutics AG

In 2015, we entered into a strategic collaboration, option and license agreement with CRISPR to collaborate on the discovery and development of potential new treatments aimed at the underlying genetic causes of human diseases using CRISPR-Cas9 gene editing technology. We have the exclusive right to license up to six CRISPR-Cas9-based targets. In connection with the CRISPR agreement, we paid CRISPR an upfront payment of $75.0 million and made a $30.0 million investment in CRISPR pursuant to a convertible loan agreement that converted into preferred stock in the first quarter of 2016. In the second quarter of 2016, we made an additional preferred stock investment in CRISPR of approximately $3.1 million. In connection with CRISPR's initial public offering in October 2016, we made an additional $10.0 million common share investment in CRISPR and our preferred stock investment in CRISPR converted into common shares.

We fund all of the discovery activities conducted pursuant to the agreement. For potential hemoglobinapathy treatments, including treatments for sickle cell disease, we share equally with CRISPR all research and development costs and worldwide revenues. For other targets that we elect to license, we would lead all development and global commercialization activities. For each of up to six targets that we elect to license, other than hemoglobinapathy targets, CRISPR has the potential to receive up to $420.0 million in development, regulatory and commercial milestones and royalties on net sales.

We may terminate the agreement upon 90 days' notice to CRISPR prior to any product receiving marketing approval or upon 270 days' notice after a product has received marketing approval. The agreement also may be terminated by either party for a material breach by the other, subject to notice and cure provisions. Unless earlier terminated, the agreement will continue in effect until the expiration of our payment obligations under the agreement.

Other Collaborations

Moderna Therapeutics, Inc.

In July 2016, we entered into a strategic collaboration and licensing agreement with Moderna pursuant to which the parties are seeking to identify and develop messenger ribonucleic acid, or mRNA, therapeutics for the treatment of CF. In connection with the Moderna agreement, we made an upfront payment to Moderna of $20.0 million and a $20.0 million investment in Moderna pursuant to a convertible promissory note that converted into preferred stock in August 2016.

Moderna has the potential to receive future development and regulatory milestones of up to $275.0 million, including $220.0 million in approval and reimbursement milestones, as well as tiered royalty payments on future sales.

Under the terms of the agreement, Moderna is leading discovery efforts and we are leading all preclinical, development and commercialization activities associated with the advancement of mRNA therapeutics that result from this collaboration and we will fund all expenses related to the collaboration.

We may terminate the agreement by providing advanced notice to Moderna, with the required length of notice dependent on whether any product developed under the agreement has received marketing approval. The agreement also may be terminated by either party for a material breach by the other, subject to notice and cure provisions. Unless earlier terminated, the agreement will continue in effect until the expiration of our payment obligations under the agreement.

BioAxone Biosciences, Inc.

In 2014, we entered into a license and collaboration agreement with BioAxone. Pursuant to this agreement, we are collaborating with BioAxone on the research, development and commercialization of VX-210 (formerly referred to as Cethrin), a Rho inhibitor controlled by BioAxone, for the treatment of patients who have spinal cord injuries.

We paid BioAxone initial payments of $10.0 million and BioAxone has the potential to receive up to $90.0 million in milestones and fees, including development and regulatory milestone payments and a license continuation fee. In addition, BioAxone would receive royalties and commercial milestones based on future net product sales, if any. We hold an option to purchase BioAxone at a predetermined price. The option expires on the earliest of (a) the day the FDA accepts a Biologics License Application submission for VX-210, (b) the day we elect to continue the license instead of exercising the option to purchase BioAxone and (c) March 15, 2018, subject to our option to extend this date by one year. We may terminate our agreement with BioAxone upon 90 days' notice or immediately if we determine that a licensed product is unsafe for administration to humans. The agreement also may be terminated by either party for a material breach by the other or by BioAxone for our inactivity with respect to VX-210, in each case subject to notice and cure provisions. Unless earlier terminated, the agreement will continue until the expiration of our royalty obligations.

Outlicense Arrangements

We have entered into various agreements pursuant to which we have outlicensed rights to certain drug candidates to third-party collaborators. Pursuant to these outlicense arrangements, our collaborators become responsible for all costs related to the continued development of such drug candidates and obtain development and commercialization rights to these drug candidates. Depending on the terms of the arrangements, our collaborators may be required to make upfront payments, milestone payments upon the achievement of certain product research and development objectives and/or pay royalties on future sales, if any, of commercial products resulting from the collaboration.

Merck KGaA

On January 10, 2017, we entered into a Strategic Collaboration and License Agreement with Merck KGaA, Darmstadt, Germany, or Merck KGaA. Pursuant to the agreement, we granted Merck KGaA an exclusive worldwide license to research, develop and commercialize four oncology research and development programs. Under the agreement, we granted Merck KGaA exclusive, worldwide rights to our two clinical-stage programs targeting DNA damage repair: our ataxia telangiectasia and Rad3-related protein inhibitor, or ATR program, including VX-970 and VX-803, and our DNA-dependent protein kinase inhibitor, or DNA-PK program, including VX-984. In addition, we granted Merck KGaA exclusive, worldwide rights to two pre-clinical programs.

Under the agreement, we will receive an up-front payment of $230.0 million. In addition, we will receive tiered royalties on potential sales of licensed products, calculated as a percentage of net sales, that range from (i) mid-single digits to mid-twenties for clinical-stage programs and (ii) mid-single digits to high single digits for the pre-clinical research programs. Merck KGaA will assume full responsibility for development and commercialization costs for all programs. The licenses granted pursuant to the agreement and the up-front payment are subject to the expiration of the waiting period under the Hart-Scott-Rodino Antitrust Improvements Act.

Merck KGaA may terminate the agreement or any individual program by providing 90 days' notice, or, in the case of termination of a program with a product that has received marketing approval, 180 days' notice. The agreement may also be

terminated by either party for a material breach by the other party, subject to notice and cure provisions. Unless earlier terminated, the agreement will continue in effect until the date on which the royalty term and all payment obligations with respect to all products in all countries have expired.

Janssen Pharmaceuticals, Inc.

In 2014, we entered into an agreement with Janssen Pharmaceuticals, Inc., or Janssen Inc. Pursuant to this agreement, Janssen Inc. has an exclusive worldwide license to develop and commercialize certain drug candidates for the treatment of influenza, including VX-787. We received non-refundable payments of $35.0 million from Janssen Inc. in 2014 and have the potential to receive development, regulatory and commercial milestone payments as well as royalties on future product sales, if any. Janssen Inc. is responsible for costs related to the development and commercialization of the compounds. Janssen Inc. may terminate the agreement, subject to certain exceptions, upon six months' notice.

INTELLECTUAL PROPERTY

We actively seek protection for our products and proprietary information by means of U.S. and foreign patents, trademarks and copyrights, as appropriate. In addition, we rely upon trade secret protection and contractual arrangements to protect certain of our proprietary information and products. We have patents and pending patent applications that relate to potential drug targets, compounds we are developing to modulate those targets, methods of making or using those compounds and proprietary elements of our drug discovery platform.

Much of our technology and many of our processes depend upon the knowledge, experience and skills of key scientific and technical personnel. To protect our rights to our proprietary know-how and technology, we require all employees, as well as our consultants and advisors when feasible, to enter into confidentiality agreements that require disclosure and assignment to us of ideas, developments, discoveries and inventions made by these employees, consultants and advisors in the course of their service to us.

While we have numerous issued patents and pending patent applications in our patent portfolio, we believe that the patents and patent applications in the United States and the European Union that are the most important to our business are those that claim the composition-of-matter of our drugs and drug candidates that have progressed at least into Phase 3 clinical trials. The following table sets forth the status of such primary patents and patent applications in the United States and the European Union covering the composition-of-matter of these drugs and drug candidates:

Drug/Drug Candidate	Status of United States Patent (Anticipated Expiration, Subject to Potential Extensions)	Status of European Union Patent (Anticipated Expiration, Subject to Potential Extensions)
Ivacaftor	Granted (2027)	Granted (2025)
Lumacaftor	Granted (2030)	Granted (2026)
Tezacaftor	Granted (2027)	Granted (2028)

We hold issued patents and pending patent applications in the United States, and in foreign countries we deem appropriate, claiming intellectual property developed as part of our research and development programs. In addition to the composition-of-matter patents and patent applications listed above, we hold or have exclusive licenses to the following intellectual property:

- U.S. and foreign patent applications covering CF potentiators, correctors and ENaC inhibitors, including ivacaftor, lumacaftor, tezacaftor, VX-371, VX-152, VX-440, VX-659 and VX-445 and many other related compounds, and the use of those potentiators, correctors and ENaC inhibitors to treat CF.
- U.S. and foreign patents and patent applications covering VX-150 and VX-241 and the use of VX-150 and VX-241 to treat pain indications.
- U.S. and foreign patents and patent applications covering VX-210 and the use of VX-210 to treat neurology indications.

- U.S. and foreign patents and patent applications covering the manufacture, pharmaceutical compositions, related solid forms, formulations, dosing regimens and methods of use of these compounds, including ivacaftor and lumacaftor.

We cannot be certain, however, that issued patents will be enforceable or provide adequate protection or that pending patent applications will result in issued patents.

From time to time we enter into non-exclusive license agreements for proprietary third-party technology used in connection with our research activities. These license agreements typically provide for the payment by us of a license fee, but may also include terms providing for milestone payments or royalties for the development and/or commercialization of our drug products arising from the related research.

Ivacaftor was granted orphan drug status in the United States and the European Union. We have a U.S. patent that covers the composition-of-matter of ivacaftor that we expect will provide intellectual property protection in the United States through its expiration date in 2027. We have a European patent that covers the composition-of-matter of ivacaftor that we expect will provide intellectual property protection in the European Union through its expiration date in 2025, subject to potential extension. We are entitled to orphan drug exclusivity for ivacaftor in the United States and the European Union, which means that the FDA may not approve another application to market ivacaftor for the same indication for a period of seven years following approval, and the EMA cannot accept an MAA for a drug similar to ivacaftor for a period of ten years following approval. As a result of the orphan drug exclusivity, even if a competitor successfully challenges the ivacaftor patents, it could not obtain approval from the FDA to market ivacaftor in the United States for the treatment of patients who have one of the mutations to the *CFTR* gene for which KALYDECO is currently approved until 2019, or submit an MAA in the European Union for the treatment of patients who have one of the mutations to the *CFTR* gene for which KALYDECO is currently approved until 2022, except in very limited circumstances.

Lumacaftor was granted orphan drug designation in the United States and the European Union and the fixed dose combination of lumacaftor and ivacaftor was granted orphan drug status in the United States. We have patents in the United States and European Union that cover the composition of matter of lumacaftor that we expect will provide intellectual property protection in these jurisdictions through their expiration dates in 2030 and 2026, respectively, subject to potential extension.

Tezacaftor was granted orphan drug designation in the United States and the European Union. We have patents in the United States and European Union that cover the composition of matter of tezacaftor that we expect will provide intellectual property protection in these jurisdictions through their expiration dates in 2027 and 2028, respectively, subject to potential extension.

MANUFACTURING

Manufacturing Approach and Philosophy

As we market and sell our approved products and advance our drug candidates through clinical development toward commercialization, we continue to build and maintain our supply chain and quality assurance resources. We rely on internal capabilities and an international network of third parties to manufacture and distribute our products for commercial sale and post-approval clinical trials and to manufacture and distribute our drug candidates for clinical trials. Wherever possible, we seek to establish multiple suppliers for each raw material and step in the manufacturing process, however our supply chain includes a single-source manufacturer for (i) one step in the ivacaftor manufacturing process and (ii) the manufacture of the oral granule formulation of KALYDECO that is used for patients with CF two to five years of age.

We expect that we will continue for the foreseeable future to rely on third parties to meet most of our commercial supply needs and a significant portion of our clinical supply needs. We have established our own small-scale manufacturing capabilities, which we use for clinical trial supplies and as an additional source for commercial supplies.

Our supply chain for sourcing raw materials and manufacturing drug product ready for distribution is a multi-step international endeavor. Third-party contract manufacturers, including some in China, supply us with raw materials, and convert these raw materials into drug substance, and convert the drug substance into final dosage form. Establishing and managing this global supply chain for each of our drugs and drug candidates requires a significant financial commitment and the creation and maintenance of numerous third-party contractual relationships.

We have developed systems and processes to track, monitor and oversee our third-party manufacturers' activities, including a quality assurance program intended to ensure that our third-party manufacturers comply with current Good Manufacturing Practices, or cGMP. We regularly evaluate the performance of our third-party manufacturers with the objective of confirming their continuing capabilities to meet our needs efficiently and economically. Manufacturing facilities, both foreign and domestic, are subject to inspections by or under the authority of the FDA and other U.S. and foreign government authorities.

Manufacture of KALYDECO (ivacaftor)

We obtain ivacaftor to meet our commercial and clinical supply needs through a third-party manufacturing network. A disruption in the commercial supply of KALYDECO would have a significant effect on patients, our business and our product revenues. A disruption in the clinical supply of ivacaftor could delay the completion of clinical trials and/or affect timelines for submitting regulatory filings.

Manufacture of ORKAMBI (lumacaftor/ivacaftor)

We have developed several manufacturing processes to produce commercial quantities of ORKAMBI, including a process utilizing continuous manufacturing technology as well as a batch manufacturing process. We have established manufacturing capabilities at our third-party manufacturer in the United Kingdom that is producing commercial quantities of ORKAMBI using a batch manufacturing process we designed. We have established continuous manufacturing capabilities and completed validation for these capabilities at our facility located in Boston, Massachusetts. While continuous process manufacturing has been used in many industries, we believe that we are the first company to obtain FDA approval for a fully-continuous drug product manufacturing process.

Manufacture of Tezacaftor/Ivacaftor

We are using both a batch manufacturing process and a continuous drug product manufacturing process to obtain a supply of tezacaftor tablets being used in our Phase 3 clinical trials of tezacaftor in combination with ivacaftor. If we successfully complete development and obtain approval for tezacaftor in combination with ivacaftor, we plan to produce our commercial supply of tezacaftor using a continuous drug product manufacturing process.

COMPETITION

The pharmaceutical industry is characterized by extensive research efforts, rapid technological progress and intense competition. There are many public and private companies, including pharmaceutical companies and biotechnology companies, engaged in developing products for the indications our drugs are approved to treat and the therapeutic areas we are targeting with our research and development activities. Potential competitors also include academic institutions, government agencies, other public and private research organizations and charitable venture philanthropy organizations that conduct research, seek patent protection and/or establish collaborative arrangements for research, development, manufacturing and commercialization. Many of our competitors have substantially greater financial, technical and human resources than we do. We face competition based on the safety and efficacy of our products and drug candidates, the timing and scope of regulatory approvals, the availability and cost of supply, marketing and sales capabilities, reimbursement coverage, price, patent protection and other factors. Our competitors may develop or commercialize more effective, safer or more affordable products than we are able to develop or commercialize or obtain more effective patent protection. As a result, our competitors may commercialize products more rapidly or effectively than we do, which would adversely affect our competitive position, the likelihood that our drug candidates, if approved, would achieve and maintain market acceptance and our ability to generate meaningful revenues from our products. Future competitive products may render our products, or future products, obsolete or noncompetitive.

Cystic Fibrosis

An increasing number of companies are seeking to identify and develop drug candidates for the treatment of CF, including companies such as Concert Pharmaceuticals, Galapagos NV in collaboration with Abbvie, Genzyme, which is a division of Sanofi, Novartis, Pfizer, ProQR Therapeutics, Proteostasis Therapeutics, PTC Therapeutics and several private companies. Although we are the first company to successfully develop drugs that treat the underlying cause of CF, ORKAMBI and KALYDECO are collectively approved to treat only a portion of patients with CF. Our competitors have research and development programs directed at identifying and developing CFTR potentiators, CFTR correctors, ENaC inhibitors and drug candidates with other mechanisms of action or that utilize new therapeutic approaches that seek to address

the underlying cause of CF. Our competitors are exploring the development of drug candidates both as monotherapies and as part of combination regimens. Our success in rapidly developing and commercializing KALYDECO and ORKAMBI may increase the resources that our competitors allocate to the development of these potential treatments for CF. If one or more competing therapies are successfully developed as a treatment for patients with CF, our revenues from ORKAMBI, KALYDECO and/or our other CF drug candidates, if then approved, could face significant competitive pressure.

GOVERNMENT REGULATION

The research, development, testing, manufacture, packaging, quality control, approval, labeling, packaging, storage, safety monitoring, record keeping, promotion, advertising, distribution import, export and marketing of our products and drug candidates are subject to extensive regulation by United States and foreign governmental authorities.

United States Government Regulation

New Drug Application Approval Processes

In the United States, the FDA regulates drugs, including small molecules, under the Federal Food, Drug and Cosmetic Act, or the FDCA, and implementing regulations. The process of obtaining regulatory approvals and the subsequent compliance with applicable federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the drug development process, approval process or after approval, may subject us to administrative or judicial sanctions, any of which could have a material adverse effect on us. These sanctions could include:

- refusal to approve or delay in review of pending applications;
- withdrawal of an approval or the implementation of limitations on a previously approved indication for use;
- imposition of a clinical hold, a risk mitigation and evaluation strategy or other safety-related limitations;
- warning letters or “untitled letters”;
- product seizures;
- total or partial suspension of production or distribution; or
- injunctions, fines, disgorgement, refusals of government contracts, or civil or criminal penalties.

The process required by the FDA before a drug may be marketed in the United States generally involves the following:

- completion of preclinical laboratory tests, animal studies and formulation studies conducted according to Good Laboratory Practices, or GLP, and other applicable regulations;
- submission to the FDA of an investigational new drug, or IND, application, which must become effective before clinical trials in the United States may begin;
- performance of adequate and well-controlled clinical trials according to Good Clinical Practices, or GCP, to establish the safety and efficacy of the proposed drug for its intended use;
- submission to the FDA of an NDA;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the product will be produced to assess compliance with cGMP to assure that the facilities, methods and controls are adequate to preserve the product’s identity, strength, quality and purity; and
- FDA review and approval of the NDA.

Once a drug candidate is identified for development, it enters the preclinical testing stage. Preclinical tests include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal pharmacology and toxicology studies. An IND sponsor must submit the results of the preclinical tests, together with manufacturing information and analytical data, to the FDA as part of the IND. Preclinical or nonclinical testing typically continues even after the IND is

submitted. In addition to including the results of the preclinical studies, the IND also will include a protocol detailing, among other things, the objectives of the initial clinical trial and the parameters to be used in monitoring safety. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, places the IND on clinical hold. If an IND is placed on clinical hold, the IND sponsor and the FDA must resolve any outstanding concerns before clinical trials can begin. A clinical hold may occur at any time during the life of an IND, and may affect one or more specific clinical trials or all clinical trials conducted under the IND.

All clinical trials must be conducted under the supervision of one or more qualified investigators in accordance with GCP. They must be conducted under protocols detailing the objectives of the trial, dosing procedures, subject selection and exclusion criteria and the safety and effectiveness criteria to be evaluated. Each protocol and any amendments must be submitted to the FDA as part of the IND, and progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently in other situations, including the occurrence of serious adverse events. An institutional review board, or IRB, at each institution participating in the clinical trial must review and approve the protocol and any amendments before a clinical trial commences or continues at that institution, approve the information regarding the clinical trial and the consent form that must be provided to each trial subject or his or her legal representative, and monitor the clinical trial until completed and otherwise comply with IRB regulations. Information about certain clinical trials must be submitted within specific timeframes to the National Institutes of Health for public dissemination on the www.clinicaltrials.gov website.

Clinical trials typically are conducted in three sequential phases that may overlap or be combined:

- *Phase 1.* The drug initially is introduced into healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution and elimination. In the case of some drug candidates for severe or life-threatening diseases, such as cancer, especially when the drug candidate may be inherently too toxic to ethically administer to healthy volunteers, the initial human testing is often conducted in patients.

- *Phase 2.* Clinical trials are initiated in a limited patient population intended to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the drug candidate for specific targeted diseases and to determine dosage tolerance and optimal dosage.

- *Phase 3.* Clinical trials are undertaken to further evaluate dosage, clinical efficacy and safety in an expanded patient population at geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk-benefit ratio of the drug candidate and provide an adequate basis for regulatory approval and product labeling.

Phase 1, Phase 2 and Phase 3 testing may not be completed successfully within any specified period, if at all. The FDA or the sponsor may suspend a clinical trial at any time for a variety of reasons, including a finding that the healthy volunteers or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug candidate has been associated with unexpected serious harm to healthy volunteers or patients.

We estimate that it generally takes 10 to 15 years, or possibly longer, to discover, develop and bring to market a new pharmaceutical product in the United States, as outlined below:

Phase	**Estimated Duration**
Discovery	2 to 4 years
Preclinical	1 to 2 years
Phase 1	1 to 2 years
Phase 2	2 to 4 years
Phase 3	2 to 4 years
FDA approval	8 months to 2 years

During the development of a new drug, sponsors are given opportunities to meet with the FDA at certain points. These points may be prior to submission of an IND, at the end of Phase 2 testing, and before an NDA is submitted. Meetings at other times may be requested. These meetings can provide an opportunity for the sponsor to share information about the data gathered to date, for the FDA to provide advice, and for the sponsor and FDA to reach agreement on the next phase of development. Sponsors typically use the end of Phase 2 meeting to discuss their Phase 2 clinical results and present their plans for the pivotal Phase 3 clinical trial that they believe will support approval of the drug candidate.

As part of the development process, companies usually complete animal safety studies and develop additional information about the chemistry and physical characteristics of the drug and finalize a process for manufacturing the product in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the drug candidate, and the manufacturer must develop methods for testing the quality, purity and potency of the final products. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the drug candidate does not undergo unacceptable deterioration over its shelf-life.

The results of drug development, preclinical studies and clinical trials, along with descriptions of the manufacturing process, analytical tests conducted on the chemistry of the drug candidate, proposed labeling and other relevant information are submitted to the FDA as part of an NDA requesting approval to market the drug candidate. The FDA reviews each NDA submitted to ensure that it is sufficiently complete for substantive review before it accepts it for filing. It may request additional information rather than accept an NDA for filing. The FDA has approximately two months to make a decision on whether to accept an NDA for filing.

Once the submission is accepted for filing, the FDA begins an in-depth review. The FDA may not approve an NDA if the applicable regulatory criteria are not satisfied or may require additional clinical or other data. Even if such data are submitted, the FDA may ultimately decide that the NDA does not satisfy the criteria for approval. The FDA reviews an NDA to determine, among other things, whether a drug candidate is safe and effective for its intended use and whether its manufacturing is cGMP-compliant to assure and preserve the drug candidate's identity, strength, quality and purity. The FDA may refer the NDA to an advisory committee for review and recommendation as to whether the NDA should be approved and under what conditions. The FDA is not bound by the recommendation of an advisory committee, but it generally follows such recommendations. Before approving an NDA, the FDA will inspect the facility or facilities where the drug candidate is manufactured and tested. Additionally, before approving an NDA, the FDA may inspect one or more clinical trial sites to assure compliance with GCP requirements.

The FDA may require, as a condition of approval, restricted distribution and use, enhanced labeling, special packaging or labeling, expedited reporting of certain adverse events, pre-approval of promotional materials, restrictions on direct-to-consumer advertising or commitments to conduct additional research post-approval. The FDA will issue a complete response letter if the agency decides not to approve the NDA in its present form. The complete response letter usually describes all of the specific deficiencies in the NDA identified by the FDA. If a complete response letter is issued, the applicant may either resubmit the NDA, addressing all of the deficiencies identified in the letter, or withdraw the application.

Biologics License Application Process

Certain of our drug candidates may be regulated by the FDA under the FDCA and the Public Health Service Act as biologics. Biologics can present special safety, efficacy and manufacturing challenges that may differ from those present in the regulation of small molecule drugs. As such, while similar to the NDA review process described above, in lieu of filing an NDA, biologics require the submission of a Biologics License Application, or BLA, and approval of such BLA by the FDA prior to being marketed in the U.S.

Expedited Review and Approval

The FDA has various programs, including Fast Track, priority review, and accelerated approval, that are intended to expedite or simplify the process for reviewing drug candidates, and/or provide for approval on the basis of surrogate endpoints. Even if a drug candidate qualifies for one or more of these programs, the FDA may later decide that the drug candidate no longer meets the conditions for qualification or that the time period for FDA review or approval will not be shortened. Generally, drug candidates that may be eligible for these programs are those for serious or life-threatening conditions, those with the potential to address unmet medical needs, and those that offer meaningful benefits over existing treatments. For example, Fast Track is a process designed to facilitate the development, and expedite the review of drug candidates to treat serious diseases and fill an unmet medical need. Priority review is designed to give drug candidates that offer significant improvements in safety or effectiveness or provide a treatment where no adequate therapy exists an initial review within six months after acceptance for filing, as compared to a standard review time of ten months after acceptance for filing. Although Fast Track and priority review do not affect the standards for approval, the FDA will attempt to facilitate early and frequent meetings with a sponsor of a Fast Track designated drug candidate and expedite review of the application for a drug candidate designated for priority review. Accelerated approval provides an earlier approval of drugs that treat serious diseases, and that fill an unmet medical need based on a surrogate endpoint, which is a laboratory measurement or

physical sign that the FDA determines is reasonably likely to predict a clinical benefit. As a condition of approval, the FDA may require that a sponsor of a product receiving accelerated approval perform post-marketing confirmatory clinical trials.

In July 2012, the Food and Drug Administration Safety and Innovation Act, or FDASIA, was enacted, amending the FDCA. As part of FDASIA, Congress created a drug designation called "Breakthrough Therapy." This designation is intended to facilitate expedited development and review of a compound which, alone or in combination with one or more other compounds, is intended to treat a serious or life-threatening disease or condition and for which preliminary clinical evidence indicates that the compound may demonstrate substantial clinical improvement over existing therapies. Breakthrough Therapy designation may be requested at the filing of, or as an amendment to, an IND based on criteria established by the FDA.

Actions identified in FDASIA that may expedite the development and review of a Breakthrough Therapy include, as appropriate: holding meetings with the sponsor and the review team throughout the development of the drug; involving senior managers and experienced review staff, as appropriate, in a collaborative, cross-disciplinary review; and assigning a cross-disciplinary project lead for the FDA review team to facilitate efficient review of the development program and serve as a scientific liaison between the review team and the sponsor.

Post-approval Requirements

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product may result in restrictions on the product or complete withdrawal of the product from the market. In addition, under the FDCA the sponsor of an approved drug in the United States may not promote that drug for unapproved, or off-label, uses, although a physician may prescribe a drug for an off-label use in accordance with the practice of medicine. After approval, some types of changes to the approved product, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further FDA review and approval. In addition, the FDA may require testing and surveillance programs to monitor the effect of approved products that have been commercialized, and the FDA has the power to prevent or limit further marketing of a product based on the results of these post-marketing programs.

Products manufactured or distributed by us pursuant to FDA approvals are subject to continuing regulation by the FDA, including, among other things:

- record-keeping requirements;
- reporting of adverse experiences with the product;
- providing the FDA with updated safety and efficacy information;
- drug sampling and distribution requirements;
- notifying the FDA and gaining its approval of specified manufacturing or labeling changes;
- complying with certain electronic records and signature requirements; and
- complying with FDA promotion and advertising requirements.

Drug manufacturers and other entities involved in the manufacture and distribution of approved products are required to register with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and some state agencies for compliance with cGMP and other laws.

We rely, and expect to continue to rely, on third parties for the production of our products. Future FDA and state inspections may identify compliance issues at the facilities of our contract manufacturers that may disrupt manufacture or distribution of our products, or require substantial resources to correct.

From time to time, new legislation is enacted that changes the statutory provisions governing the approval, manufacturing and marketing of products regulated by the FDA. In addition, FDA regulations and guidance often are revised or reinterpreted by the agency in ways that may significantly affect our business and our products. It is impossible to predict whether legislative changes will be enacted, or FDA regulations, guidance or interpretations changed.

Patent Term Restoration and Data Exclusivity

Depending upon the timing, duration and specifics of FDA approval of the use of our drugs, some of our United States patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent term restoration period is generally one-half the time between the later of the effective date of an IND or the issuance date of the patent, and the submission date of an NDA, plus the time between the submission date of an NDA and the approval of that application. Only one patent applicable to an approved product is eligible for the extension and the extension must be applied for prior to expiration of the patent. The United States Patent and Trademark Office, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we may apply for restorations of patent term for some of our currently owned or licensed patents to add patent life beyond their current expiration date, depending on the expected length of clinical trials and other factors involved in the submission of the relevant NDA.

Data exclusivity provisions under the FDCA also can delay the submission or the approval of certain applications. The FDCA provides a five-year period of non-patent data exclusivity within the United States to the first applicant to gain approval of an NDA for a new chemical entity. A product is a new chemical entity if the FDA has not previously approved any other new product containing the same active moiety, which is the molecule responsible for the action of the drug substance. During the data exclusivity period for a new chemical entity, the FDA may not accept for review an abbreviated new drug application, or ANDA, or a 505(b)(2) NDA submitted by another company for another version of such product where the applicant does not own or have a legal right of reference to all the data required for approval. However, an application may be submitted after four years if it contains a certification of patent invalidity or non-infringement. The FDCA also provides three years of data exclusivity for an NDA, 505(b)(2) NDA or supplement to an existing NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant are deemed by the FDA to be essential to the approval of the application, for example, for new indications, dosages, or strengths of an existing drug. This three-year exclusivity covers only the conditions associated with the new clinical investigations and does not prohibit the FDA from approving ANDAs for drugs containing the original active agent.

Pediatric Exclusivity

Section 505A of the FDCA, as amended by the FDA Amendments Act of 2007, provides for pediatric exclusivity which, if granted, provides for the attachment of an additional six months to the term of any existing regulatory exclusivity, including non-patent and orphan exclusivity. If the sponsor submits information requested in writing by the FDA, in the form of a written request, relating to the use of the drug in children and such information is accepted by FDA within the statutory time limits, whatever regulatory periods of exclusivity or patent protection covering the product are extended by six months. The FDA may not issue a written request for clinical trials on unapproved or approved indications or where it determines that information relating to the use of a drug in a pediatric population, or part of the pediatric population, may not produce health benefits in that population.

Exclusivity of Biologics

Biologics are entitled to exclusivity under the Biologics Price Competition and Innovation Act, which was passed as Title VII to the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act of 2010, which we refer to as the ACA. The law provides a pathway for approval of biosimilars following the expiration of 12 years of exclusivity for the innovator biologic plus any extension term for pediatrics as discussed above. Historically, a biologic approved under a BLA was not subject to the generic drug review and approval provisions of the FDCA. However, the ACA created a regulatory pathway for the abbreviated approval for biological products that are demonstrated to be "biosimilar" or "interchangeable" with an FDA-approved biological product. In order to meet the standard of interchangeability, a sponsor must demonstrate that the biosimilar product can be expected to produce the same clinical result as the reference product, and for a product that is administered more than once, that the risk of switching between the reference product and biosimilar product is not greater than the risk of maintaining the patient on the reference product. Such biosimilars would reference biological products approved in the United States. The law establishes a period of 12 years of data exclusivity for reference products, which protects the data in the original BLA by prohibiting sponsors of biosimilars from gaining FDA approval based in part on reference to data in the original BLA.

Foreign Regulation

In addition to regulations in the United States, we are subject to a variety of foreign regulations governing clinical trials and commercial sales and distribution of our products. Whether or not we obtain FDA approval for a drug candidate, we must obtain approval by the comparable regulatory authorities of foreign countries or economic areas, such as the European Union, before we can commence clinical trials or market products in those countries or areas. The approval process and requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary greatly from place to place, and the time may be longer or shorter than that required for FDA approval.

Under European Union regulatory systems, a company may submit marketing authorization applications either under a centralized or decentralized procedure. The centralized procedure, which is compulsory for medicines produced by biotechnology or those medicines intended to treat AIDS, cancer, neurodegenerative disorders, or diabetes and optional for those medicines that are highly innovative, provides for the grant of a single marketing authorization that is valid for all European Union member states. The decentralized procedure provides for approval by one or more "concerned" member states based on an assessment of an application performed by one member state, known as the "reference" member state. Under the decentralized approval procedure, an applicant submits an application, or dossier, and related materials to the reference member state and concerned member states. The reference member state prepares a draft assessment and drafts of the related materials within 120 days after receipt of a valid application. Within 90 days of receiving the reference member state's assessment report, each concerned member state must decide whether or not to approve the assessment report and related materials. If a member state does not recognize the marketing authorization, the disputed points are eventually referred to the European Commission, whose decision is binding on all member states.

Orphan Drug Designation

Under the Orphan Drug Act, the FDA may grant orphan drug designation to drug candidates intended to treat a rare disease or condition, which is generally a disease or condition that affects fewer than 200,000 people in the United States, or more than 200,000 people in the United States and for which there is no reasonable expectation that the cost of developing and making available in the United States a drug for this type of disease or condition will be recovered from sales in the United States for that drug. Orphan drug designation must be requested before submitting an NDA or BLA. After the FDA grants orphan drug designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in or shorten the duration of the regulatory review and approval process. KALYDECO, ORKAMBI and tezacaftor have been granted designation as orphan drugs by the FDA.

If a drug candidate that has orphan drug designation subsequently receives the first FDA approval for that drug for the disease for which it has such designation, the product is entitled to orphan drug exclusivity, which means that the FDA may not approve any other applications to market the same drug for the same indication, except in very limited circumstances, for seven years. Orphan drug exclusivity, however, also could block the approval of our drug candidates for seven years if a competitor first obtains approval of the same product as defined by the FDA or if our drug candidate is determined to be contained within the competitor's product for the same indication or disease.

As in the United States, we may apply for designation of a drug candidate as an orphan drug for the treatment of a specific indication in the European Union before the application for marketing authorization is made. Orphan drugs in Europe enjoy economic and marketing benefits, including up to 10 years of market exclusivity for the approved indication unless another applicant can show that its product is safer, more effective or otherwise clinically superior to the orphan-designated product.

The FDA and foreign regulators expect holders of exclusivity for orphan drugs, such as KALYDECO and ORKAMBI, to ensure the availability of sufficient quantities of their orphan drugs to meet the needs of patients. Failure to do so could result in the withdrawal of marketing exclusivity for the orphan drug.

Reimbursement

Sales of our products depend, to a large degree, on the extent to which our products will be covered by third-party payors, such as government health programs, commercial insurance and managed health care organizations. These third-party payors increasingly are reducing reimbursements for medical products and services. Additionally, the containment of health care costs has become a priority of federal and state governments, and the prices of drugs have been a focus in this effort. The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement and requirements for substitution of

generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could limit our revenues. Decreases in third-party reimbursement for a product or a decision by a third-party payor to not cover a product could reduce physician usage of the product.

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or the MMA, established the Medicare Part D program to provide a voluntary prescription drug benefit to Medicare beneficiaries. Under Part D, Medicare beneficiaries may enroll in prescription drug plans offered by private entities, which will provide coverage of outpatient prescription drugs. Unlike Medicare Part A and B, Part D coverage is not standardized. Part D prescription drug plan sponsors are not required to pay for all covered Part D drugs, and each drug plan can develop its own drug formulary that identifies which drugs it will cover and at what tier or level. However, Part D prescription drug formularies must include drugs within each therapeutic category and class of covered Part D drugs, though not necessarily all the drugs in each category or class. Any formulary used by a Part D prescription drug plan must be developed and reviewed by a pharmacy and therapeutic committee. Government payment for some of the costs of prescription drugs may increase demand for products for which we receive marketing approval. However, any negotiated prices for our products covered by a Part D prescription drug plan likely will be lower than the prices we might otherwise obtain. Moreover, 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 payment rates. Any reduction in payment that results from the MMA may result in a similar reduction in payments from non-governmental payors.

The American Recovery and Reinvestment Act of 2009 provides funding for the federal government to compare the effectiveness of different treatments for the same illness. A plan for the research will be developed by the Department of Health and Human Services, or HHS, the Agency for Healthcare Research and Quality and the National Institutes of Health, and periodic reports on the status of the research and related expenditures will be made to the U.S. Congress. Although the results of the comparative effectiveness studies are not intended to mandate coverage policies for public or private payors, it is not clear what effect, if any, the research will have on the sales of our products. It is possible that comparative effectiveness research demonstrating benefits of a competitor's product could adversely affect the sales of our products. If third-party payors do not consider our products to be cost-effective compared to other available therapies, they may not cover our products as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow us to sell our products on a profitable basis.

The ACA was enacted in March 2010 and is designed to expand coverage for the uninsured while at the same time containing overall health care costs. With regard to pharmaceutical products, among other things, the ACA is designed to expand and increase industry rebates for drugs covered under Medicaid programs, impose an annual fee on branded pharmaceutical manufacturers and make changes to the coverage requirements under the Medicare Part D program. The branded prescription drug fee is not tax deductible. We cannot predict all of the effects of the ACA on pharmaceutical companies as many of the ACA reforms require the promulgation of detailed regulations implementing the statutory provisions, which has not yet occurred.

In Europe and many other foreign countries, the success of ORKAMBI, KALYDECO and of any other drug candidates we may develop, depends largely on obtaining and maintaining government reimbursement, because in many foreign countries patients are unable to access prescription pharmaceutical products that are not reimbursed by their governments. Negotiating reimbursement rates in foreign countries can delay the commercialization of a pharmaceutical product and generally results in a reimbursement rate that is lower than the net price that companies can obtain for the same product in the United States.

In some countries, such as Germany and France, commercial sales of a new product can occasionally begin while the reimbursement rate that a company will receive is under discussion. In other countries, a company must complete the reimbursement discussions prior to the commencement of commercial sales of the pharmaceutical product. The requirements governing drug pricing vary widely from country to country. For example, the member states of the European Union can restrict the range of drugs for which their national health insurance systems provide reimbursement and to control the prices of drugs for human use. A member state may approve a specific price for the drug or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the drug on the market. Recently, many countries in the European Union have increased the amount of discounts required on pharmaceuticals and these efforts could continue as countries attempt to manage healthcare expenditures, especially in light of the severe fiscal and debt crises experienced by many countries in the European Union. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will provide for reimbursement of our products, or such countries may only provide

for reimbursement on terms that we do not deem adequate. Additionally, reimbursement discussions in ex-U.S. markets may take a significant period of time.

Other United States Regulations

Pharmaceutical companies also are subject to various federal and state laws pertaining to health care "fraud and abuse," including anti-kickback laws and false claims laws, and the reporting of payments to physicians and teaching hospitals.

Anti-kickback Laws

U.S. federal laws prohibit fraud and abuse involving state and federal health care programs, such as Medicare and Medicaid. These laws are interpreted broadly and enforced aggressively by various state and federal agencies, including the Centers for Medicare & Medicaid Services, or CMS, the Department of Justice, the Office of Inspector General for HHS and various state agencies. These anti-kickback laws prohibit, among other things, knowingly and willfully offering, paying, soliciting, receiving or providing remuneration, directly or indirectly, in exchange for or to induce either the referral of an individual, or the furnishing, arranging for or recommending of an item or service that is reimbursable, in whole or in part, by a federal health care program. Remuneration is broadly defined to include anything of value, such as, cash payments, gifts or gift certificates, discounts, or the furnishing of services, supplies or equipment. The anti-kickback laws are broad and prohibit many arrangements and practices that are lawful in businesses outside of the health care industry.

The penalties for violating the anti-kickback laws can be severe. The sanctions include criminal and civil penalties, and possible exclusion from the federal health care programs. Many states have adopted laws similar to the federal anti-kickback laws, and some apply to items and services reimbursable by any payor, including third-party payors.

State and Federal Prohibitions on False Claims

The federal False Claims Act imposes liability on any person or entity that, among other things, knowingly presents, or causes to be presented, a false or fraudulent claim for payment to the federal government. Under the False Claims Act, a person acts knowingly if he has actual knowledge of the information or acts in deliberate ignorance or in reckless disregard of the truth or falsity of the information. Specific intent to defraud is not required. Provisions of the False Claims Act allow a private individual to bring an action on behalf of the federal government and to share in any amounts paid by the defendant to the government in connection with the action. The number of filings under these provisions has increased significantly in recent years. When an entity is determined to have violated the False Claims Act, it may be required to pay up to three times the actual damages sustained by the government, plus civil penalties for each false claim. Conduct that violates the False Claims Act may also lead to exclusion from the federal health care programs. Given the number of claims likely to be at issue, potential damages under the False Claims Act for even a single inappropriate arrangement could be significant. In addition, various states have enacted similar laws modeled after the False Claims Act that apply to items and services reimbursed under Medicaid and other state health care programs, and, in several states, such laws apply to claims submitted to all payors.

Federal Prohibitions on Health Care Fraud and False Statements Related to Health Care Matters

Under the administrative simplification provisions of the Health Insurance Portability and Accountability Act of 1996, or HIPAA, and state laws there are numerous regulations for protecting the privacy and security of protected health information. Additional administrative simplification provisions created the following federal crimes: health care fraud, false statements relating to health care matters, theft or embezzlement in connection with a health benefit program and obstruction of criminal investigation of health care offenses. The health care fraud statute prohibits knowingly and willfully executing a scheme to defraud any health care benefit program, including a private insurer. The false statements statute prohibits knowingly and willfully falsifying, concealing, or covering up a material fact or making any materially false, fictitious, or fraudulent statement in connection with the delivery of or payment for health care benefits, items, or services. The theft or embezzlement statute prohibits knowingly and willfully embezzling, stealing or otherwise converting or misapplying the money or property of a health care benefit program. The obstruction of criminal investigations of health care offenses statute prohibits willfully preventing, obstructing, misleading or delaying the communication of information and records relating to a violation of a federal health care offense to a criminal investigator. A violation of any of these laws is a felony and may result in fines, or exclusion from the federal health care programs.

US Open Payments (formerly Physician Payment Sunshine Act)

Open Payments (commonly known as the Sunshine Act) is a federal program, required by the ACA, that requires pharmaceutical manufacturers to report annually to the Centers for Medicare and Medicaid Services payments or other transfers of value made by that entity to physicians and teaching hospitals. In February 2013, regulations were released that contain detailed guidance regarding the information that must be collected and reported. We were required to collect information regarding such payments starting in August 2013 and were required to begin reporting such information in March 2014. Over the next several years, we will need to continue to dedicate significant resources to enhance our systems and processes in order to comply with these regulations. Failure to comply with the reporting requirements could result in significant civil monetary penalties. Similar laws have been enacted or are under consideration in foreign jurisdictions, including France which has adopted the *Loi Bertrand* , or French Sunshine Act, which became effective in 2013.

The Foreign Corrupt Practices Act

The Foreign Corrupt Practices Act prohibits U.S. companies and their representatives from offering, promising, authorizing or making payments to foreign officials for the purpose of obtaining or retaining business abroad. In many countries, the health care professionals we regularly interact with may meet the definition of a foreign government official for purposes of the Foreign Corrupt Practices Act.

Other Regulations

In addition to the statutes and regulations described above, we also are subject to regulation in the United States under the Occupational Safety and Health Act, the Environmental Protection Act, the Toxic Substances Control Act, the Resource Conservation and Recovery Act and other federal, state, local and foreign statutes and regulations, now or hereafter in effect.

EMPLOYEES

As of December 31, 2016 , we had approximately 2,150 employees, as compared to approximately 1,950 employees as of December 31, 2015 . Of these employees, approximately 1,725 were based in the United States, approximately 350 were based in Europe and approximately 75 were based in Canada. In February 2017, we decided to consolidate our research activities into our Boston, Milton Park and San Diego locations and are in the process of closing our research site in Canada. Our scientific staff members have diversified experience and expertise in molecular and cell biology, genetics, biochemistry, synthetic organic chemistry, protein X-ray crystallography, protein nuclear magnetic resonance spectroscopy, microbiology, computational chemistry and computational biology, biophysical chemistry, medicinal chemistry, clinical pharmacology and clinical medicine. Our clinical development personnel have extensive expertise in designing and executing clinical trials. Employees in our commercial organization have extensive experience in selling and marketing pharmaceutical products as well as seeking reimbursement from government and third-party payors for pharmaceutical products. Our employees are not covered by a collective bargaining agreement, except for a small number of employees outside the U.S. Science magazine named Vertex as one of its top employers in the life sciences in each of the last five years. We consider our relations with our employees to be good.

OTHER MATTERS

Financial Information and Significant Customers

Financial information about (i) our net product revenues and other revenues generated in the principal geographic regions in which we operate and our significant customers is set forth in Note T, “Segment Information,” to our consolidated financial statements included in this Annual Report on Form 10-K, (ii) net income (loss) per share attributable to Vertex common shareholders and our total assets are provided in our consolidated financial statements included in this Annual Report on Form 10-K and (iii) our research and development expenses in each of the last three fiscal years and our deconsolidation of Alios as of December 31, 2014 is provided in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations.” A discussion of the risks attendant to our international operations is set forth in the “Risk Factors” section of this Annual Report on Form 10-K.

Information Available on the Internet

Our internet address is *www.vrtx.com.* Our annual reports on Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K, and all amendments to those reports, are available to you free of charge through the “Investors-SEC

Filings" section of our website as soon as reasonably practicable after those materials have been electronically filed with, or furnished to, the Securities and Exchange Commission.

Corporate Information

Vertex was incorporated in Massachusetts in 1989, and our principal executive offices are located at 50 Northern Avenue Boston, Massachusetts 02210.

DIRECTORS AND EXECUTIVE OFFICERS OF THE REGISTRANT

The names, ages and positions held by our executive officers and directors are as follows:

Name	Age	Position
Jeffrey M. Leiden, M.D., Ph.D.	61	Chairman of the Board, Chief Executive Officer and President
David Altshuler, M.D., Ph.D.	52	Executive Vice President, Global Research and Chief Scientific Officer
Stuart A. Arbuckle	51	Executive Vice President and Chief Commercial Officer
Jeffrey A. Chodakewitz, M.D.	61	Executive Vice President, Global Medicines Development and Medical Affairs, and Chief Medical Officer
Michael Parini, J.D.	42	Executive Vice President and Chief Legal and Administrative Officer
Amit K. Sachdev, J.D.	49	Executive Vice President, Chief Regulatory Officer and Chief of Staff to the CEO
Ian F. Smith	51	Executive Vice President, Chief Operating Officer and Chief Financial Officer
Paul M. Silva	51	Senior Vice President and Corporate Controller
Sangeeta M. Bhatia, M.D., Ph.D.	48	Director
Joshua S. Boger, Ph.D.	65	Director
Terrence C. Kearney	62	Director
Yuchun Lee	51	Director
Margaret G. McGlynn	57	Director
Bruce I. Sachs	57	Director
Elaine S. Ullian	69	Director
William Young	72	Director

Dr. Leiden is our Chairman, Chief Executive Officer and President. He has held the positions of Chief Executive Officer and President since February 2012 after joining us as CEO Designee in December 2011. He has been a member of our Board of Directors since July 2009, the Chairman of our Board of Directors since May 2012, and served as our lead independent director from October 2010 through December 2011. Dr. Leiden was a Managing Director at Clarus Ventures, a life sciences venture capital firm, from 2006 through January 2012. Dr. Leiden was President and Chief Operating Officer of Abbott Laboratories, Pharmaceuticals Products Group, and a member of the Board of Directors of Abbott Laboratories from 2001 to 2006. From 1987 to 2000, Dr. Leiden held several academic appointments, including the Rawson Professor of Medicine and Pathology and Chief of Cardiology and Director of the Cardiovascular Research Institute at the University of Chicago, the Elkan R. Blout Professor of Biological Sciences at the Harvard School of Public Health, and Professor of Medicine at Harvard Medical School. He is an elected member of both the American Academy of Arts and Sciences, and the Institute of Medicine of the National Academy of Sciences. Dr. Leiden is a senior advisor to Clarus Ventures. Dr. Leiden serves as a director of Quest Diagnostics Inc., a medical diagnostics company, and Massachusetts Mutual Life Insurance Company, an insurance company. Dr. Leiden was a director and the non-executive Vice Chairman of the board of Shire plc, a specialty biopharmaceutical company, from 2006 to January 2012. Dr. Leiden received his M.D., Ph.D. and B.A. degrees from the University of Chicago.

Dr. Altshuler has been our Executive Vice President, Global Research and Chief Scientific Officer since January 2015 and was a member of our Board of Directors from May 2012 through December 2014. Dr. Altshuler was one of four founding members of the Broad Institute, a research collaboration of Harvard, MIT, The Whitehead Institute and the Harvard Hospitals. He served as the Director of the Institute's Program in Medical and Population Genetics from 2003 through December 2014 and as the Institute's Deputy Director and Chief Academic Officer from 2009 through December 2014. Dr. Altshuler joined the faculty at Harvard Medical School and the Massachusetts General Hospital in 2000 and held the academic rank of Professor of Genetics and Medicine from 2008 through December 2014. He served as Adjunct Professor of Biology at MIT from 2012 through December 2014. Dr. Altshuler earned a B.S. from MIT, a Ph.D. from Harvard University and an M.D. from Harvard Medical School. Dr. Altshuler completed his clinical training in Internal Medicine, and in Endocrinology, Diabetes and Metabolism, at the Massachusetts General Hospital.

Mr. Arbuckle is our Executive Vice President and Chief Commercial Officer, a position he has held since September 2012. Prior to joining us, Mr. Arbuckle held multiple commercial leadership roles at Amgen, Inc., a 17,000 person biotechnology company, from July 2004 through August 2012. Mr. Arbuckle has worked in the biopharmaceuticals industry since 1986, including more than 15 years at GlaxoSmithKline plc, where he held sales and marketing roles of increasing responsibility for medicines aimed at treating respiratory, metabolic, musculoskeletal, cardiovascular and other diseases. He has served as a member of the Board of Directors of Cerulean Pharma, Inc. since June 2015. Mr. Arbuckle holds a BSc in pharmacology and physiology from the University of Leeds.

Dr. Chodakewitz is our Executive Vice President, Global Medicines Development and Medical Affairs and Chief Medical Officer. Dr. Chodakewitz joined Vertex as a Senior Vice President in January 2014 and became an Executive Vice President in October 2014. Prior to joining us, Dr. Chodakewitz spent more than 20 years at Merck & Co., Inc., where he held a variety of roles including Vice President of Clinical Research – Infectious Diseases & Vaccines, Vice President of Clinical Pharmacology/Early Stage Development, Senior Vice President of Late Stage Development, and Senior Vice President of Global Scientific Strategy (Infectious Diseases, Respiratory/Immunology). Prior to his tenure at Merck, he served as the Director of the HIV Outpatient Clinic at the Veterans Administration Medical Center in West Haven, Connecticut and held various academic positions at Yale University and New York University Schools of Medicine. Dr. Chodakewitz serves as a member of the Board of Directors of Tetraphase Pharmaceuticals, Inc., a pharmaceutical company. Dr. Chodakewitz holds B.S. in Biochemistry from Yale University, and an M.D. from the Yale University School of Medicine.

Mr. Parini is our Executive Vice President and Chief Legal and Administrative Officer, a position he has held since January 2017. From January 2016 to January 2017, he was our Executive Vice President and Chief Legal Officer. From 2004 until he joined Vertex, Mr. Parini served in various roles of increasing responsibility at Pfizer Inc., most recently as Senior Vice President and Associate General Counsel. Prior to Pfizer, Mr. Parini was an attorney at Akin, Gump, Strauss, Hauer & Feld, L.L.P. Mr. Parini holds a B.A. from Georgetown University and a J.D. from the Georgetown University Law Center.

Mr. Sachdev is our Executive Vice President, Chief Regulatory Officer and Chief of Staff to our CEO, a role he assumed in January 2017. He served as our Executive Vice President, Policy, Access and Value, from October 2014 through December 2016. In 2007, he joined us as a Senior Vice President, and has led our government affairs and public policy activities, as well as our patient advocacy programs. From 2010 through 2013 he established our first international commercial operations in Canada. Prior to joining us, Mr. Sachdev served as Executive Vice President, Health of the Biotechnology Industry Organization (BIO) and was the Deputy Commissioner for Policy at the FDA where he also served in several other senior positions within the FDA. Prior to the FDA, Mr. Sachdev served as Majority Counsel to the Committee on Energy and Commerce in the United States House of Representatives and practiced law at the Chemical Manufacturers Association, and subsequently at the law firm of Ropes & Gray LLP. Mr. Sachdev holds a B.S from Carnegie Mellon University, and a J.D. from Emory University School of Law.

Mr. Smith is our Executive Vice President, Chief Financial Officer and Chief Operating Officer, a role he assumed in January 2017. He was our Executive Vice President and Chief Financial Officer from February 2006 until January 2017, our Senior Vice President and Chief Financial Officer from November 2003 to February 2006, and our Vice President and Chief Financial Officer from October 2001 to November 2003. Prior to joining us, Mr. Smith served as a partner in the Life Science and Technology Practice Group of Ernst & Young LLP, an accounting firm, from 1999 to 2001. Mr. Smith initially joined Ernst & Young's U.K. firm in 1987, and then joined its Boston office in 1995. Mr. Smith has served as a member of the Boards of Directors of Acorda Therapeutics, Inc., a drug development company, since February 2007, and Infinity Pharmaceuticals, Inc., a drug development company, since May 2008. In August 2016, Mr. Smith joined the Board of Directors of Ophthotech Corporation, a biopharmaceutical company, and was also appointed to serve as Chairman of the Audit Committee of Ophthotech Corporation's Board. Mr. Smith holds a B.A. in accounting and finance from Manchester Metropolitan University, U.K., is a member of the American Institute of Certified Public Accountants and is a Chartered Accountant of England and Wales.

Mr. Silva is our Senior Vice President and Corporate Controller, a position he has held since April 2011. Mr. Silva joined us in August 2007 as Senior Director, Accounting Operations and was our Vice President and Corporate Controller from September 2008 through April 2011. Prior to joining us, he was the Vice President, Internal Reporting at Iron Mountain Incorporated from July 2006 until August 2007 and a consultant to Iron Mountain's financing department from April 2005 until July 2006. He was the Finance Director of the Bioscience Technologies Division of Thermo Electron Corporation from 2002 to April 2005. Mr. Silva holds a B.S. in accounting from Assumption College.

Dr. Bhatia has been a member of our Board of Directors since June 2015. Dr. Bhatia is a professor at the Massachusetts Institute of Technology, where she currently serves as the John J. and Dorothy Wilson Professor of Health Sciences & Technology/Electrical Engineering & Computer Science. Prior to joining the Massachusetts Institute of Technology in 2005, Dr. Bhatia was a professor of bioengineering and medicine at the University of California at San Diego from 1998 through 2005. Dr. Bhatia also is an investigator for the Howard Hughes Medical Institute, a member of the Department of Medicine at Brigham and Women's Hospital, a member of the Broad Institute and a member of the Koch Institute for Integrative Cancer Research. Dr. Bhatia holds an Sc.B. in biomedical engineering from Brown University, an S.M. and Ph.D. in Mechanical Engineering from the Massachusetts Institute of Technology and an M.D. from Harvard Medical School.

Dr. Boger is the founder of Vertex and has been a director since our inception in 1989. He was our Chief Executive Officer from 1992 through May 2009. He was our Chairman of our Board of Directors from 1997 until May 2006 and our President from our inception until December 2000, and from 2005 through February 2009. He was our Chief Scientific Officer from 1989 until May 1992. Prior to founding Vertex in 1989, Dr. Boger held the position of Senior Director of Basic Chemistry at Merck Sharp & Dohme Research Laboratories in Rahway, New Jersey, where he headed both the Department of Medicinal Chemistry of Immunology & Inflammation and the Department of Biophysical Chemistry. Dr. Boger holds a B.A. in chemistry and philosophy from Wesleyan University and M.S. and Ph.D. degrees in chemistry from Harvard University.

Mr. Kearney has been a member of our Board of Directors since May 2011. Mr. Kearney served as the Chief Operating Officer of Hospira, Inc., a specialty pharmaceutical and medication delivery company, from April 2006 to January 2011. From April 2004 to April 2006, he served as Hospira's Senior Vice President, Finance, and Chief Financial Officer, and he served as Acting Chief Financial Officer through August 2006. Mr. Kearney served as Vice President and Treasurer of Abbott Laboratories from 2001 to April 2004. From 1996 to 2001, Mr. Kearney was Divisional Vice President and Controller for Abbott's International Division. Mr. Kearney serves as a member of the Board of Directors at Acceleron Pharma Inc., a biopharmaceutical company, and AveXis, Inc., a gene therapy company, and served as a member of the Board of Directors at Innoviva, Inc. (formerly known as Theravance, Inc.), a royalty management company, until April 2016. He received his B.S. in biology from the University of Illinois and his M.B.A. from the University of Denver.

Mr. Lee has been a member of our Board of Directors since September 2012. Mr. Lee serves as an Executive in Residence (XIR) and Partner of General Catalyst Partners, a venture capital firm, positions he has held since April of 2013. Mr. Lee also serves as the Chief Executive Officer of Allego, Inc. and is Executive Chairman of Clarabridge, Inc. Mr. Lee was the Vice President of IBM's Enterprise Marketing Management Group from November 2010 through January 2013. Mr. Lee co-founded Unica Corporation, a provider of software and services used to automate marketing processes, in 1992, and was Unica's President and/or Chief Executive Officer from 1992 through November 2010, when Unica was acquired by IBM. From 1989 to 1992, Mr. Lee was a senior consultant at Digital Equipment Corporation, a supplier of general computing technology and consulting services. Mr. Lee holds a B.S. and an M.S. in electrical engineering and computer science from the Massachusetts Institute of Technology and an M.B.A. from Babson College.

Ms. McGlynn has been a member of our Board of Directors since May 2011. Ms. McGlynn served as the President and Chief Executive Officer of the International AIDS Vaccine Initiative, a global not-for-profit organization whose mission is to ensure the development of safe, effective and accessible HIV vaccines for use throughout the world, from July 2011 until September 2015. Ms. McGlynn served as President, Vaccines and Infectious Diseases of Merck & Co., Inc. from 2005 until 2009. Ms. McGlynn joined Merck in 1983 and served in a variety of marketing, sales and managed care roles. Ms. McGlynn serves as a member of the Board of Directors for Air Products and Chemicals, Inc., a company specializing in gases and chemicals for industrial uses, and Amicus Therapeutics, Inc., a biopharmaceutical company. She is also a member of the National Industrial Advisory Committee at the University at Buffalo School of Pharmacy and Pharmaceutical Sciences. Ms. McGlynn holds a B.S. in Pharmacy and an M.B.A. in Marketing from the State University of New York at Buffalo.

Mr. Sachs has been a member of our Board of Directors since 1998. Mr. Sachs is a General Partner at Charles River Ventures, a venture capital firm he joined in 1999. From 1998 to 1999, he served as Executive Vice President and General Manager of Ascend Communications, Inc. From 1997 until 1998, Mr. Sachs served as President and Chief Executive Officer of Stratus Computer, Inc. From 1995 to 1997, he served as Executive Vice President and General Manager of the Internet Telecom Business Group at Bay Networks, Inc. From 1993 to 1995, he served as President and Chief Executive Officer of Xylogics, Inc. Mr. Sachs holds a B.S.E.E. in electrical engineering from Bucknell University, an M.E.E. in electrical engineering from Cornell University, and an M.B.A. from Northeastern University.

Ms. Ullian has been a member of our Board of Directors since 1997. Ms. Ullian served as President and Chief Executive Officer of Boston Medical Center, a private, not-for-profit, 626-bed, academic medical center with a community-based focus,

from 1996 through January 2010. From 1994 to 1996, she served as President and Chief Executive Officer of Boston University Medical Center Hospital. From 1987 to 1994, Ms. Ullian served as President and Chief Executive Officer of Faulkner Hospital. She also serves as a director of Thermo Fisher Scientific Inc. and Hologic, Inc. Ms. Ullian holds a B.A. in political science from Tufts University and an M.P.H. from the University of Michigan.

Mr. Young has been a member of our Board of Directors since May 2014. Mr. Young is a Venture Partner at Clarus Ventures, a life sciences venture capital firm, which he joined in 2010. Prior to Clarus Ventures, Mr. Young served from 1999 until June 2009 as the Chairman and Chief Executive Officer of Monogram Biosciences, Inc., a biotechnology company acquired by Laboratory Corporation of America in June 2009. From 1980 to 1999, Mr. Young was employed at Genentech, Inc. in positions of increasing responsibility, including as Chief Operating Officer from 1997 to 1999, where he was responsible for all product development, manufacturing and commercial functions. Prior to joining Genentech, Mr. Young was with Eli Lilly & Co. for 14 years. Mr. Young currently serves as the Chairman of the Board of Directors of NanoString Technologies, Inc., and as a member of the Board of Directors of Theravance BioPharma Inc. Mr. Young retired from BioMarin Pharmaceutical Inc.'s Board of Directors in November 2015 and from Biogen's Board of Directors in June 2014. Mr. Young holds a B.S. in Chemical Engineering from Purdue University, an M.B.A. from Indiana University and an Honorary Doctorate in Engineering from Purdue University. Mr. Young was elected to the National Academy of Engineering in 1993 for his contributions to biotechnology.

ITEM 1A. RISK FACTORS

RISK FACTORS

Investing in our common stock involves a high degree of risk, and you should carefully consider the risks and uncertainties described below in addition to the other information included or incorporated by reference in this Annual Report on Form 10-K. If any of the following risks or uncertainties actually occurs, our business, financial condition or results of operations would likely suffer, possibly materially. In that case, the trading price of our common stock could decline.

Risks Related to Our Business

Our business and future revenues depend heavily on ORKAMBI net product revenues. If we are unable to increase our ORKAMBI net product revenues or if we do not meet the expectations of investors or public equity market analysts, our business will be materially harmed and the market price of our common stock would likely decline.

ORKAMBI was approved by the FDA in July 2015 and by the European Commission in November 2015, for the treatment of patients with CF twelve years of age and older who are homozygous for the F508del mutation in their CFTR gene. In September 2016, the FDA approved ORKAMBI for the treatment of patients with CF six to eleven years of age who are homozygous for the F508del mutation in their *CFTR* gene. Most of our ORKAMBI net product revenues have come from the United States and, except with respect to Germany, we have not recognized significant ex-U.S. net product revenues due to the time it takes to complete reimbursement discussions in many ex-U.S. countries. We have experienced challenges in the commercialization of ORKAMBI, including discontinuations by patients who had previously initiated treatment with ORKAMBI and a slower than anticipated launch in Germany. Our ability to increase ORKAMBI net product revenues will be dependent on:

- our ability to obtain, and the timing and terms of obtaining, reimbursement for ORKAMBI in ex-U.S. markets;
- the number of additional patients who begin treatment with ORKAMBI, including patients six to eleven years of age in the United States;
- the rate at which additional patients initiate treatment;
- the proportion of initiated patients who remain on treatment; and
- the compliance rate for patients who remain on treatment.

If we continue to experience challenges with the commercialization of ORKAMBI or if ORKAMBI were to become subject to problems such as safety or efficacy issues, the introduction or greater acceptance of competing products, changes in reimbursement policies of payors and other third parties, or adverse legal, administrative, regulatory or legislative developments, our ability to commercialize ORKAMBI would be impaired and our stock price would likely decline. Since the regulations that govern pricing, coverage and reimbursement for drugs vary widely from country to country, there is no assurance that coverage and reimbursement will be available outside of the United States and, even if it is available, the timing or the level of reimbursement may not be satisfactory. Adverse pricing limitations or a delay in obtaining coverage and reimbursement would decrease our future net product revenues and harm our business.

Our business is dependent on KALYDECO net product revenues and if we are unable to sustain our KALYDECO net product revenues, our business will be materially harmed and the market price of our common stock would decline .

KALYDECO net product revenues represented approximately 41% and 61% of our total revenues in 2016 and 2015, respectively, and we expect KALYDECO net product revenues to continue to represent a substantial portion of our total revenues in future periods. We are seeking to expand the label for KALYDECO and to increase the number of patients eligible and reimbursed for treatment with KALYDECO in the United States and ex-U.S. markets. We have initiated a clinical trial for ivacaftor in patients with CF less than two years of age to evaluate the effect of ivacaftor on markers of CF disease in young children. There can be no assurance that the data from this clinical trial will be sufficient to obtain approval for ivacaftor in this patient population. Additionally, in February 2016, we received a Complete Response Letter from the FDA regarding our sNDA for ivacaftor for patients with CF two years of age and older who have one of 23 residual function mutations. The FDA determined that it cannot approve the sNDA in its present form. While we have had discussions with

the FDA regarding the sNDA to determine an appropriate path forward, there can be no assurance that the outcome from these discussions will be sufficient to obtain approval for ivacaftor in this patient population.

If we are unable to sustain KALYDECO net products revenues for any reason, such as safety or efficacy issues, the introduction or greater acceptance of competing products, changes in reimbursement policies of payors and other third parties, or adverse legal, administrative, regulatory or legislative developments, our ability to commercialize KALYDECO would be impaired and our product revenues would decrease and our financial position and stock price would be materially harmed.

If we are unable to successfully develop additional drug candidates, and in particular tezacaftor in combination with ivacaftor and triple combination regimens including next-generation CFTR corrector compounds, our business will be materially harmed.

Our long-term success and revenue growth will depend upon our ability to successfully develop new products. We believe that a significant portion of the value attributed to our company by investors is based on the potential of the combination regimens that we are developing for the treatment of CF, including tezacaftor in combination with ivacaftor, which is Phase 3 development, and triple combination regimens that include our next-generation CFTR corrector compounds, including VX-152 and VX-440, each of which are in Phase 2 development, VX-659, which is in Phase 1 development, and VX-445, which we expect will enter Phase 1 development in the first quarter of 2017. Furthermore, our success will be dependent on our ability to successfully develop and ultimately commercialize drug candidates in therapeutic areas outside of CF, including drug candidates resulting from our internal research programs and drug candidates that have been or may in the future be licensed or acquired from third parties.

Drug development is inherently risky and we will be required to undertake additional clinical trials before such candidates become eligible for marketing approval. The results of clinical trials and findings from our nonclinical studies for these drug candidates, including toxicology findings in nonclinical studies conducted concurrently with clinical trials, could lead to abrupt changes in our development activities, including the possible cessation of development activities associated with a particular drug candidate or program. Many companies in the pharmaceutical and biotechnology industries, including our company, have suffered significant setbacks in later-stage clinical trials even after achieving promising results in earlier-stage clinical trials. Accordingly, the results from completed preclinical studies and clinical trials may not be replicated in later clinical trials, and ongoing clinical trials for our drug candidates may not be predictive of the results we may obtain in later-stage clinical trials or of the likelihood of approval of a drug candidate for commercial sale.

We expect data from our Phase 3 development program evaluating tezacaftor in combination with ivacaftor in the first half of 2017. If supported by data from the Phase 3 development program, we plan to submit an NDA to the FDA for tezacaftor in combination with ivacaftor in the second half of 2017. We expect to begin receiving data from clinical trials evaluating triple combination treatment regimens in the second half of 2017. If our ongoing or planned clinical trials for our drug candidates, are not successful, or if we fail to expand our pipeline outside of CF, our business will be materially harmed.

We have a history of incurring losses, and we cannot predict the extent of our future profitability.

We have incurred operating losses in each of the last three years. While our revenues have increased and our operating losses have decreased in each of the last three years, we have not achieved annual profitability on a GAAP basis. Our ability to achieve and sustain profitability depends on the extent to which we can continue to increase our revenue and control our costs in order to, among other things, counter any unforeseen difficulties, complications or other unknown factors that may impair future revenue or require additional expenditures. Our ability to increase our revenues is dependent on our ability to increase our sales of ORKAMBI, to maintain sales of KALYDECO and to develop and commercialize additional products. Our operating expenses may increase due to, among other factors, additional investments to support or accelerate our research and development activities, the expansion of our organization, and/or costs associated with business development activities, including costs to acquire assets or programs, integration costs and the costs to develop drug candidates that are acquired. Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to predict the extent of our future profitability or losses. If we are unable to increase sales of ORKAMBI, sustain sales of KALYDECO and develop additional products, we may not achieve and/or sustain profitability.

If our competitors bring drugs with superior product profiles to market, our drugs may not be competitive and our revenues could decline.

ORKAMBI, KALYDECO and any drugs that we develop in the future may not be able to compete effectively with marketed drugs or new drugs that may be developed by competitors. The risk of competition is specifically important to our company because substantially all of our revenues as well as our most advanced drug candidates are related to the treatment of patients with CF. There are many other companies developing drugs for the same indications that we are pursuing. In order to compete successfully in these areas, we must demonstrate improved safety, efficacy and/or tolerability, and ease of manufacturing, and gain and maintain market acceptance over competing drugs. Many of our competitors, including major pharmaceutical companies such as Abbvie, Bristol-Myers Squibb, Gilead, Johnson & Johnson, Merck, Merck KGaA, Novartis, Pfizer, Sanofi and Roche, possess substantially greater financial, technical and human resources than we possess. Potential competitors also include other public and private companies, academic institutions, government agencies, other public and private research organizations and charitable venture philanthropy organizations that conduct research, seek patent protection and/or establish collaborative arrangements for research, development, manufacturing and commercialization. As an example, in 2013 and 2014 we experienced a rapid decline in the number of patients being treated with INCIVEK, a product we previously marketed for the treatment of hepatitis C virus infection.

Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller and other early-stage companies also may prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These third parties compete with us in recruiting and retaining qualified scientific and management personnel, establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs.

A number of companies are seeking to identify and develop drug candidates for the treatment of CF, including Galapagos NV in collaboration with Abbvie, Concert Pharmaceuticals, Genzyme, which is a division of Sanofi, Novartis, Pfizer, ProQR Therapeutics, Proteostasis Therapeutics, PTC Therapeutics and several private companies. Our competitors have research and development programs directed at identifying CFTR potentiators, CFTR correctors, ENaC inhibitors and drug candidates with other mechanisms of action or that utilize new therapeutic approaches that seek to address the underlying cause of CF. Our success in rapidly developing and commercializing ORKAMBI and KALYDECO may increase the resources that our competitors allocate to the development of these potential treatments for CF. Our competitors are exploring the development of drug candidates both as monotherapies and as part of combination regimens. If one or more competing therapies are successfully developed as a treatment for patients with CF, our revenues from ORKAMBI, KALYDECO and/or other compounds, if then approved, could face competitive pressures. If one or more competing therapies prove to be superior to our existing products and/or drug candidates for the treatment of CF, our business would be materially adversely affected.

If we discover safety issues with any of our products or if we fail to comply with continuing U.S. and applicable foreign regulations, commercialization efforts for the product could be negatively affected, the approved product could lose its approval or sales could be suspended, and our business could be materially harmed.

Our products are subject to continuing regulatory oversight, including the review of additional safety information. Drugs are more widely used by patients once approval has been obtained and therefore side-effects and other problems may be observed after approval that were not seen or anticipated, or were not as prevalent or severe, during pre-approval clinical trials or nonclinical studies. The subsequent discovery of previously unknown problems with a product could negatively affect commercial sales of the product, result in restrictions on the product or lead to the withdrawal of the product from the market. Each of our two commercial products and our most advanced drug candidates, contain ivacaftor, either alone or in combination with one or more other compounds. As a result, if either of our products were to experience safety issues, both ORKAMBI and KALYDECO, as well as one or more of our drug candidates, may be adversely affected. The reporting of adverse safety events involving our products or public speculation about such events could cause our stock price to decline or experience periods of volatility.

If we or our collaborators fail to comply with applicable continuing regulatory requirements, we or our collaborators may be subject to fines, suspension or withdrawal of regulatory approvals for specific products, product recalls and seizures, operating restrictions and/or criminal prosecutions. In addition, the manufacturers we engage to make our products and the manufacturing facilities in which our products are made are subject to periodic review and inspection by the FDA and foreign regulatory authorities. If problems are identified during the review or inspection of these manufacturers or manufacturing

facilities, it could result in our inability to use the facility to make our product or a determination that inventories are not safe for commercial sale.

If physicians and patients do not accept our drugs, or if patients do not remain on treatment or comply with the prescribed dosing regimen, our product revenues would be materially harmed in future periods.

Our drugs may not gain or maintain market acceptance among physicians and patients. Effectively marketing our drugs and any of our drug candidates, if approved, requires substantial efforts, both prior to launch and after approval. Physicians may elect not to prescribe our drugs, and patients may elect not to take them or may discontinue use of our drugs after initiation of treatment, for a variety of reasons including:

- prevalence and severity of adverse side-effects;
- lack of reimbursement availability from third-party payors;
- lower demonstrated efficacy, safety and/or tolerability compared to alternative treatment methods;
- lack of cost-effectiveness;
- a decision to wait for the approval of other therapies in development that have significant perceived advantages over our drug;
- convenience and ease of administration;
- other potential advantages of alternative treatment methods; and
- ineffective sales, marketing and/or distribution support.

For example, our net product revenues from ORKAMBI during 2016 were affected by discontinuations by patients who had previously initiated treatment with ORKAMBI. If the discontinuation rate for ORKAMBI or any of our other drug products increases, or if our drugs otherwise fail to achieve or maintain market acceptance, we may not be able to generate significant revenues in future periods.

Government and other third-party payors seek to contain costs of health care through legislative and other means. If they fail to provide coverage and adequate reimbursement rates for our products, our revenues will be harmed.

In both domestic and foreign markets, our sales of products depend in part upon the availability of reimbursement from third-party payors. Third-party payors include government health programs such as Medicare and Medicaid in the United States and the national health care systems in many international markets, managed care providers, private health insurers and other organizations. The trend in the health care industry is cost containment and efforts of third-party payors to contain or reduce health care costs that may adversely affect our ability to establish or maintain appropriate prices for our products or any drugs that we may develop and commercialize. In most ex-U.S. markets, pricing or profitability of therapeutic and other pharmaceutical products is subject to governmental control and such government authorities are increasingly attempting to limit or regulate the price of drug products, particularly under recent global economic pressures and geopolitical uncertainty particularly in Europe. Reimbursement agencies in Europe are often more conservative than those in the United States and the reimbursement process is often slower since reimbursement decisions are made on a country-by-country basis. In the United States, there have been, and we expect that there will continue to be, a number of federal and state proposals to implement similar governmental control as currently exists in Europe. The ACA requires discounts under the Medicare drug benefit program and increased the rebates paid by pharmaceutical companies on drugs covered by Medicaid. The ACA also imposes an annual fee, which increases annually, on sales by branded pharmaceutical manufacturers.

In addition, third-party payors attempt to contain health care costs by demanding price discounts or rebates and limiting both the types and variety of drugs that they will cover and the amounts that they will pay for drugs. As a result, they may not cover or provide adequate payment for our products. We might need to conduct post-marketing studies in order to demonstrate the cost-effectiveness of our products or any other future products to such payors' satisfaction. Such studies might require us to commit a significant amount of management's time and our financial and other resources. Our products might not ultimately be considered cost-effective. Adequate third-party reimbursement might not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

Reimbursement rates vary according to the use of the drug and the clinical setting in which it is used, may be based on payments allowed for lower-cost products that already are reimbursed, may be incorporated into existing payments for other products or services and may reflect budgetary constraints and/or imperfections in the data used to calculate these rates. Net prices for products are reduced by mandatory discounts or rebates required by government health care programs and privately-negotiated discounts. While we have implemented policies in an effort to comply with mandated reimbursement rates, the U.S. federal government, state governments and private payors frequently pursue actions against pharmaceutical and biotechnology companies alleging that the companies have overstated prices in order to inflate reimbursement rates. Any such action could adversely affect the pricing of and revenues from our products.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory proposals and initiatives to change the health care system in ways that could affect our ability to sell products. For example the ACA was enacted under the prior U.S. administration, and there is significant uncertainty regarding changes in the laws and regulations applicable to the health care system that may be made under the new administration, and, in particular, the effect any such changes may have on our business. Some of these proposed and implemented reforms have resulted, or could result, in reduced reimbursement rates and/or more limited access for our current or future products, which would adversely affect our business, operations and financial results.

Specialty pharmaceuticals are drugs that are prescribed by specialist physicians to treat rare or life-threatening conditions and typically address smaller patient populations. Each of ORKAMBI and KALYDECO is a specialty pharmaceutical product and our research and development programs are primarily focused on developing additional specialty pharmaceutical products. The increasing availability and use of innovative specialty pharmaceuticals, combined with their relative higher cost as compared to other types of pharmaceutical products, is beginning to generate significant third-party payor interest in developing cost-containment strategies targeted to this sector. Government regulations in both non-U.S. and U.S. markets could limit the prices that can be charged for our products and may limit our commercial opportunity. The increasing use of health technology assessments in markets around the world and the financial challenges faced by many governments may lead to significant adverse effects on our business.

Any legislation or regulatory changes or relaxation of laws that restrict imports of drugs from other countries also could reduce the net price we receive for our products.

If regulatory authorities interpret any of our conduct, including our marketing practices, as being in violation of applicable health care laws, including fraud and abuse laws, laws prohibiting off-label promotion, disclosure laws or other similar laws, we may be subject to civil or criminal penalties.

We are subject to health care fraud and abuse laws, such as the federal False Claims Act and the anti-kickback provisions of the federal Social Security Act, laws prohibiting off-label product promotion and other similar laws and regulations both in United States and in non-U.S. markets. While we have a corporate compliance program designed to actively identify, prevent and mitigate risk through the implementation of compliance policies and systems and the promotion of a culture of compliance, if we are found not to be in full compliance with these laws our business could be materially harmed.

The federal anti-kickback law prohibits knowingly and willfully offering, paying, soliciting, receiving or providing remuneration, directly or indirectly, in exchange for or to induce either the referral of an individual, or the ordering, furnishing, arranging for or recommending of an item or service that is reimbursable, in whole or in part, by a federal health care program, such as Medicare or Medicaid. The federal statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, patients, purchasers and formulary managers on the other hand, and therefore constrains our marketing practices and our various service arrangements with physicians, including physicians who make clinical decisions to use our products. Although there are a number of statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution, the exemptions and safe harbors are drawn narrowly and have been interpreted by courts as such.

Federal false claims laws prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to get a false claim paid. Pharmaceutical companies have been prosecuted under these laws for a variety of alleged promotional and marketing activities, such as providing free product to customers with the expectation that the customers would bill federal programs for the product; reporting to pricing services inflated average wholesale prices that were then used by federal programs to set reimbursement rates; engaging in promotion for uses that the FDA has not approved, known as “off-label” uses, that caused claims to be submitted to Medicaid for non-covered off-label uses; submitting inflated “best price” information to the

Medicaid Rebate Program; and certain manufacturing-related violations. The scope of this and other laws may expand in ways that make compliance more difficult and expensive.

Although physicians are permitted, based on their medical judgment, to prescribe products for indications other than those approved by the FDA, manufacturers are prohibited from promoting their products for such off-label uses. We market ORKAMBI and KALYDECO to eligible CF patients for whom the applicable product has been approved and provide promotional materials and training programs to physicians regarding the use of ORKAMBI and KALYDECO in these patient populations. These eligible patients represent only a portion of the total patients with CF. If the FDA determines that our promotional materials, training or other activities constitute off-label promotion, it could request that we modify our training or promotional materials or other activities, conduct corrective advertising or subject us to regulatory enforcement actions, including the issuance of a warning letter, injunction, seizure, civil fine and criminal penalties. It also is possible that other federal, state or foreign enforcement authorities might take action if they believe that the alleged improper promotion led to the submission and payment of claims for an off-label use, which could result in significant fines or penalties under other statutory authorities, such as laws prohibiting false claims for reimbursement. Even if it is later determined we were not in violation of these laws, we may be faced with negative publicity, incur significant expenses defending our actions and have to divert significant management resources from other matters.

Also applicable to some of our practices is the Health Insurance Portability and Accountability Act, or HIPAA, and its implementing regulations, which created federal criminal laws that prohibit executing a scheme to defraud any health care benefit program or making false statements relating to health care matters and which also imposes certain regulatory and contractual requirements regarding the privacy, security and transmission of individually identifiable health information. In addition, the ACA includes various provisions designed to strengthen significantly fraud and abuse enforcement, such as increased funding for enforcement efforts and the lowering of the intent requirement of the federal anti-kickback statute and criminal health care fraud statute such that a person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it.

In recent years, legislation has been adopted at the federal, state and local level requiring pharmaceutical companies to establish marketing compliance programs, file periodic reports or make periodic public disclosures on sales, marketing, pricing, clinical trials, health care provider payments and other activities. For example, as part of the ACA, the federal government enacted the Open Payments (commonly known as the Sunshine Act) provisions. Open Payments requires pharmaceutical manufacturers to report annually to the Centers for Medicare and Medicaid Services payments or other transfers of value made by that entity to physicians and teaching hospitals. We also now have similar reporting obligations throughout the European Union. We expended significant efforts to establish, and are continuing to devote significant resources to maintain and enhance, systems and processes in order to comply with these regulations. Failure to comply with the reporting requirements would result in significant civil monetary penalties.

The sales and marketing practices of our industry have been the subject of increased scrutiny from governmental entities in the United Sates and other countries in which we market our products, and we believe that this trend will continue. The risk of our being found in violation of these laws is increased by the fact that many of them have not been fully interpreted by the regulatory authorities or the courts, and their provisions are subject to a variety of interpretations. If our past or present operations are found to be in violation of any such laws or any other governmental regulations that may apply to us, we may be subject to penalties, including civil and criminal penalties, damages, fines, exclusion from federal health care programs and/or the curtailment or restructuring of our operations. Any action against us for violation of these laws, even if we successfully defend against them, also could cause us to incur significant legal expenses and divert our management's attention from the operation of our business.

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, including HIPAA, which among other things, imposes certain requirements relating to the privacy, security and transmission of individually identifiable health information. In addition to HIPAA, 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 and disclosure of personal information. Various foreign countries also have, or are developing, laws governing the collection, use and 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. We have in the past relied on adherence to the U.S.-EU Safe Harbor Framework as agreed to and set forth by the U.S. Department of Commerce and the European Union, which established a means for legitimizing the transfer of personal information by U.S. companies doing business in Europe from the European Economic Area to the United States. As a result of a 2015 opinion of the European Union Court of Justice, the U.S.-EU Safe Harbor Framework was deemed to be an invalid method of compliance with restrictions regarding the transfer of data outside of the European Economic Area. In response to the invalidation of the U.S.-EU Safe Harbor Framework, we have utilized other sanctioned approaches for transferring personal information from the European Union to the United States, such as standard contractual clauses that have been approved by the European Commission. While we continue to address the implications of changes to European Union 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 European Union and the potential for significant penalties if we are found to be non-compliant. 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.

On January 1, 2015, the EMA adopted a new policy on publication of clinical data whereby it will publish clinical reports submitted as part of MAAs for drugs. The policy applies to all clinical reports submitted after January 1, 2015 and the reports will be released as soon as a decision on the application has been made by the EMA. While implementation of this policy is ongoing and its full effect on our business is not yet known, the ability of third-parties to review and/or analyze the raw data from our clinical trials may increase the risk of patient confidentiality breaches and could result in enhanced scrutiny of our clinical trials results. Such scrutiny could result in misconceptions being spread about our drugs and drug candidates, even if the underlying analysis of such review turns out to be flawed. These publications could also result in the disclosure of information to our competitors that we might otherwise deem confidential, which could harm our competitive position.

The increasing use of social media platforms presents risks and challenges.

Social media increasingly is being used by third parties to communicate about our products and drug candidates and the diseases our therapies are designed to treat. We believe that members of the CF community may be more active on social media as compared to other patient populations due to the demographics of this patient population. Social media practices in the pharmaceutical and biotechnology industries are evolving, which creates uncertainty and risk of noncompliance with regulations applicable to our business. For example, patients may use social media platforms to comment on the effectiveness of, or adverse experiences with, a drug or a drug candidate, which could result in reporting obligations. In addition, there is a risk of inappropriate disclosure of sensitive information or negative or inaccurate posts or comments about us on any social networking website. If any of these events were to occur or we otherwise fail to comply with applicable regulations, we could incur liability, face restrictive regulatory actions or incur other harm to our business.

Risks Related to Development, Clinical Testing and Regulation of Our Products and Drug Candidates

Our drug candidates remain subject to clinical testing and regulatory approval. If we are unable to successfully develop additional drug candidates, and in particular tezacaftor in combination with ivacaftor and triple combination regiments including next-generation CFTR corrector compounds, our business will be materially harmed.

Our business depends upon the successful development and commercialization of drug candidates. These drug candidates are in various stages of development and must satisfy rigorous standards of safety and efficacy before they can be approved for sale by the FDA or comparable foreign regulatory authorities. To satisfy these standards, we must allocate resources among our various development programs and must engage in expensive and lengthy testing of our drug candidates. Discovery and development efforts for new pharmaceutical products, including new combination therapies, are resource-intensive and may take 10 to 15 years or longer for each drug candidate. Despite our efforts, our drug candidates may not:

- offer therapeutic or other improvement over existing competitive therapies;
- be proven safe and effective in clinical trials;
- meet applicable regulatory standards;
- be capable of being produced in commercial quantities at acceptable costs; or

- if approved for commercial sale, be successfully marketed as pharmaceutical products.

We have recently completed and/or have ongoing or planned clinical trials for several of our drug candidates, including drug candidates for the treatment of CF, oncology, pain and neurology. The strength of our company's product portfolio and pipeline will depend in large part upon the outcomes of these clinical trials and our ability to develop and commercialize combination treatments for CF that include ivacaftor in combination with (i) tezacaftor and/or (ii) our next-generation CFTR corrector compounds, including VX-152, VX-440, VX-659 and VX-445. Results of our clinical trials and findings from our nonclinical studies, including toxicology findings in nonclinical studies conducted concurrently with clinical trials, could lead to abrupt changes in our development activities, including the possible cessation of development activities associated with a particular drug candidate or program. Moreover, clinical data are often susceptible of varying interpretations and analyses, and many companies that have believed their drug candidates performed satisfactorily in clinical trials have nonetheless failed to obtain marketing approval of their drug candidate. Furthermore, results from our clinical trials may not meet the level of statistical significance required by the FDA or other regulatory authorities for approval of a drug candidate.

Many companies in the pharmaceutical and biotechnology industries, including our company, have suffered significant setbacks in later-stage clinical trials even after achieving promising results in earlier-stage clinical trials. Accordingly, the results from completed preclinical studies and clinical trials may not be replicated in later clinical trials, and ongoing clinical trials for our drug candidates may not be predictive of the results we may obtain in later-stage clinical trials or of the likelihood of approval of a drug candidate for commercial sale. In addition, from time to time we report interim data from our clinical trials. Interim data from a clinical trial may not be predictive of final results from the clinical trial.

If we are unable to obtain regulatory approval, we will be unable to commercialize our drug candidates.

The time required to complete clinical trials and to satisfy the FDA and other countries' regulatory review processes is uncertain and typically takes many years. Our analysis of data obtained from nonclinical and clinical activities is subject to confirmation and interpretation by regulatory authorities, which could delay, limit or prevent regulatory approval. We also may encounter unanticipated delays or increased costs due to government regulation from future legislation or administrative action or changes in governmental policy during the period of drug development, clinical trials and governmental regulatory review.

We may seek a Fast Track and/or Breakthrough Therapy designation for some of our drug candidates. For example, a number of our drugs and drug candidates, including ivacaftor, lumacaftor, tezacaftor, VX-371, VX-440, VX-152, VX-445 and VX-220 have been granted Fast Track designation in the United States. Ivacaftor and the combination regimens of lumacaftor with ivacaftor and tezacaftor with ivacaftor were designated as Breakthrough Therapies. Drug candidates that receive one or both of these designations may be eligible for, among other things, a priority regulatory review. Each of these designations is within the discretion of the FDA. Accordingly, even if we believe one of our drug candidates meets the criteria for Fast Track and/or Breakthrough Therapy designation, the FDA may disagree and instead determine not to make such designation. The receipt of one or both of these designations for a drug candidate does not guarantee a faster development process, review or approval compared to drugs considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our drugs or drug candidates qualifies for Fast Track and/or Breakthrough Therapy designation, the FDA may later decide to withdraw such designation if it determines that the drug or drug candidate no longer meets the conditions for qualification.

Any failure to obtain regulatory approvals for a drug candidate would prevent us from commercializing that drug candidate. Any delay in obtaining required regulatory approvals could materially adversely affect our ability to successfully commercialize a drug candidate. Furthermore, any regulatory approval to market a drug may be subject to limitations that we do not expect on the indicated uses for which we may market the drug. Any such limitations could reduce the size of the market for the drug.

We also are subject to numerous foreign regulatory requirements governing the conduct of clinical trials, manufacturing and marketing authorization, pricing and third-party reimbursement. Non-U.S. jurisdictions have different approval procedures than those required by the FDA, and these jurisdictions may impose additional testing requirements for our drug candidates. The foreign regulatory approval process includes all of the risks associated with the FDA approval process described above, as well as risks attributable to the satisfaction of foreign requirements. Approval by the FDA does not ensure approval by regulatory authorities outside the United States and approval by a foreign regulatory authority does not ensure approval by the FDA. In addition, although the FDA may accept data from clinical trials conducted outside the United States, acceptance of this data is subject to conditions imposed by the FDA. For example, the clinical trial must be well

designed and conducted and performed by qualified investigators in accordance with ethical principles. The trial population also must adequately represent the U.S. population, and the data must be applicable to the U.S. population and U.S. medical practice in ways that the FDA deems clinically meaningful. In addition, while these clinical trials are subject to the applicable local laws, FDA acceptance of the data will depend on its determination that the trials also complied with all applicable U.S. laws and regulations. If the FDA does not accept the data from any trial that we conduct outside the United States, it would likely result in the need for additional trials, which would be costly and time-consuming and delay or permanently halt our development of the applicable drug candidate.

If clinical trials are prolonged or delayed, our development timelines for the affected development program could be extended, our costs to develop the drug candidate could increase and the competitive position of the drug candidate could be adversely affected.

We cannot predict whether or not we will encounter problems with any of our completed, ongoing or planned clinical trials that will cause us or regulatory authorities to delay or suspend clinical trials, or delay the analysis of data from our completed or ongoing clinical trials. Among the factors that could delay our development programs are:

- ongoing discussions with the FDA or comparable foreign authorities regarding the scope or design of our clinical trials and the number of clinical trials we must conduct;
- delays in enrolling volunteers or patients into clinical trials, including as a result of low numbers of patients that meet the eligibility criteria for the trial;
- a lower than anticipated retention rate of volunteers or patients in clinical trials;
- the need to repeat clinical trials as a result of inconclusive results, unforeseen complications in testing or clinical investigator error;
- inadequate supply or deficient quality of drug candidate materials or other materials necessary for the conduct of our clinical trials;
- unfavorable FDA or foreign regulatory authority inspection and review of a manufacturing facility that supplied clinical trial materials or its relevant manufacturing records or a clinical trial site or records of any clinical or preclinical investigation;
- unfavorable scientific results from clinical trials;
- serious and unexpected drug-related side-effects experienced by participants in our clinical trials or by participants in clinical trials being conducted by our competitors to evaluate drug candidates with similar mechanisms of action or structures to drug candidates that we are developing;
- favorable results in testing of our competitors' drug candidates, or FDA or foreign regulatory authority approval of our competitors' drug candidates; or
- action by the FDA or a foreign regulatory authority to place a clinical hold or partial clinical hold on a trial or compound or deeming the clinical trial conduct as problematic.

Our ability to enroll patients in our clinical trials in sufficient numbers and on a timely basis is subject to a number of factors, including the size of the patient population, the nature of the protocol, the proximity of patients to clinical sites, the availability of effective treatments for the relevant disease, the number of other clinical trials ongoing and competing for patients in the same indication and the eligibility criteria for the clinical trial. In addition, patients may drop out of our clinical trials or may be lost to follow-up medical evaluation after treatment ends, and this could impair the validity or statistical significance of the trials. Delays in patient enrollment or unforeseen drop-out rates may result in increased costs and longer development times.

We, our collaborators, the FDA or other applicable regulatory authorities may suspend clinical trials of a drug candidate at any time if we or they believe the healthy volunteers or patients participating in such clinical trials are being exposed to unacceptable health risks or for other reasons. Any such suspension could materially adversely affect the development of a particular drug candidate and our business.

If our processes and systems are not compliant with regulatory requirements, we could be subject to restrictions on marketing our products or could be delayed in submitting regulatory filings seeking approvals for our drug candidates.

We have a number of regulated processes and systems that are required to obtain and maintain regulatory approval for our drugs and drug candidates. These processes and systems are subject to continual review and periodic inspection by the FDA and other regulatory bodies. In addition, the clinical research organizations and other third parties that we work with in our non-clinical studies and clinical trials and our oversight of such parties are subject to similar reviews and periodic inspection by the FDA and other regulatory bodies. If compliance issues are identified at any point in the development and approval process, we may experience delays in filing for regulatory approval for our drug candidates, or delays in obtaining regulatory approval after filing. Any later discovery of previously unknown problems or safety issues with approved drugs or manufacturing processes, or failure to comply with regulatory requirements, may result in restrictions on such drugs or manufacturing processes, withdrawal of drugs from the market, the imposition of civil or criminal penalties or a refusal by the FDA and/or other regulatory bodies to approve pending applications for marketing approval of new drugs or supplements to approved applications, any of which could have a material adverse effect on our business. In addition, we are a party to agreements that transfer responsibility for complying with specified regulatory requirements, such as filing and maintenance of marketing authorizations and safety reporting or compliance with manufacturing requirements, to our collaborators and third-party manufacturers. If our collaborators or third-party manufacturers do not fulfill these regulatory obligations, any drugs for which we or they obtain approval may be subject to later restrictions on manufacturing or sale, which could have a material adverse effect on our business.

Risks Related to Collaborations and other Business Development Activities

Our ability to execute on our long-term strategy depends in part on our ability to acquire rights to additional drugs, drug candidates and other technologies that have the potential to add to our pipeline or provide us with new commercial opportunities.

In order to achieve our long-term business objectives, our strategy is to supplement our internal pipeline by acquiring rights to additional drugs, drug candidates and other technologies that have the potential to provide us with new commercial opportunities, including in the field of treating CF and in therapeutic areas outside of CF. We may not be able to acquire, in-license or otherwise obtain rights to additional drugs, drug candidates or other technologies on acceptable terms or at all. We have faced and will continue to face significant competition for these types of drugs, drug candidates and other technologies from a variety of other companies with interests in the specialty pharmaceutical marketplace, many of which have significantly more financial resources and experience in business development activities than we have. In addition, non-profit organizations may be willing to provide capital to the companies that control additional drugs, drug candidates or technologies, which may provide incentives for companies to advance these drugs, drug candidates or technologies independently. Because of these competitive pressures, the cost of acquiring, in-licensing or otherwise obtaining rights to such drugs, drug candidates or other technologies has grown dramatically in recent years and may be at levels that we cannot afford or that we believe are not justified by market potential. This competition is most intense for approved drugs and late-stage drug candidates, which have the lowest risk and would have the most immediate effect on our financial performance.

We may not realize the anticipated benefits of potential acquisitions or licenses to businesses, drugs, drug candidates and other technologies, and the integration following any such acquisition or license may disrupt our business and management.

We may acquire a business or the rights to drugs, drug candidates or other technologies. In recent years we have entered into numerous collaboration agreements, including our collaboration with Parion pursuant to which we exclusively licensed investigational ENaC inhibitors, including VX-371, our agreement with CRISPR to collaborate on the discovery and development of potential new treatments aimed at the underlying genetic causes of human diseases using CRISPR-Cas9 gene editing technology and our agreement with Moderna pursuant to which we are seeking to identify and develop mRNA therapeutics for the treatment of CF. With respect to each of these transactions and any additional acquisition of a business or rights to drugs, drug candidates or other technologies, we may not realize the anticipated benefits of such transaction, each of which involves numerous risks. These risks include:

- failure to successfully further develop the acquired or licensed drugs or technology or to achieve strategic objectives, including successfully developing and commercializing the drugs, drug candidates or technologies that we acquire or license;

- inadequate or unfavorable data from clinical trials evaluating the acquired or licensed drug or drug candidates;
- entry into markets in which we have no or limited direct prior experience or where competitors in such markets have stronger market positions;
- disruption of our ongoing business and distraction of our management and employees from other opportunities and challenges;
- potential failure of the due diligence processes to identify significant problems, liabilities or other shortcomings or challenges of an acquired company, or acquired or licensed product or technology, including but not limited to, problems, liabilities or other shortcomings or challenges with respect to intellectual property, product quality, safety, accounting practices, employee, customer or third party relations and other known and unknown liabilities;
- liability for activities of the acquired company or licensor before the acquisition or license, including intellectual property infringement claims, violations of laws, commercial disputes, tax liabilities, and other known and unknown liabilities;
- exposure to litigation or other claims in connection with, or inheritance of claims or litigation risk as a result of an acquisition or license, including but not limited to, claims from terminated employees, customers, former equity holders or other third-parties;
- difficulty in integrating the drugs, drug candidates, technologies, business operations and personnel of an acquired company; and
- difficulties in the integration of the acquired company's departments, systems, including accounting, human resource and other administrative systems, technologies, books and records, and procedures, as well as in maintaining uniform standards, controls, including internal control over financial reporting required by the Sarbanes-Oxley Act of 2002 and related procedures and policies.

Acquisitions and licensing arrangements are inherently risky, and ultimately, if we do not complete an announced acquisition or license transaction or integrate an acquired business, or an acquired or licensed drug, drug candidate or other technology successfully and in a timely manner, we may not realize the benefits of the acquisition or license to the extent anticipated and the perception of the effectiveness of our management team and our company may suffer in the marketplace. Additionally, we may later incur impairment charges related to assets acquired in any such transaction. For example, we acquired or licensed several drug candidates for the treatment of HCV infection, but due to adverse clinical data regarding these drug candidates and competitive pressures, we incurred significant costs and impairment charges but did not realize the expected benefits from these transactions. In addition, even if we achieve the long-term benefits associated with strategic transactions, our expenses and short-term costs may increase materially and adversely affect our liquidity and short-term net income (loss). Future licenses or acquisitions could result in potentially dilutive issuances of equity securities, the incurrence of debt, the creation of contingent liabilities, impairment expenses related to goodwill, and impairment or amortization expenses related to other intangible assets, which could harm our financial condition.

We face risks in connection with existing and future collaborations with respect to the development, manufacture and commercialization of our products and drug candidates.

The risks that we face in connection with our current collaborations, including with Parion, CRISPR, Merck KGaA, Moderna and Janssen Inc. and any future collaborations include the following:

- Our collaborators may change the focus of their development and commercialization efforts or may have insufficient resources to effectively develop our drug candidates. The ability of some of our products and drug candidates to reach their potential could be limited if collaborators decrease or fail to increase development or commercialization efforts related to those products or drug candidates. Our collaboration agreements provide our collaborators with a level of discretion in determining the amount and timing of efforts and resources that they will apply to these collaborations.
- Any future collaboration agreements may have the effect of limiting the areas of research and development that we may pursue, either alone or in collaboration with third parties.

- Collaborators may develop and commercialize, either alone or with others, drugs that are similar to or competitive with the drugs or drug candidates that are the subject of their collaborations with us.
- Disagreements with collaborators, including disagreements over proprietary rights, contract interpretation or the preferred course of development, might cause delays or termination of the research, development or commercialization of drug candidates, might lead to additional responsibilities for us with respect to drug candidates, or might result in litigation or arbitration. Any such disagreements would divert management attention and resources and be time-consuming and expensive.
- Collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential litigation.
- Collaborators may infringe the intellectual property rights of third parties, which may expose us to litigation and potential liability.
- Investigations and/or compliance or enforcement actions against a collaborator, which may expose us to indirect liability as a result of our partnership with such collaborator.
- Our collaboration agreements are subject to termination under various circumstances.

Additionally, if a collaborator were to be involved in a business combination, it might deemphasize or terminate the development or commercialization of any drug candidate licensed to it by us. If one of our collaborators terminates its agreement with us, we may find it more difficult to attract new collaborators and our perception in the business and financial communities could be harmed.

We may not be able to attract collaborators or external funding for the development and commercialization of certain of our drug candidates.

As part of our ongoing strategy, we may seek additional collaborative arrangements or external funding for certain of our development programs and/or seek to expand existing collaborations to cover additional commercialization and/or development activities. We have a number of research programs and early-stage clinical development programs, some of which are being developed in collaboration with a third party. For example, in January 2017, we granted Merck KGaA an exclusive worldwide license to research, develop and commercialize four of our oncology research and development programs. At any time, we may determine that in order to continue development of a drug candidate or program or successfully commercialize a drug we need to identify a collaborator or amend or expand an existing collaboration. Whether we reach a definitive agreement for a collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. Those factors may include the design or results of clinical trials, the likelihood of approval by the FDA or similar regulatory authorities outside the United States, the potential market for the subject drug candidate, the costs and complexities of manufacturing and delivering such drug candidate to patients, the potential of competing products, the existence of uncertainty with respect to our ownership of the applicable intellectual property, which can exist if there is a challenge to such ownership without regard to the merits of the challenge, and industry and market conditions generally. Potentially, and depending on the circumstances, we may desire that a collaborator either agree to fund portions of a drug development program led by us, or agree to provide all of the funding and directly lead the development and commercialization of a program. No assurance can be given that any efforts we make to seek additional collaborative arrangements will be successfully completed on a timely basis or at all. If we elect to fund and undertake development or commercialization activities on our own, we may need to obtain additional expertise and additional capital, which may not be available to us on acceptable terms or at all. If we are unable to enter into acceptable collaborative relationships, one or more of our development programs could be delayed or terminated and the possibility of our receiving a return on our investment in the program could be impaired.

Risks Related to Third-Party Manufacturing and Reliance on Third Parties

We depend on third-party manufacturers to manufacture our products and the materials we require for our clinical trials. We may not be able to maintain these relationships and could experience supply disruptions outside of our control.

We rely on a worldwide network of third-party manufacturers and in rare circumstances, compounders, to manufacture some of our drugs for commercial use and our drug candidates for clinical trials. As a result of our reliance on these third-party manufacturers and suppliers, we could be subject to significant supply disruptions outside of our control. Our supply chain for sourcing raw materials and manufacturing drug product ready for distribution is a multi-step international endeavor. Third-party contract manufacturers, including some in China, supply us with raw materials, and convert these raw materials into drug substance and convert the drug substance into final dosage form. Establishing and managing this global supply chain requires a significant financial commitment and the creation and maintenance of numerous third-party contractual relationships. Although we attempt to manage the business relationships with companies in our supply chain, we do not have control over their operations. Supply disruptions may result from a number of factors, including shortages in product raw materials, labor or technical difficulties, regulatory inspections or restrictions, shipping or customs delays or any other performance failure by any third-party manufacturer on which we rely. Any supply disruptions could disrupt sales of our products and/or the timing of our clinical trials.

We require a supply of ivacaftor and lumacaftor for commercial sale (as KALYDECO and/or ORKAMBI). We also require a supply of our drug candidates for use in our clinical trials. We obtain ivacaftor and lumacaftor (and the combinations thereof) to meet our commercial and clinical supply needs through a third-party manufacturing network. Our supply chain includes a single-source manufacturer for (i) one step in the ivacaftor manufacturing process and (ii) the manufacture of the oral granule formulation of KALYDECO that is used for patients with CF two to five years of age. As a result, if these manufacturers become unable or unwilling to continue manufacturing product on our behalf and we are not able to promptly identify another manufacturer, we would experience a disruption in the commercial supply of ORKAMBI and/or KALYDECO, which would have a significant effect on patients, our business and our product revenues. Similarly, a disruption in the clinical supply of drug products could delay the completion of clinical trials and affect timelines for regulatory filings. There can be no assurance that we will be able to establish and maintain secondary manufacturers for all of our ivacaftor or lumacaftor supply needs on a timely basis or at all.

In the course of providing its services, a contract manufacturer may develop process technology related to the manufacture of our products or drug candidates that the manufacturer owns, either independently or jointly with us. This would increase our reliance on that manufacturer or require us to obtain a license from that manufacturer in order to have our products or drug candidates manufactured by other suppliers utilizing the same process.

We rely on third parties to conduct certain pre-clinical work and clinical trials, and those third parties may not perform satisfactorily, including failing to meet established deadlines for the completion of such studies and/or trials or failing to satisfy regulatory requirements.

We rely on third parties such as contract research organizations to help manage certain pre-clinical work and our clinical trials and on medical institutions, clinical investigators and clinical research organizations such as the Therapeutic Development Network, which is primarily funded by the CFFT, to assist in the design and review of, and to conduct our clinical trials, including enrolling qualified patients. Our reliance on these third parties for clinical development activities reduces our control over these activities but does not relieve us of our responsibilities. For example, we remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols for the clinical trial. Moreover, the FDA requires us to comply with standards, commonly referred to as good laboratory practices and good clinical practices for conducting, recording and reporting the results of pre-clinical and clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of trial participants are protected. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may be required to replace them. Although we believe that there are a number of other third-party contractors we could engage to continue these activities, it may result in a delay of the affected clinical trial or drug development program. If clinical trials are not conducted in accordance with our contractual expectations or regulatory requirements, action by regulatory authorities might significantly and adversely affect the conduct or progress of these clinical trials or in specific circumstances might result in a requirement that a clinical trial be redone. Accordingly, our efforts to obtain regulatory approvals for and commercialize our drug candidates could be delayed.

Risks Related to Intellectual Property

If our patents do not protect our drugs or our drugs infringe third-party patents, we could be subject to litigation and substantial liabilities.

We have numerous issued patents and pending patent applications in the United States, as well as counterparts in other countries. Our success will depend, in significant part, on our ability to obtain and defend U.S. and foreign patents covering our drugs, their uses and our processes, to preserve our trade secrets and to operate without infringing the proprietary rights of third parties. We cannot be certain that any patents will issue from our pending patent applications or, even if patents issue or have issued, that the issued claims will provide us with adequate protection against competitive products or otherwise be commercially valuable.

Due to evolving legal standards relating to the patentability, validity and enforceability of patents covering pharmaceutical inventions and the scope of claims made under these patents, our ability to obtain, maintain and enforce patents is uncertain and involves complex legal and factual questions. Recent patent reform legislation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents in the U.S. The Leahy-Smith America Invents Act, or the Leahy-Smith Act, includes a number of significant changes to United States patent law. These include provisions that affect the way patent applications are prosecuted and may also affect patent litigation. The United States Patent Office developed new regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, became effective in March 2013. The first to file provisions limit the rights of an inventor who is the first to invent an invention but is not the first to file an application claiming that invention. U.S. and foreign patent applications typically are maintained in confidence for a period of time after they initially are filed with the applicable patent office. Consequently, we cannot be certain that we were the first to invent, or the first to file patent applications on, our products or drug candidates or their use. If a third party also has filed a U.S. patent application relating to our drugs or drug candidates, their uses, or a similar invention, we may have to participate in legal or administrative proceedings to determine priority of invention. For applications governed by the Lahey-Smith Act, if a third-party has an earlier filed U.S. patent application relating to our drugs or drug candidates, their uses, or a similar invention, we may be unable to obtain an issued patent from our application.

The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability. Our patents may be challenged by third parties, resulting in the patent being deemed invalid, unenforceable or narrowed in scope, or the third party may circumvent any such issued patents. Also, our pending patent applications may not issue, and we may not receive any additional patents. Our patents might not contain claims that are sufficiently broad to prevent others from utilizing our technologies. For instance, the issued patents relating to our drugs or drug candidates may be limited to a particular molecule or molecules and may not cover similar molecules that have similar clinical properties. Consequently, our competitors may independently develop competing products that do not infringe our patents or other intellectual property. In addition, if the breadth or strength of protection provided by our patents and patent applications is threatened, it could dissuade companies from collaborating with us to license, develop or commercialize current or future products.

The laws of many foreign jurisdictions do not protect intellectual property rights to the same extent as in the United States and many companies in our segment of the pharmaceutical industry have encountered significant difficulties in protecting and defending such rights in foreign jurisdictions. If we encounter such difficulties in protecting or are otherwise precluded from effectively protecting our intellectual property rights in foreign jurisdictions, our business could be substantially harmed.

Because of the extensive time required for the discovery, development, testing and regulatory review of drug candidates, it is possible that, a patent may expire before a drug candidate can be commercialized, or a patent may expire or remain in force for only a short period following commercialization of such drug candidate resulting in a minimal, if any, period of patent exclusivity. To the extent our drug candidates are not commercialized significantly ahead of the expiration date of any applicable patent, or to the extent we have no patent protection on such drug candidates, then, to the extent available we would rely on other forms of exclusivity, such as regulatory exclusivity provided by the FDCA and its counterpart agencies in various jurisdictions, and/or orphan drug exclusivity.

Uncertainty over intellectual property in the pharmaceutical and biotechnology industry has been the source of litigation and other disputes, which is inherently costly and unpredictable.

There is considerable uncertainty within our industry about the validity, scope and enforceability of many issued patents in the United States and elsewhere in the world, and, to date, the law and practice remains in substantial flux both in the agencies that grant patents and in the courts. We cannot currently determine the ultimate scope and validity of patents which may be granted to third parties in the future or which patents might be asserted as being infringed by the manufacture, use and sale of our products.

There has been, and we expect that there may continue to be, significant litigation in the industry regarding patents and other intellectual property rights. Litigation, arbitrations, administrative proceedings and other legal actions with private parties and governmental authorities concerning patents and other intellectual property rights may be protracted, expensive and distracting to management. Competitors may sue us as a way of delaying the introduction of our drugs or to remove our drugs from the market. Any litigation, including litigation related to Abbreviated New Drug Applications, or ANDA, litigation related to 505(b)(2) applications, interference proceedings to determine priority of inventions, derivations proceedings, *inter partes* review, oppositions to patents in foreign countries, litigation against our collaborators or similar actions, may be costly and time consuming and could harm our business. We expect that litigation may be necessary in some instances to determine the validity and scope of certain of our proprietary rights. Litigation may be necessary in other instances to determine the validity, scope or non-infringement of certain patent rights claimed by third parties to be pertinent to the manufacture, use or sale of our products. Ultimately, the outcome of such litigation could adversely affect the validity and scope of our patent or other proprietary rights, hinder our ability to manufacture and market our products, or result in the assessment of significant monetary damages against us that may exceed amounts, if any, accrued in our financial statements.

To the extent that valid present or future third-party patents or other intellectual property rights cover our drugs, drug candidates or technologies, we or our strategic collaborators may seek licenses or other agreements from the holders of such rights in order to avoid or settle legal claims. Such licenses may not be available on acceptable terms, which may hinder our ability to, or prevent us from being able to, manufacture and market our drugs. Payments under any licenses that we are able to obtain would reduce our profits derived from the covered products.

We may be subject to claims by third parties asserting that our employees or we have misappropriated their intellectual property, or claiming ownership of what we regard as our own intellectual property.

Many of our employees were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that these employees or we have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such employee's former employer. Litigation may be necessary to defend against these claims.

In addition, while it is our policy to require our employees and contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own. Our and their assignment agreements may not be self-executing or may be breached, and we may be forced to bring claims against third parties, or defend claims they may bring against us, to determine the ownership of what we regard as our intellectual property.

If we fail in prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to management.

Risks Related To Our Operations

Risks associated with operating in foreign countries could materially adversely affect our business.

We have expanded our international operations over the past several years in order to market ORKAMBI and KALYDECO and expand our research and development capabilities. In 2016, a significant portion of our revenues and expenses were associated with our foreign operations and we expect that portion to increase over time as we complete reimbursement discussions in Europe for ORKAMBI. New laws and industry codes in the European Union and elsewhere have expanded transparency requirements regarding payments and transfers of value as well as patient-level clinical trial

data. New laws in the European Union also have expanded protections related to personal data and provided for increased sanctions for violations. Collectively, our expansion and these new requirements are adding to our compliance costs and expose us to potential sanctions for failing to meet the enhanced safeguards and reporting demands in these jurisdictions. In addition, a significant portion of our commercial supply chain, including sourcing of raw materials and manufacturing, is located in China and the European Union. Consequently, we are, and will continue to be, subject to risks related to operating in foreign countries. Risks associated with conducting operations in foreign countries include:

- differing regulatory requirements for drug approvals and regulation of approved drugs in foreign countries;
- varying reimbursement regimes and difficulties or the inability to obtain reimbursement for our products in a timely manner;
- differing patient treatment infrastructures, particularly since our business is focused on the treatment of rare diseases that are typically prescribed by specialist physicians;
- collectibility of accounts receivable;
- changes in tariffs, trade barriers and regulatory requirements, the risks of which appear to have increased in the current political environment;
- economic weakness, including recession and inflation, or political instability in particular foreign economies and markets;
- differing levels of enforcement and/or recognition of contractual and intellectual property rights;
- complying with local laws and regulations, which are interpreted and enforced differently across jurisdictions and which can change significantly over time;
- foreign taxes, including withholding of payroll taxes;
- foreign currency fluctuations, which could result in reduced revenues or increased operating expenses, and other obligations incident to doing business or operating in another country;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- import and export licensing requirements, tariffs, and other trade and travel restrictions;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad; and
- business interruptions resulting from geo-political actions, including war and terrorism.

Our revenues are subject to foreign exchange rate fluctuations due to the global nature of our operations. Although we have foreign currency forward contracts to hedge forecasted product revenues denominated in foreign currencies, our efforts to reduce currency exchange losses may not be successful. As a result, currency fluctuations among our reporting currency, the U.S. dollar, and the currencies in which we do business will affect our operating results, often in unpredictable ways.

In addition, our international operations are subject to regulation under U.S. law. For example, the Foreign Corrupt Practices Act prohibits U.S. companies and their representatives from offering, promising, authorizing or making payments to foreign officials for the purpose of obtaining or retaining business abroad. In many countries, the health care professionals we regularly interact with may meet the definition of a foreign government official for purposes of the Foreign Corrupt Practices Act. We also are subject to import/export control laws. Failure to comply with domestic or foreign laws could result in various adverse consequences, including the possible delay in approval or refusal to approve a product, recalls, seizures, withdrawal of an approved product from the market, the imposition of civil or criminal sanctions, the prosecution of executives overseeing our international operations and corresponding bad publicity and negative perception of our company in foreign countries.

If we fail to manage our operations effectively, our business may suffer.

We have expanded and are continuing to expand our global operations and capabilities, which has placed, and will continue to place, significant demands on our management and our operational, research and development and financial infrastructure. To effectively manage our business, we need to:

- implement and clearly communicate our corporate-wide strategies;
- enhance our operational and financial infrastructure, including our controls over records and information;
- enhance our operational, financial and management processes, including our cross-functional decision-making processes and our budget prioritization systems;
- train and manage our global employee base;
- transition from a U.S.-centric company into an organization capable of developing and commercializing multiple drug candidates in international markets; and
- enhance our compliance and legal resources.

Risk Relating to the Referendum of the United Kingdom's Membership of the European Union.

Our European headquarters and European research facility are located in the United Kingdom, and a significant portion of our ex-U.S. net product revenues are derived from sales in the United Kingdom. In June 2016, the United Kingdom, or the U.K., held a referendum in which voters approved an exit from the European Union commonly referred to as "Brexit." It is expected that the U.K. government will provide official notice in the first half of 2017, and after notice is provided the parties will negotiate the terms of the U.K.'s withdrawal from the European Union. The withdrawal could, among other outcomes, disrupt the free movement of goods, services and people between the U.K. and the E.U., undermine bilateral cooperation in key policy areas and significantly disrupt trade between the U.K. and the E.U. In addition, Brexit could lead to legal uncertainty and potentially divergent national laws and regulations as the U.K. determines which E.U. laws to replace or replicate. Given the lack of comparable precedent, it is unclear what financial, trade, regulatory and legal implications the withdrawal of the U.K. from the E.U. would have and how such withdrawal would affect us. The announcement of Brexit caused significant volatility in global stock markets and currency exchange rate fluctuations that resulted in the strengthening of the U.S. dollar against foreign currencies in which we conduct business. The announcement of Brexit and the withdrawal of the U.K. from the E.U. may also create global economic uncertainty, which may cause third-party payors, including governmental organizations, to closely monitor their costs and reduce their spending budgets. Any of these effects of Brexit, among others, could adversely affect our business, financial condition and operating results.

Our business has a substantial risk of product liability claims and other litigation liability. If we do not obtain appropriate levels of insurance, any potential claims could adversely affect our business.

We are or may be involved in various legal proceedings, including securities class action lawsuits and claims related to product liability, intellectual property and breach of contract. Such proceedings may involve claims for, or the possibility of, fines and penalties involving substantial amounts of money or other relief, including but not limited to civil or criminal fines and penalties. If any of these legal proceedings were to result in an adverse outcome, it could have a material adverse effect on our business.

With respect to product liability and clinical trial risks, in the ordinary course of business we are subject to liability claims and lawsuits, including potential class actions, alleging that our products or drug candidates have caused, or could cause, serious adverse events or other injury. We have product liability insurance and clinical trial insurance in amounts that we believe are adequate to cover this risk. However, our insurance may not provide adequate coverage against all potential liabilities. If a claim is brought against us, we might be required to pay legal and other expenses to defend the claim, as well as pay uncovered damage awards resulting from a claim brought successfully against us and these damages could be significant and have a material adverse effect on our financial condition. Furthermore, whether or not we are ultimately successful in defending any such claims, we might be required to direct significant financial and managerial resources to such defense and adverse publicity is likely to result.

A breakdown or breach of our information technology systems could subject us to liability or interrupt the operation of our business.

We maintain and rely extensively on information technology systems and network infrastructures for the effective operation of our business. In the course of our business, we collect, store and transmit confidential information (including personal information and intellectual property), and it is critical that we do so in a secure manner to maintain the confidentiality and integrity of such confidential information. The size and complexity of our information technology and information security systems makes such systems potentially vulnerable to service interruptions or to security breaches. A disruption, infiltration or failure of our information technology systems or any of our data centers as a result of software or hardware malfunctions, computer viruses, cyber attacks, employee theft or misuse, power disruptions, natural disasters, floods or accidents could cause breaches of data security and loss of critical data, which in turn could materially adversely affect our business and subject us to both private and governmental causes of action. While we have implemented security measures in an attempt to minimize these risks to our data and information technology systems and have adopted a business continuity plan to deal with a disruption to our information technology systems, there can be no assurance that our efforts will prevent breakdowns or breaches in our systems that could adversely affect our business.

If we fail to attract and retain skilled employees, our business could be materially harmed.

Because our drug discovery and development activities are highly technical in nature, we require the services of highly qualified and trained scientists who have the skills necessary to conduct these activities. In addition, we need to attract and retain employees with experience in marketing and commercialization of medicines. We face intense competition for our personnel from our competitors and other companies throughout our industry. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. Moreover, the growth of local biotechnology companies and the expansion of major pharmaceutical companies into the Boston area have increased competition for the available pool of skilled employees, especially in technical fields, and the high cost of living in Massachusetts makes it difficult to attract employees from other parts of the country to Massachusetts. In addition, the available pool of skilled employees would be further reduced if immigration laws change in a manner that increases restrictions on immigration. Our ability to commercialize our products, and achieve our research and development objectives, depends on our ability to respond effectively to these demands. If we are unable to hire and retain qualified personnel, there could be a material adverse effect on our business.

The loss of the services of key employees or the failure to effectively integrate key employees could negatively affect our business.

Our future success will depend in large part on our ability to retain the services of our key scientific and management personnel and to integrate new scientific and management personnel into our business. A loss of key personnel or a failure to properly integrate new personnel could be disruptive. We have entered into employment agreements with some executives and provide compensation-related benefits to all of our key employees that vest over time and therefore induce them to remain with us. However, the employment agreements can be terminated by the executive on relatively short notice. The value to employees of stock-related benefits that vest over time—such as options, restricted stock and restricted stock units—is significantly affected by movements in our stock price, and may at any point in time be insufficient to counteract more lucrative offers from other companies. A failure to retain, as well as hire, train and effectively integrate into our organization a sufficient number of qualified scientists, professionals, sales personnel and senior management would negatively affect our business.

If we do not comply with laws regulating the protection of the environment and health and human safety, our business could be adversely affected.

Our research and development efforts involve the regulated use of hazardous materials, chemicals and various controlled and radioactive compounds. Although we believe that our safety procedures for handling and disposing of these materials comply with the standards prescribed by state, federal and foreign regulations, the risk of loss of, or accidental contamination or injury from, these materials cannot be eliminated. If an accident occurs, we could be held liable for resulting damages, which could be substantial. We also are subject to numerous environmental, health and workplace safety laws and regulations, including those governing laboratory procedures, exposure to blood-borne pathogens and the handling of biohazardous materials. Although we maintain workers' compensation insurance to cover us for costs we may incur due to injuries to our employees resulting from the use of these materials, this insurance may not provide adequate coverage against potential liabilities. We maintain insurance to cover pollution conditions or other extraordinary or unanticipated events

relating to our use and disposal of hazardous materials that we believe is appropriate based on the small amount of hazardous materials we generate. Additional federal, state and local laws and regulations affecting our operations may be adopted in the future. We may incur substantial costs to comply with, and substantial fines or penalties if we violate, any of these laws or regulations.

If our facilities were to experience a catastrophic loss, our operations would be seriously harmed.

Most of our operations, including our research and development activities, are conducted in a limited number of facilities. If any of our major facilities were to experience a catastrophic loss, due to a fire, earthquake or similar event, our operations could be seriously harmed. For example, our corporate headquarters, as well as additional leased space that we use for certain logistical and laboratory operations and manufacturing, are located in a flood zone along the Massachusetts coast. We have adopted a business continuity plan to address most crises. However, if we are unable to fully implement our disaster recovery plans, we may experience delays in recovery of data and/or an inability to perform vital corporate functions, which could result in a significant disruption in our research, development, manufacturing and/or commercial activities, the loss or critical data and/or large expenses to repair or replace the facility, which would have a material adverse effect on our business.

Risks Related to Holding Our Common Stock

Our stock price may fluctuate.

Market prices for securities of companies such as ours are highly volatile. From January 1, 2016 to December 31, 2016, our common stock traded between $71.46 and $124.96 per share. The market for our stock, like that of other companies in the biotechnology industry, has experienced significant price and volume fluctuations. The future market price of our securities could be significantly and adversely affected by factors such as:

- the information contained in our quarterly earnings releases, including our net product revenues and operating expenses for completed periods and guidance regarding future periods;
- announcements of FDA actions with respect to our drugs or our competitors' drugs, or regulatory filings for our drug candidates or those of our competitors, or announcements of interim or final results of clinical trials or nonclinical studies relating to our drugs, drug candidates or those of our competitors;
- prescription data and other information disclosed by third parties regarding our business or products;
- technological innovations or the introduction of new drugs by our competitors;
- government regulatory action;
- public concern as to the safety of drugs developed by us or our competitors;
- developments in patent or other intellectual property rights or announcements relating to these matters;
- developments in domestic and international governmental policy or regulation, for example, relating to intellectual property rights;
- developments relating specifically to other companies and market conditions for pharmaceutical and biotechnology stocks or stocks in general;
- business development, capital structuring or financing activities; and
- general worldwide or national economic, political and capital market conditions.

Following periods of volatility in the market price of a company's securities, stockholder derivative lawsuits and securities class action litigation are common. Such litigation, if instituted against us or our officers and directors, could result in substantial costs and a diversion of management's attention and resources.

Our indebtedness could materially and adversely affect our financial condition, and the terms of our credit agreement impose restrictions on our business, reducing our operational flexibility and creating default risks.

In October 2016, we entered into a credit agreement providing for a $500 million revolving facility, $300 million of which was drawn at closing. All outstanding borrowings under the credit agreement mature on October 13, 2021. Our indebtedness could have important consequences to our business, including increasing our vulnerability to general adverse financial, business, economic and industry conditions, as well as other factors that are beyond our control. The credit agreement requires that we comply with certain financial covenants, including (i) a consolidated leverage ratio covenant and (ii) a consolidated EBITDA covenant, in each case to be measured on a quarterly basis. Further, the credit agreement includes negative covenants, subject to exceptions, restricting or limiting our ability and the ability of our subsidiaries to, among other things, incur additional indebtedness, grant liens, engage in certain investment, acquisition and disposition transactions, pay dividends, repurchase capital stock and enter into transactions with affiliates. As a result, we may be restricted from engaging in business activities that may otherwise improve our business. Failure to comply with the covenants could result in an event of default that could trigger acceleration of our indebtedness, which would require us to repay all amounts owing under the credit agreement and/or our capital leases and could have a material adverse effect on our business. Additionally, our obligations under the credit agreement are unconditionally guaranteed by certain of our domestic subsidiaries. All obligations under the credit agreement, and the guarantees of those obligations, are secured by substantially all of our assets and the assets of all guarantors (excluding intellectual property, owned and leased real property and certain other excluded property), including the pledge of all or a portion of the equity interests of certain of our subsidiaries. If we fail to satisfy our obligations under the credit agreement or are unable to obtain sufficient funds to make payments, the lenders could foreclose on our pledged collateral.

Our quarterly operating results are subject to significant fluctuation.

Our operating results have fluctuated from quarter to quarter in the past, and we expect that they will continue to do so in the future. Our revenues are primarily dependent on the level of net product revenues from sales of ORKAMBI and KALYDECO and our total net product revenues could vary on a quarterly basis. Our total net product revenues may be affected by, among other factors, the timing of orders from our significant customers. Additional factors that have caused quarterly fluctuations in recent years include variable amounts of revenues, impairment charges, charges for excess and obsolete inventories, changes in the fair value of derivative instruments and the consolidation or deconsolidation of variable interest entities. Our revenues also are subject to foreign exchange rate fluctuations due to the global nature of our operations. Although we have foreign currency forward contracts to hedge forecasted product revenues denominated in foreign currencies, our efforts to reduce currency exchange losses may not be successful. As a result, currency fluctuations among our reporting currency, the U.S. dollar, and the currencies in which we do business may affect our operating results, often in unpredictable ways. Our quarterly results also could be materially affected by significant charges, which may or may not be similar to charges we have experienced in the past. Most of our operating expenses relate to our research and development activities, do not vary directly with the amount of revenues and are difficult to adjust in the short term. As a result, if revenues in a particular quarter are below expectations, we are unlikely to reduce operating expenses proportionately for that quarter. These examples are only illustrative and other risks, including those discussed in these "Risk Factors," could also cause fluctuations in our reported financial results. Our operating results during any one period do not necessarily suggest the results of future periods.

We expect that results from our clinical development activities and the clinical development activities of our competitors will continue to be released periodically, and may result in significant volatility in the price of our common stock.

Any new information regarding our products and drug candidates or competitive products or potentially competitive drug candidates can substantially affect investors' perceptions regarding our future prospects. We, our collaborators and our competitors periodically provide updates regarding drug development programs, typically through press releases, conference calls and presentations at medical conferences. These periodic updates often include interim or final results from clinical trials conducted by us or our competitors and/or information about our or our competitors' expectations regarding regulatory filings and submissions as well as future clinical development of our products or drug candidates, competitive products or potentially competitive drug candidates. The timing of the release of information by us regarding our drug development programs is often beyond our control and is influenced by the timing of receipt of data from our clinical trials and by the general preference among pharmaceutical companies to disclose clinical data during medical conferences. In addition, the information disclosed about our clinical trials, or our competitors' clinical trials, may be based on interim rather than final data that may involve interpretation difficulties and may in any event not accurately predict final results.

We could be negatively affected by government investigations.

In the third quarter of 2015, we received a subpoena from the United States Department of Justice related to our marketed medicines. This subpoena requested documents relating primarily to our Good Laboratory Practices in a bioanalytical laboratory. We have responded to the subpoena. If this matter is not resolved in a satisfactory manner, our business could be adversely affected.

Changes in tax laws, regulations and treaties could affect our future taxable income.

A change in tax laws, treaties or regulations, or their interpretation, of any country in which we operate could materially affect us if we generate taxable income in a future period. We continue to assess the impact of various tax reform proposals and modifications to existing tax treaties in all jurisdictions where we have operations to determine the potential effect on our business and any assumptions we have made about our future taxable income. We cannot predict whether any specific proposals will be enacted, the terms of any such proposals or what effect, if any, such proposals would have on our business if they were to be enacted.

We may need to raise additional capital that may not be available.

We have a history of operating losses and may in the future need to raise additional capital. In recent periods, we also have received significant proceeds from the issuance of common stock under our employee benefit plans, but we received limited proceeds from employee benefit plans in 2016 and the amount and timing of future proceeds from employee benefits plans is uncertain. Any potential public offering, private placement or debt financing may or may not be similar to the transactions that we entered into in the past. Any debt financing may be on terms that, among other things, include conversion features that could result in dilution to our then-existing security holders and restrict our ability to pay interest and dividends—although we do not intend to pay dividends for the foreseeable future. Additionally, our pledge of specified assets as collateral to secure our obligations under our credit agreement may limit our ability to obtain additional debt financing. Any equity financings would result in dilution to our then-existing security holders. If adequate funds are not available on acceptable terms, or at all, we may be required to curtail significantly or discontinue one or more of our research, drug discovery or development programs, including clinical trials, incur significant cash exit costs, or attempt to obtain funds through arrangements with collaborators or others that may require us to relinquish rights to certain of our technologies, drugs or drug candidates. Based on many factors, including general economic conditions, additional financing may not be available on acceptable terms, if at all.

Issuances of additional shares of our common stock could cause the price of our common stock to decline.

As of December 31, 2016 , we had 248.3 million shares of common stock issued and outstanding. As of December 31, 2016 , we also had outstanding options to purchase 12.6 million shares of common stock with a weighted-average exercise price of $81.41 per share. Outstanding vested options are likely to be exercised if the market price of our common stock exceeds the applicable exercise price, and, in the future, we expect to issue additional options, restricted stock and restricted stock units to directors and employees. In addition, we may issue additional common stock or restricted securities in the future as part of financing activities or business development activities and any such issuances may have a dilutive effect on our then-existing shareholders. Sales of substantial amounts of our common stock in the open market, or the availability of such shares for sale, could adversely affect the price of our common stock. The issuance of restricted common stock or common stock upon exercise of any outstanding options would be dilutive, and may cause the market price for a share of our common stock to decline.

We have adopted anti-takeover provisions and are subject to Massachusetts corporate laws that may frustrate any attempt to remove or replace our current management or effectuate a business combination involving Vertex.

Our corporate charter and by-law provisions and Massachusetts state laws may discourage certain types of transactions involving an actual or potential change of control of Vertex that might be beneficial to us or our security holders. Our charter provides for staggered terms for the members of the Board of Directors. Our by-laws grant the directors a right to adjourn annual meetings of shareholders, and certain provisions of our by-laws may be amended only with an 80% shareholder vote. We may issue shares of any class or series of preferred stock in the future without shareholder approval and upon such terms as our Board of Directors may determine. The rights of the holders of common stock will be subject to, and may be adversely affected by, the rights of the holders of any class or series of preferred stock that may be issued in the future. Massachusetts state law prohibits us from engaging in specified business combinations, unless the combination is approved or consummated in a prescribed manner, and prohibits voting by any shareholder who acquires 20% or more of our voting

stock without shareholder approval. As a result, shareholders or other parties may find it more difficult to remove or replace our current management. Additionally, one of our collaboration agreements includes a change in control provision that could reduce the potential acquisition price an acquirer is willing to pay or discourage a takeover attempt that may otherwise be viewed as beneficial to shareholders.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K and, in particular, the description of our Business set forth in Item 1, the Risk Factors set forth in this Item 1A and our Management's Discussion and Analysis of Financial Condition and Results of Operations set forth in Item 7 contain or incorporate a number of forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, including statements regarding:

- our expectations regarding the amount of, timing of and trends with respect to our revenues, costs and expenses and other gains and losses, including those related to net product revenues from KALYDECO and ORKAMBI;
- our expectations regarding clinical trials, development timelines and regulatory authority filings and submissions for ivacaftor, lumacaftor, tezacaftor, VX-371, VX-440, VX-152, VX-659, VX-445, VX-150 and VX-210, as well as the MAA for ORKAMBI for patients with CF six to eleven years of age who are homozygous for the F508del mutation in their *CFTR* gene and the NDA for tezacaftor in combination with ivacaftor;
- our ability to obtain reimbursement for ORKAMBI in ex-U.S. markets and our ability to otherwise successfully market ORKAMBI and KALYDECO or any of our other drug candidates for which we obtain regulatory approval;
- our expectations regarding the timing and structure of clinical trials of our drugs and drug candidates, including ivacaftor, lumacaftor, tezacaftor, VX-371, VX-440, VX-152, VX-659, VX-445, VX-150 and VX-210, and the expected timing of our receipt of data from our ongoing and planned clinical trials;
- the data that will be generated by ongoing and planned clinical trials and the ability to use that data to advance compounds, continue development or support regulatory filings;
- our beliefs regarding the support provided by clinical trials and preclinical and nonclinical studies of our drug candidates for further investigation, clinical trials or potential use as a treatment;
- our plan to continue investing in our research and development programs and our strategy to develop our drug candidates, alone or with third party-collaborators;
- the establishment, development and maintenance of collaborative relationships;
- potential business development activities;
- potential fluctuations in foreign currency exchange rates;
- our ability to use our research programs to identify and develop new drug candidates to address serious diseases and significant unmet medical needs; and
- our liquidity and our expectations regarding the possibility of raising additional capital.

Any or all of our forward-looking statements in this Annual Report on Form 10-K may turn out to be wrong. They can be affected by inaccurate assumptions or by known or unknown risks and uncertainties. Many factors mentioned in this Annual Report on Form 10-K will be important in determining future results. Consequently, no forward-looking statement can be guaranteed. Actual future results may vary materially from expected results. We also provide a cautionary discussion of risks and uncertainties under "Risk Factors" above in this Item 1A. These are factors and uncertainties that we think could cause our actual results to differ materially from expected results. Other factors and uncertainties besides those listed there could also adversely affect us.

Without limiting the foregoing, the words "believes," "anticipates," "plans," "intends," "expects" and similar expressions are intended to identify forward-looking statements. There are a number of factors and uncertainties that could cause actual events or results to differ materially from those indicated by such forward-looking statements, many of which are beyond our control, including the factors and uncertainties set forth under "Risk Factors" above in this Item 1A. In addition, the forward-looking statements contained herein represent our estimate only as of the date of this filing and should not be relied upon as representing our estimate as of any subsequent date. While we may elect to update these forward-looking statements at some point in the future, we specifically disclaim any obligation to do so to reflect actual results, changes in assumptions or changes in other factors affecting such forward-looking statements.

ITEM 1B. UNRESOLVED STAFF COMMENTS

We did not receive any written comments from the Securities and Exchange Commission prior to the date 180 days before the end of the fiscal year ended December 31, 2016 regarding our filings under the Securities Exchange Act of 1934, as amended, that have not been resolved.

ITEM 2. PROPERTIES

Corporate Headquarters

We lease approximately 1.1 million square feet of office and laboratory space at our corporate headquarters in Boston, Massachusetts in two buildings pursuant to two leases that we entered into in May 2011. The leases commenced in December 2013 and will extend until December 2028. We have an option to extend the term of the leases for an additional ten years. In addition, in connection with our relocation to Boston, we entered into a lease in June 2012 for approximately 100,000 square feet of space in the Boston Marine Industrial Park, in close proximity to our corporate headquarters. We are using this additional space for certain logistical and laboratory operations and manufacturing equipment that will complement the office and laboratory facilities at our corporate headquarters.

Facility in Cambridge, Massachusetts

We currently lease approximately 290,000 square feet of laboratory and office space at our former Kendall Square facility in Cambridge, Massachusetts that will expire in 2018. We have subleased approximately 267,000 square feet of the approximately 290,000 square feet of the Kendall Square facility under subleases, each with terms ending in 2018.

Additional United States and Worldwide Locations

In addition to our facilities in Massachusetts, we lease an aggregate of approximately 300,000 square feet of space. This includes laboratory and office space to support our research and development organizations in San Diego, California and Milton Park, Abingdon, England, London, England and office space in many of the countries in which we sell our products. In addition, in December 2015, we entered into a lease for approximately 170,000 square feet of office and laboratory space under construction in San Diego, California, which will replace our existing facility in San Diego. The lease will commence upon completion of the building, scheduled for the first half of 2018, and will extend for 16 years from the commencement date.

ITEM 3. LEGAL PROCEEDINGS

Local No. 8 IBEW Retirement Plan & Trust v. Vertex Pharmaceuticals Incorporated, et al.

On May 28, 2014, a purported shareholder class action *Local No. 8 IBEW Retirement Plan & Trust v. Vertex Pharmaceuticals Incorporated, et al.* was filed in the United States District Court for the District of Massachusetts, naming us and certain of our current and former officers and directors as defendants. The lawsuit alleged that we made material misrepresentations and/or omissions of material fact in our disclosures during the period from May 7, 2012 through May 29, 2012, all in violation of Section 10(b) of the Securities Exchange Act of 1934, as amended, and Rule 10b-5 promulgated thereunder. The purported class consisted of all persons (excluding defendants) who purchased our common stock between May 7, 2012 and May 29, 2012. The plaintiffs sought unspecified monetary damages, costs and attorneys' fees as well as disgorgement of the proceeds from certain individual defendants' sales of our stock. On October 8, 2014, the Court approved Local No. 8 IBEW Retirement Fund as lead plaintiff, and Scott and Scott LLP as lead counsel for the plaintiff and the putative class. On September 30, 2015, the court granted our motion to dismiss. On October 15, 2015, the plaintiff filed a notice of appeal. In 2016, the parties filed briefs with, and presented oral arguments to, the First Circuit Court of Appeals.

On October 3, 2016, the First Circuit Court of Appeals affirmed the district court's dismissal of the plaintiff's complaint. The times for petitioning the U.S. Court of Appeals for the First Circuit for an en banc rehearing as well as filing a petition for certiorari to the U.S. Supreme Court both have passed.

In the third quarter of 2015, we received a subpoena from the United States Department of Justice related to our marketed medicines. This subpoena requested documents relating primarily to our Good Laboratory Practices in a bioanalytical laboratory. We have responded to the subpoena and intend to continue to cooperate.

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

Our common stock is traded on The NASDAQ Global Select Market under the symbol "VRTX." The following table sets forth for the periods indicated the high and low sale prices per share of our common stock as reported by NASDAQ Stock Market LLC:

Year Ended December 31, 2016:	**High**	**Low**
First quarter	$ 124.96	$ 75.90
Second quarter	96.49	75.92
Third quarter	103.73	83.50
Fourth quarter	97.93	71.46

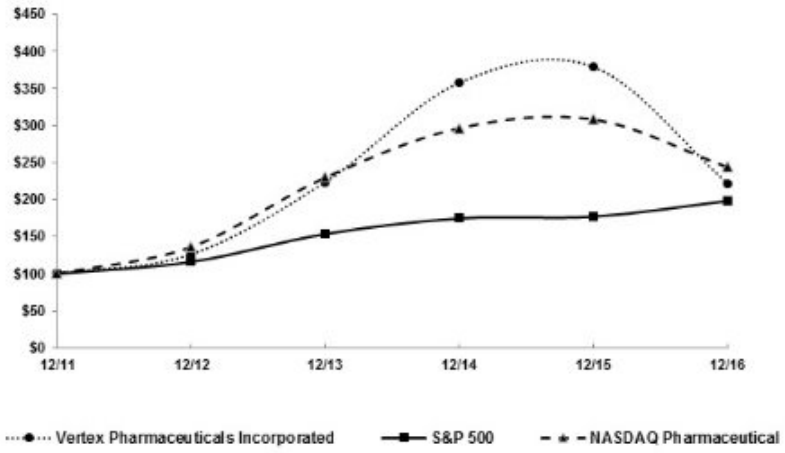
Year Ended December 31, 2015:	**High**	**Low**
First quarter	$ 136.33	$ 103.75
Second quarter	137.50	113.68
Third quarter	143.45	97.45
Fourth quarter	134.71	101.49

Shareholders

As of February 10, 2017 , there were 1,629 holders of record of our common stock.

Performance Graph

CUMULATIVE TOTAL RETURN
Based on Initial Investment of $100 on December 31, 2011
with dividends reinvested (fiscal years ended December 31)



We became part of the Standard & Poor's 500 ("S&P 500 ®") Stock Index in 2013.

Dividends

We have never declared or paid any cash dividends on our common stock, and we currently expect that any future earnings will be retained for use in our business. Any future determination to declare cash dividends will be subject to the discretion of our board of directors and applicable law and will depend on various factors, including our results of operations, financial condition, prospects and any other factors deemed relevant by our board of directors. In addition, our credit agreement limits our ability to pay cash dividends on our common stock.

Issuer Repurchases of Equity Securities

The table set forth below shows all repurchases of securities by us during the three months ended December 31, 2016 :

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Number of Shares that May Yet be Purchased Under the Plans or Programs
Oct. 1, 2016 to Oct. 31, 2016	23,701	$ 0.01	—	—
Nov. 1, 2016 to Nov. 30, 2016	16,880	$ 0.01	—	—
Dec. 1, 2016 to Dec. 31, 2016	10,946	$ 0.01	—	—

The repurchases were made under the terms of our Amended and Restated 2006 Stock and Option Plan and Amended and Restated 2013 Stock and Option Plan. Under these plans, we award shares of restricted stock to our employees that typically are subject to a lapsing right of repurchase by us. We may exercise this right of repurchase if a restricted stock recipient's service to us is terminated. If we exercise this right, we are required to repay the purchase price paid by or on behalf of the recipient for the repurchased restricted shares, which typically is the par value per share of $0.01. Repurchased shares are returned and are available for future awards under the terms of our Amended and Restated 2013 Stock and Option Plan.

ITEM 6. SELECTED FINANCIAL DATA

The following unaudited selected consolidated financial data are derived from our audited consolidated financial statements and have been revised to reflect discontinued operations. These data should be read in conjunction with our audited consolidated financial statements and related notes that are included elsewhere in this Annual Report on Form 10-K and with "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in Item 7.

	Year Ended December 31,				
	2016	2015	2014	2013	2012
	(in thousands, except per share amounts)				
Consolidated Statements of Operations Data:					
Product revenues, net					
KALYDECO product revenues, net	$ 703,432	$ 631,674	$ 463,750	$ 371,285	$ 171,645
ORKAMBI product revenues, net	979,590	350,663	—	—	—
INCIVEK product revenues, net	610	17,987	24,071	466,360	1,161,813
Total product revenues, net	1,683,632	1,000,324	487,821	837,645	1,333,458
Royalty revenues	16,600	23,959	40,919	156,592	141,498
Collaborative revenues (1)	1,945	8,053	51,675	217,738	52,086
Total revenues	1,702,177	1,032,336	580,415	1,211,975	1,527,042
Total costs and expenses (2)	1,692,241	1,499,215	1,272,827	1,821,983	1,480,315
(Loss) income from continuing operations attributable to Vertex	(112,052)	(556,334)	(737,643)	(503,622)	32,271
(Loss) income from discontinued operations attributable to Vertex (3)	—	—	(912)	58,594	(139,303)
Net (loss) income attributable to Vertex	$ (112,052)	$ (556,334)	$ (738,555)	$ (445,028)	$ (107,032)
Diluted (loss) income from continuing operations attributable to Vertex per common share	$ (0.46)	$ (2.31)	$ (3.14)	$ (2.24)	$ 0.15
Shares used in per diluted share calculations	244,685	241,312	235,307	224,906	215,262

	As of December 31,				
	2016	2015	2014	2013	2012
	(in thousands)				
Consolidated Balance Sheet Data:					
Cash, cash equivalents and marketable securities	$ 1,434,557	$ 1,042,462	$ 1,387,106	$ 1,465,076	$ 1,321,215
Total assets	2,896,787	2,498,587	2,334,679	2,319,041	2,759,288
Total current liabilities (4)	792,537	506,167	368,254	397,829	432,624
Long-term debt obligations, excluding current portion (5)	—	223,863	280,569	—	400,000
Construction financing lease obligation, excluding current portion (6)	486,359	472,611	473,073	440,937	268,031
Other long-term obligations	279,700	202,318	116,600	123,870	424,251

(1) In 2013, we recorded $203.4 million of collaborative revenues from Janssen NV, which were primarily attributable to a 2013 amendment to our collaboration agreement with Janssen NV. See Note B, "Collaborative Arrangements."

(2) Total costs and expenses included (i) in 2013 and 2012, an aggregate of $10.4 million and $133.2 million, respectively, of write-offs for excess and obsolete inventories, (ii) in 2013 and 2012, total costs and expenses included intangible asset impairment charges of $412.9 million and $105.8 million , respectively and (iii) in 2016, 2015, 2014 and 2013, $1.3 million , $2.2 million , $50.9 million and $40.5 million, respectively, of restructuring charges. See Note H, "Inventories," Note J, "Intangible Assets and Goodwill" and Note Q, "Restructuring Expenses."

(3) (Loss) income from discontinued operations attributable to Vertex relates to our collaboration with Alios BioPharma, Inc., in 2012 through 2013, which we deconsolidated as of December 31, 2013. See Note B, "Collaborative Arrangements."

(4) In 2016, we borrowed $300.0 million pursuant to a revolving credit facility that matures in October 2021. In February 2017, we repaid the $300.0 million that was outstanding under our revolving credit facility. See Note L, "Long Term Obligations."

(5) In 2013, our convertible senior subordinated notes (due 2015) with an aggregate principal amount of $400.0 million were converted into common stock or redeemed. During 2016, we terminated and repaid all outstanding obligations under our term loan. See Note L, "Long Term Obligations."

(6) In 2011, we entered into two leases for our corporate headquarters, which we occupied in December 2013. We are deemed for accounting purposes to be the owner of the buildings. See Note L, "Long Term Obligations."

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

OVERVIEW

We are in the business of discovering, developing, manufacturing and commercializing medicines for serious diseases. We use precision medicine approaches with the goal of creating transformative medicines for patients in specialty markets. Our business is focused on developing and commercializing therapies for the treatment of cystic fibrosis, or CF, and advancing our research and development programs in other indications, while maintaining our financial strength. Our two marketed products are ORKAMBI (lumacaftor in combination with ivacaftor) and KALYDECO (ivacaftor).

Our total net product revenues were $1.7 billion in 2016 , an increase of 68% over net product revenues of $1.0 billion in 2015 , primarily due to increased ORKAMBI net product revenues, which commenced in the third quarter of 2015, and an increase in KALYDECO net product revenues. We expect our net income (loss) and total net product revenues in 2017 will be largely dependent on the level of ORKAMBI net product revenues.

Cystic Fibrosis

ORKAMBI and KALYDECO are approved to treat approximately 40% of the 75,000 CF patients in North America, Europe, Australia and Canada. ORKAMBI (lumacaftor in combination with ivacaftor) is approved as a treatment for approximately 25,000 patients who have two copies (homozygous) of the F508del mutation in their cystic fibrosis transmembrane conductance regulator, or *CFTR,* gene. KALYDECO (ivacaftor) is approved for the treatment of approximately 4,000 CF patients who have the G551D mutation or other specified mutations in their *CFTR* gene. Our goal is to develop treatment regimens that will provide benefits to as many patients with CF as possible and will enhance the benefits that currently are being provided to patients taking our medicines.

CF Development Programs

We have multiple development programs in the field of CF, including:

- Tezacaftor (VX-661) is a corrector compound that we are evaluating in a Phase 3 development program in combination with ivacaftor in multiple CF patient populations who have at least one copy of the F508del mutation in their *CFTR* gene. We expect data from this Phase 3 development program in the first half of 2017. If supported by data from the Phase 3 development program, we plan to submit a New Drug Application, or NDA, to the United States Food and Drug Administration, or FDA for tezacaftor in combination with ivacaftor in the second half of 2017.

- VX-152, VX-440, VX-659 and VX-445 are next-generation CFTR corrector compounds that we are evaluating as part of combination treatment regimens. We have initiated Phase 2 clinical trials of VX-152 and VX-440 and expect data from these clinical trials in the second half of 2017. We have initiated Phase 1 clinical trials of VX-659 and VX-445.

- VX-371, an investigational epithelial sodium channel, or ENaC, inhibitor, is being evaluated in a Phase 2 development program and which we exclusively licensed from Parion Sciences, Inc., or Parion, in 2015.

Research and Development

We are engaged in a number of other research and mid- and early-stage development programs, including in the areas of pain and neurology. We have also entered into third-party collaborations pursuant to which we are engaged in the discovery and development of nucleic acid-based therapies for a variety of diseases, including CF. We plan to continue investing in our research programs and fostering scientific innovation in order to identify and develop transformative medicines. Our current research programs include programs targeting cystic fibrosis, adrenoleukodystrophy, alpha-1 antritrypsin deficiency, sickle cell disease and polycystic kidney disease. We believe that pursuing research in diverse areas allows us to balance the risks inherent in drug development and may provide drug candidates that will form our pipeline in future years.

Collaboration Arrangements

We have entered into collaborations with biotechnology and pharmaceutical companies in order to acquire rights or to license drug candidates or technologies that enhance our pipeline and/or our research capabilities. Over the last several years, we entered into collaboration agreements with:

- CRISPR Therapeutics AG, or CRISPR, pursuant to which we are collaborating on the discovery and development of potential new treatments aimed at the underlying genetic causes of human diseases using CRISPR-Cas9 gene editing technology;
- Parion Sciences, Inc., or Parion, pursuant to which we are developing epithelial sodium channel, or ENaC, inhibitors for the treatment of pulmonary diseases;
- Moderna Therapeutics, Inc., or Moderna, pursuant to which we are seeking to identify and develop mRNA therapeutics for the treatment of CF; and
- BioAxone Biosciences, Inc., or BioAxone, pursuant to which we are evaluating VX-210 as a potential treatment for patients who have spinal cord injuries.

Generally, when we in-license a technology or drug candidate, we make upfront payments to the collaborator, assume the costs of the program and agree to make contingent payments, which could consist of milestone, royalty and option payments. Depending on many factors, including the structure of the collaboration, the significance of the drug candidate that we license to the collaborator's operations and the other activities in which our collaborators are engaged, the accounting for these transactions can vary significantly. For example, the upfront payments and expenses incurred in connection with our CRISPR and Moderna collaborations are being expensed as research expenses because the collaboration represents a small portion of these collaborators overall business. CRISPR and Moderna's activities unrelated to our collaborations have no effect on our consolidated financial statements. Parion and BioAxone are being accounted for as variable interest entities, or VIEs, and are included in our consolidated financial statements due to (i) the significance of the respective licensed programs to Parion and BioAxone as a whole, (ii) our power to control the significant activities under each collaboration and (iii) our obligation to absorb losses and right to receive benefits that potentially could be significant. Each of our consolidated VIEs are engaging in activities unrelated to our collaboration, including in the case of Parion, seeking to develop novel treatments for pulmonary and ocular diseases. The revenues and expenses unrelated to the programs we in-license from our VIEs are immaterial to our consolidated financial statements. In each case, the activities unrelated to our collaboration represent less than 1% of our total revenues and total expenses. Because we consolidate our VIEs, we evaluate the fair value of the contingent payments payable by us on a quarterly basis. Changes in the fair value of these contingent future payments affect net income attributable to Vertex on a dollar-for-dollar basis, with increases in the fair value of contingent payments payable by us to a VIE resulting in a decrease in net income attributable to Vertex (or an increase in net loss attributable to Vertex) and decreases in the fair value of contingent payments payable by us to a VIE resulting in an increase in net income attributable to Vertex (or decrease in net loss attributable to Vertex). For additional information regarding our VIEs see Note B "Collaborative Arrangements" and our critical accounting policies "Collaborations; Variable Interest Entities."

We have also out-licensed internally developed programs to collaborators who are leading the development of these programs. These outlicense arrangements include our collaboration agreements with:

- Merck KGaA, pursuant to which Merck KGaA will, subject to regulatory approval, obtain rights to four oncology research and development programs; and
- Janssen Pharmaceuticals, Inc. which is developing JNJ-3872 (formerly VX-787) for the treatment of influenza.

Pursuant to these outlicensing arrangements, our collaborators are responsible for the research, development and commercialization costs associated with these programs and we are entitled to receive contingent milestone and/or royalty payments. As a result, we do not expect to incur significant expenses in connection with these programs and have the potential for future collaborative and/or royalty revenues resulting from these programs.

Drug Discovery and Development

Discovery and development of a new pharmaceutical product is a difficult and lengthy process that requires significant financial resources along with extensive technical and regulatory expertise and can take 10 to 15 years or more. Potential drug candidates are subjected to rigorous evaluations, driven in part by stringent regulatory considerations, designed to

generate information concerning efficacy, side-effects, proper dosage levels and a variety of other physical and chemical characteristics that are important in determining whether a drug candidate should be approved for marketing as a pharmaceutical product. Most chemical compounds that are investigated as potential drug candidates never progress into development, and most drug candidates that do advance into development never receive marketing approval. Because our investments in drug candidates are subject to considerable risks, we closely monitor the results of our discovery, research, clinical trials and nonclinical studies and frequently evaluate our drug development programs in light of new data and scientific, business and commercial insights, with the objective of balancing risk and potential. This process can result in abrupt changes in focus and priorities as new information becomes available and as we gain additional understanding of our ongoing programs and potential new programs, as well as those of our competitors.

If we believe that data from a completed registration program support approval of a drug candidate, we submit an NDA to the FDA requesting approval to market the drug candidate in the United States and seek analogous approvals from comparable regulatory authorities in foreign jurisdictions. To obtain approval, we must, among other things, demonstrate with evidence gathered in nonclinical studies and well-controlled clinical trials that the drug candidate is safe and effective for the disease it is intended to treat and that the manufacturing facilities, processes and controls for the manufacture of the drug candidate are adequate. The FDA and foreign regulatory authorities have substantial discretion in deciding whether or not a drug candidate should be granted approval based on the benefits and risks of the drug candidate in the treatment of a particular disease, and could delay, limit or deny regulatory approval. If regulatory delays are significant or regulatory approval is limited or denied altogether, our financial results and the commercial prospects for the drug candidate involved will be harmed.

Regulatory Compliance

Our marketing of pharmaceutical products is subject to extensive and complex laws and regulations. We have a corporate compliance program designed to actively identify, prevent and mitigate risk through the implementation of compliance policies and systems, and through the promotion of a culture of compliance. Among other laws, regulations and standards, we are subject to various U.S. federal and state laws, and comparable foreign laws pertaining to health care fraud and abuse, including anti-kickback and false claims statutes, and laws prohibiting the promotion of drugs for unapproved or off-label uses. Anti-kickback laws make it illegal for a prescription drug manufacturer to solicit, offer, receive or pay any remuneration to induce the referral of business, including the purchase or prescription of a particular drug. False claims laws prohibit anyone from presenting for payment to third-party payors, including Medicare and Medicaid, claims for reimbursed drugs or services that are false or fraudulent, claims for items or services not provided as claimed, or claims for medically unnecessary items or services. We expect to continue to devote substantial resources to maintain, administer and expand these compliance programs globally.

Reimbursement

Sales of our products depend, to a large degree, on the extent to which our products are covered by third-party payors, such as government health programs, commercial insurance and managed health care organizations. We dedicate substantial management and other resources in order to obtain and maintain appropriate levels of reimbursement for our products from third-party payors, including governmental organizations in the United States and ex-U.S. markets. In the United States, we continue to engage in discussions with numerous commercial insurers and managed health care organizations, along with government health programs that are typically managed by authorities in the individual states. In Europe and other ex-U.S. markets, we are working to obtain government reimbursement for ORKAMBI on a country-by-country basis, because in many foreign countries patients are unable to access prescription pharmaceutical products that are not reimbursed by their governments. In the fourth quarter of 2016, we reached a pricing and reimbursement agreement for ORKAMBI with the German Federal Association of the Statutory Health Insurances. Consistent with our experience with KALYDECO when it was first approved, we expect reimbursement discussions in ex-U.S. markets may take a significant period of time.

Recent Transaction

In January 2017, we entered into a Strategic Collaboration and License Agreement with Merck KGaA, Darmstadt, Germany, or Merck KGaA. Pursuant to the agreement, we granted Merck KGaA an exclusive worldwide license to research, develop and commercialize four oncology research and development programs, including our ataxia telangiectasia and Rad3-related protein inhibitor, or ATR program, including VX-970 and VX-803, and our DNA-dependent protein kinase inhibitor, or DNA-PK program, including VX-984. Under the agreement, we expect to receive an up-front payment of $230.0 million , subject to Hart-Scott Rodino clearance, and tiered royalties on potential sales of licensed products.

RESULTS OF OPERATIONS

	2016	2015	2014	2016/2015 Comparison Increase/(Decrease) $	2016/2015 Comparison Increase/(Decrease) %	2015/2014 Comparison Increase/(Decrease) $	2015/2014 Comparison Increase/(Decrease) %
	(in thousands)			(in thousands, except percentages)			
Revenues	$ 1,702,177	$ 1,032,336	$ 580,415	$ 669,841	65 %	$ 451,921	78 %
Operating costs and expenses	1,692,241	1,499,215	1,272,827	193,026	13 %	226,388	18 %
Other items, net	(121,988)	(89,455)	(45,231)	$ 32,533	36 %	44,224	98 %
Loss from continuing operations attributable to Vertex	(112,052)	(556,334)	(737,643)	(444,282)	(80)%	(181,309)	(25)%
Loss from discontinued operations attributable to Vertex	—	—	(912)	n/a	n/a	n/a	n/a
Net loss attributable to Vertex	$ (112,052)	$ (556,334)	$ (738,555)	$ (444,282)	(80)%	$ (182,221)	(25)%

Net Loss Attributable to Vertex

Comparison of Net Loss Attributable to Vertex 2016 vs. 2015

Net loss attributable to Vertex was $112.1 million in 2016 as compared to a net loss attributable to Vertex of $556.3 million in 2015 . Our revenues increased significantly in 2016 as compared to 2015 primarily due to a $628.9 million increase in ORKAMBI net product revenues, which we began selling in mid-2015, and a $71.8 million increase in KALYDECO net product revenues, partially offset by decreases in our royalty revenues and collaborative revenues. Our operating costs and expenses increased in 2016 as compared to 2015 primarily due to increases in cost of product revenues, research and development expenses, sales, general and administrative expenses.

The change in our other items, net was primarily due to a $54.9 million increase in the fair value of contingent payments related to our consolidated VIEs, which results in an increase in net loss attributable to Vertex.

Comparison of Net Loss Attributable to Vertex 2015 vs. 2014

Net loss attributable to Vertex was $556.3 million in 2015 as compared to a net loss attributable to Vertex of $738.6 million in 2014 . Our revenues increased significantly in 2015 as compared to 2014 primarily due to ORKAMBI net product revenues, which commenced in the third quarter of 2015, and a $167.9 million increase in KALYDECO net product revenues, partially offset by a $43.6 million decrease in our collaborative revenues. Our operating costs and expenses increased in 2015 as compared to 2014 primarily due to increases in research and development expenses, sales, general and administrative expenses and cost of product revenues, partially offset by decreased restructuring expenses and royalty expenses.

Our other items, net in 2015 and 2014, included $4.5 million and $0.5 million increases in the fair value of contingent payments related to our consolidated VIEs, which resulted in corresponding increases in net loss attributable to Vertex.

Earnings Per Share

In 2016 , 2015 and 2014 , net loss attributable to Vertex was $0.46 , $2.31 and $3.14 , respectively, per diluted share. In 2016 , 2015 and 2014 , net loss from continuing operations attributable to Vertex was $0.46 , $2.31 and $3.14 , respectively, per diluted share.

Common Shares Outstanding

Our shares of outstanding common stock increased from 246.3 million shares on December 31, 2015 to 248.3 million shares on December 31, 2016 due to our issuance in 2016 of approximately 2.0 million shares of common stock pursuant to our employee equity programs. Our shares of outstanding common stock increased from 241.8 million shares on December 31, 2014 to 246.3 million shares on December 31, 2015 due to our issuance in 2015 of approximately 4.5 million shares of common stock issued pursuant to our employee equity programs.

Stock-based Compensation

Stock-based compensation expense was $237.7 million , $231.0 million and $177.5 million in 2016 , 2015 and 2014 , respectively. The increase in stock-based compensation expense has primarily been due to increases in the grant-date fair value of equity awards granted in recent years, partially offset by changes we have made in our equity compensation program.

Revenues

				2016/2015 Comparison		2015/2014 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2016	2015	2014	$	%	$	%
	(in thousands)			(in thousands, except percentages)			
Product revenues, net	$ 1,683,632	$ 1,000,324	$ 487,821	$ 683,308	68 %	$ 512,503	105 %
Royalty revenues	16,600	23,959	40,919	(7,359)	(31)%	(16,960)	(41)%
Collaborative revenues	1,945	8,053	51,675	(6,108)	(76)%	(43,622)	(84)%
Total revenues	$ 1,702,177	$ 1,032,336	$ 580,415	$ 669,841	65 %	$ 451,921	78 %

Product Revenues, Net

	2016	2015	2014
	(in thousands)		
ORKAMBI	$ 979,590	$ 350,663	$ —
KALYDECO	$ 703,432	$ 631,674	$ 463,750
INCIVEK	610	17,987	24,071
Total product revenues, net	$ 1,683,632	$ 1,000,324	$ 487,821

Our total net product revenues increased by 68% in 2016 as compared to 2015 due to increased net product revenues from ORKAMBI, which was approved by the FDA in July 2015, and increased KALYDECO net product revenues.

ORKAMBI sales commenced in mid-2015 and ORKAMBI net product revenues increased from $350.7 million in 2015 to $979.6 million in 2016 . In 2015 and 2016 , we recognized approximately $1.6 million and $76.4 million , respectively, in ex-U.S. ORKAMBI net product revenues, which were mainly from Germany. We also are distributing ORKAMBI in France pursuant to an early access program, but are not recognizing any revenues on ORKAMBI sales in France because the price is not fixed or determinable. Our consolidated balance sheets include $73.4 million collected as of December 31, 2016 in France related to ORKAMBI. We believe that the level of our ORKAMBI revenues during 2017 will be dependent whether, when and on what terms we are able to obtain reimbursement in additional ex-U.S. markets, the number and rate at which additional patients begin treatment with ORKAMBI, the proportion of initiated patients who remain on treatment and the compliance rates for patients who remain on treatment.

In 2016 , KALYDECO net product revenues were $703.4 million , including $303.9 million of net product revenues from ex-U.S. markets, compared to KALYDECO net product revenues of $631.7 million in 2015, including $266.1 million of net product revenues from ex-U.S. markets. In 2017, we expect our KALYDECO net product revenues will be similar to our KALYDECO net product revenues in 2016. In 2014, KALYDECO net product revenues were $463.8 million , including $201.4 million of net product revenues from ex-U.S. markets. The increase s were primarily due to additional patients being treated with KALYDECO as we completed reimbursement discussions in various jurisdictions and to the increased number of patients eligible to receive KALYDECO through label expansions.

INCIVEK net product revenues were $0.6 million , $18.0 million and $24.1 million in 2016, 2015 and 2014, respectively. We have withdrawn INCIVEK from the market and may continue to have small adjustments to INCIVEK revenues over the next several quarters as we adjust our INCIVEK reserves for rebates, chargebacks and discounts.

Royalty Revenues

Our royalty revenues were $16.6 million , $24.0 million and $40.9 million in 2016 , 2015 and 2014 , respectively. Since the beginning of 2014, our royalty revenues have consisted of (i) revenues related to a cash payment we received in 2008

when we sold our rights to certain HIV royalties and (ii) revenues related to certain third-party royalties payable by our collaborators on sales of HIV drugs and telaprevir that also result in corresponding royalty expenses.

Collaborative Revenues

Our collaborative revenues were $1.9 million , $8.1 million and $51.7 million in 2016 , 2015 and 2014 , respectively. In 2014 , the majority of our collaborative revenues related to $35.0 million in payments we received from Janssen Inc. related to our outlicense of VX-787. Our collaborative revenues have historically fluctuated significantly from one period to another and may continue to fluctuate in the future. We expect our collaborative revenues to increase significantly in 2017 as a result of the $230.0 million upfront payment we expect to receive pursuant to the collaboration agreement with Merck KGaA that we entered into in January 2017.

Operating Costs and Expenses

				2016/2015 Comparison		2015/2014 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2016	2015	2014	$	%	$	%
	(in thousands)			(in thousands, except percentages)			
Cost of product revenues	$ 206,811	$ 117,151	$ 39,725	$ 89,660	77 %	$ 77,426	195 %
Royalty expenses	3,649	7,361	21,262	(3,712)	(50)%	(13,901)	(65)%
Research and development expenses	1,047,690	995,922	855,506	51,768	5 %	140,416	16 %
Sales, general and administrative expenses	432,829	376,575	305,409	56,254	15 %	71,166	23 %
Restructuring expenses	1,262	2,206	50,925	(944)	(43)%	(48,719)	(96)%
Total costs and expenses	$ 1,692,241	$ 1,499,215	$ 1,272,827	$ 193,026	13 %	$ 226,388	18 %

Cost of Product Revenues

Our cost of product revenues includes the cost of producing inventories that corresponded to product revenues for the reporting period, plus the third-party royalties payable on our net sales of our products. Pursuant to our agreement with Cystic Fibrosis Foundation Therapeutics Incorporated, or CFFT, our tiered third-party royalties on sales of KALYDECO and ORKAMBI, calculated as a percentage of net sales, range from the single digits to the sub-teens.

Our cost of product revenues have been increasing due primarily to increased net product revenues. In each of 2016 and 2015, our cost of product revenues included a $13.9 million commercial milestone that was earned by CFFT related to sales of ORKAMBI. There are no further commercial milestones payable to CFFT. In future periods, our cost of product revenues will not be affected by commercial milestones on ORKAMBI, with our cost of product revenues generally tracking our net product revenues.

Royalty Expenses

Royalty expenses include third-party royalties payable upon net sales of telaprevir by our collaborators in their territories and expenses related to a subroyalty payable to a third party on net sales of an HIV protease inhibitor sold by GlaxoSmithKline. Royalty expenses do not include royalties we pay to CFFT on sales of KALYDECO and ORKAMBI, which instead are included in cost of product revenues.

Research and Development Expenses

	2016	2015	2014	2016/2015 Comparison Increase/(Decrease) $	2016/2015 Comparison Increase/(Decrease) %	2015/2014 Comparison Increase/(Decrease) $	2015/2014 Comparison Increase/(Decrease) %
	(in thousands)			(in thousands, except percentages)			
Research expenses	$ 314,602	$ 337,797	$ 257,483	$ (23,195)	(7)%	$ 80,314	31%
Development expenses	733,088	658,125	598,023	74,963	11 %	60,102	10%
Total research and development expenses	$ 1,047,690	$ 995,922	$ 855,506	$ 51,768	5 %	$ 140,416	16%

Our research and development expenses include internal and external costs incurred for research and development of our drugs and drug candidates. We do not assign our internal costs, such as salary and benefits, stock-based compensation expense, laboratory supplies and other direct expenses and infrastructure costs, to individual drugs or drug candidates, because the employees within our research and development groups typically are deployed across multiple research and development programs. These internal costs are significantly greater than our external costs, such as the costs of services provided to us by clinical research organizations and other outsourced research, which we allocate by individual program. All research and development costs for our drugs and drug candidates are expensed as incurred.

Over the past three years, we have incurred $2.9 billion in research and development expenses associated with drug discovery and development. The successful development of our drug candidates is highly uncertain and subject to a number of risks. In addition, the duration of clinical trials may vary substantially according to the type, complexity and novelty of the drug candidate and the disease indication being targeted. The FDA and comparable agencies in foreign countries impose substantial requirements on the introduction of therapeutic pharmaceutical products, typically requiring lengthy and detailed laboratory and clinical testing procedures, sampling activities and other costly and time-consuming procedures. Data obtained from nonclinical and clinical activities at any step in the testing process may be adverse and lead to discontinuation or redirection of development activities. Data obtained from these activities also are susceptible of varying interpretations, which could delay, limit or prevent regulatory approval. The duration and cost of discovery, nonclinical studies and clinical trials may vary significantly over the life of a project and are difficult to predict. Therefore, accurate and meaningful estimates of the ultimate costs to bring our drug candidates to market are not available.

In 2014 , 2015 and 2016 , costs related to our CF programs represented the largest portion of our development costs. Any estimates regarding development and regulatory timelines for our drug candidates are highly subjective and subject to change. We cannot make a meaningful estimate when, if ever, our other clinical development programs will generate revenues and cash flows.

Research Expenses

	2016	2015	2014	2016/2015 Comparison Increase/(Decrease) $	2016/2015 Comparison Increase/(Decrease) %	2015/2014 Comparison Increase/(Decrease) $	2015/2014 Comparison Increase/(Decrease) %
	(in thousands)			(in thousands, except percentages)			
Research Expenses:							
Salary and benefits	$ 80,845	$ 81,752	$ 82,975	$ (907)	(1)%	$ (1,223)	(1)%
Stock-based compensation expense	51,034	49,744	40,531	1,290	3 %	9,213	23 %
Laboratory supplies and other direct expenses	43,151	37,058	38,082	6,093	16 %	(1,024)	(3)%
Outsourced services	33,682	24,210	17,401	9,472	39 %	6,809	39 %
Collaboration payments	33,000	75,000	—	(42,000)	(56)%	n/a	n/a
Infrastructure costs	72,890	70,033	78,494	2,857	4 %	(8,461)	(11)%
Total research expenses	$ 314,602	$ 337,797	$ 257,483	$ (23,195)	(7)%	$ 5,314	2 %

Over the past three years we have maintained a substantial and consistent investment in our internal research activities. Our total research expenses in 2016 and 2015 have been affected by research expenses associated with our business

development activities, including in 2016 a $20.0 million upfront payment to Moderna Therapeutics, Inc. and approximately $10.0 million in expenses related to the acquisition of early-stage research assets, and in 2015 a $75.0 million upfront payment we made to CRISPR Therapeutics AG, or CRISPR. We expect to continue to invest in our research programs with a focus on identifying drug candidates with the goal of creating transformative medicines.

Development Expenses

				2016/2015 Comparison		2015/2014 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2016	2015	2014	$	%	$	%
	(in thousands)			(in thousands, except percentages)			
Development Expenses:							
Salary and benefits	$ 177,399	$ 164,466	$ 161,718	$ 12,933	8 %	$ 2,748	2 %
Stock-based compensation expense	102,417	103,211	76,467	(794)	(1)%	26,744	35 %
Laboratory supplies and other direct expenses	42,861	30,611	34,689	12,250	40 %	(4,078)	(12)%
Outsourced services	282,137	248,506	197,743	33,631	14 %	50,763	26 %
Drug supply costs	12,510	9,799	10,026	2,711	28 %	(227)	(2)%
Infrastructure costs	115,764	101,532	117,380	14,232	14 %	(15,848)	(14)%
Total development expenses	$ 733,088	$ 658,125	$ 598,023	$ 74,963	11 %	$ 60,102	10 %

Our development expenses increased by $75.0 million , or 11% , in 2016 as compared to 2015 and increased by $60.1 million , or 10% , in 2015 as compared to 2014 . The increase in 2016 as compared to 2015 was primarily due to an increase in outsourced services related to ongoing clinical trials, including our Phase 3 development program for tezacaftor in combination with ivacaftor and increases in salary and benefits, laboratory supplies and other direct expenses and infrastructure costs. We expect our development expenses to increase in 2017 as compared to 2016 due to activities related to clinical trials, including continuation of the Phase 3 development program for tezacaftor in combination with ivacaftor as well as clinical trials associated with our next-generation correctors.

The increased development expenses in 2015 as compared to 2014 were primarily due to an increase in outsourced services related to ongoing clinical trials, including our Phase 3 development program for tezacaftor in combination with ivacaftor and an increase in stock-based compensation expense, partially offset by decreased infrastructure costs and decreased laboratory supplies and other direct expenses.

Sales, General and Administrative Expenses

				2016/2015 Comparison		2015/2014 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2016	2015	2014	$	%	$	%
	(in thousands)			(in thousands, except percentages)			
Sales, general and administrative expenses	$ 432,829	$ 376,575	$ 305,409	$ 56,254	15%	$ 71,166	23%

Sales, general and administrative expenses increased by 15% in 2016 as compared to 2015 , and by 23% in 2015 as compared to 2014 . These increases were primarily due to increased investment in commercial support for ORKAMBI in the United States and ex-U.S. markets.

Restructuring Expense

In 2016 , 2015 and 2014 , we recorded restructuring expenses of $1.3 million , $2.2 million and $50.9 million , respectively. Our restructuring expenses in 2014 were primarily related to the relocation of our corporate headquarters in Massachusetts to Boston from Cambridge. As of December 31, 2016 , our accrued restructuring liability related to our lease obligation in Cambridge was $8.0 million . This lease obligation expires in April 2018.

Other Items, Net

Interest Expense, Net

In 2016 , 2015 and 2014 , interest expense, net was $81.4 million , $84.2 million and $72.9 million , respectively. The decrease in interest expense, net in 2016 as compared to 2015 was primarily due to a lower interest rate on the $300.0 million of outstanding borrowings following the refinancing of our credit agreement in October 2016. The increase in interest expense, net in 2015 as compared to 2014 was primarily due to the interest expense we incurred for the full fiscal year in 2015 on the $300.0 million that we borrowed in mid-2014 pursuant to our prior credit agreement. We expect our interest expense, net in 2017 to be dependent on the amounts we borrow pursuant to our revolving credit agreement during 2017.

Other Income (Expense), Net

In 2016 , net other income was $4.1 million and primarily due to foreign exchange gains. In 2015 , net other expense was $6.7 million primarily due to foreign exchange losses. In 2014 , we recorded net other income of $30.4 million primarily due to a credit of $36.7 million related to a one-time cash payment we received in 2014 from our landlord pursuant to leases for our corporate headquarters in Boston, Massachusetts.

Income Taxes

In 2016 , we recorded a provision for income taxes of $16.7 million , principally related to income taxes payable by our VIEs. In 2015 , we recorded a provision for income taxes of $30.4 million , principally due to the consolidation of Parion as a VIE into our consolidated financial statements in the second quarter of 2015. In 2014 , our provision for income taxes was $7.0 million , of which approximately $3.9 million was due to the consolidation of BioAxone as a VIE into our consolidated financial statements in the fourth quarter of 2014.

Noncontrolling Interest (VIEs)

The net (income) loss attributable to noncontrolling interest (VIEs) recorded on our consolidated statements of operations reflects Parion and BioAxone's net loss (income) for the reporting period, adjusted for any changes in the noncontrolling interest holders' claim to net assets, including contingent milestone, royalty and option payments. A summary of net (income) loss attributable to noncontrolling interest related to our VIEs for the three years ended December 31, 2016 is as follows:

	2016	2015	2014
		(in thousands)	
Loss attributable to noncontrolling interest before provision for income taxes	$ 10,086	$ 6,646	$ 764
Provision for income taxes	16,743	29,731	3,876
Increase in fair value of contingent payments	(54,850)	(4,530)	(450)
Net (income) loss attributable to noncontrolling interest	$ (28,021)	$ 31,847	$ 4,190

Discontinued Operations

In 2014, we recorded a loss from discontinued operations attributable to Vertex of $0.9 million. Our loss from discontinued operations in this period included losses due to the deconsolidation of Alios BioPharma, Inc, or Alios, our former collaborator, prior to the termination of our collaboration agreement with Alios in the fourth quarter of 2014.

LIQUIDITY AND CAPITAL RESOURCES

As of December 31, 2016 , we had cash, cash equivalents and marketable securities of $1.43 billion , which represented an increase of $392.1 million from approximately $1.04 billion as of December 31, 2015 . The increase in our cash, cash equivalents and marketable securities balance was primarily due to increased cash receipts in 2016 from product sales, partially offset by increased cash expenditures in 2016 related to, among other things, research and development expenses and sales, general and administrative expenses.

Our future cash flows will be substantially dependent on product sales of ORKAMBI and KALYDECO.

Sources of Liquidity

We intend to rely on our existing cash, cash equivalents and marketable securities together with cash flows from product sales as our primary source of liquidity. We are receiving cash flows from sales of ORKAMBI and KALYDECO from the United States and ex-U.S. markets. Future net product revenues for ORKAMBI from ex-U.S. markets will be dependent on, among other things, the timing of and ability to complete reimbursement discussions in European countries. Under the agreement we entered into in the first quarter of 2016 with Merck KGaA, we expect to receive an up-front payment of $230.0 million in 2017, subject to Hart-Scott Rodino clearance.

As of December 31, 2016, we had borrowed $300.0 million under a five-year $500.0 million revolving credit facility that we entered into in October 2016. We may repay and reborrow amounts under the revolving credit agreement without penalty. Subject to certain conditions, we may request that the borrowing capacity under this credit agreement be increased by an additional $300.0 million. In February 2017, we repaid the $300.0 million that we had borrowed pursuant to the revolving credit agreement plus accrued interest using existing cash resources.

In 2014 and 2015, we also received significant proceeds from the issuance of common stock under our employee benefit plans, but we received limited proceeds from employee benefit plans in 2016 and the amount and timing of future proceeds from employee benefits plans is uncertain. Other possible sources of liquidity include strategic collaborative agreements that include research and/or development funding, commercial debt, public and private offerings of our equity and debt securities, development milestones and royalties on sales of products, software and equipment leases, strategic sales of assets or businesses and financial transactions. Negative covenants in our credit agreement may prohibit or limit our ability to access these sources of liquidity.

Future Capital Requirements

We incur substantial operating expenses to conduct research and development activities and to operate our organization. Under the terms of our credit agreement entered into in October 2016, we are required to repay all outstanding principal amounts in 2021. We also have substantial facility and capital lease obligations, including leases for two buildings in Boston, Massachusetts that continue through 2028. In addition, we have entered into certain collaboration agreements with third parties that include the funding of certain research, development and commercialization efforts with the potential for future milestone and royalty payments by us upon the achievement of pre-established developmental and regulatory targets.

We expect that cash flows from ORKAMBI and KALYDECO, together with our current cash, cash equivalents and marketable securities will be sufficient to fund our operations for at least the next twelve months. The adequacy of our available funds to meet our future operating and capital requirements will depend on many factors, including the amounts of future revenues generated by ORKAMBI and KALYDECO and the potential introduction of one or more of our other drug candidates to the market, the level of our business development activities and the number, breadth, cost and prospects of our research and development programs.

Financing Strategy

We have a $500.0 million revolving credit facility that we entered into in October 2016. We may repay and reborrow amounts under the revolving credit agreement without penalty. In addition, subject to certain conditions, we may request that the borrowing capacity under this credit agreement be increased by an additional $300.0 million. We may raise additional capital through public offerings or private placements of our securities or securing new collaborative agreements or other methods of financing. We will continue to manage our capital structure and will consider all financing opportunities, whenever they may occur, that could strengthen our long-term liquidity profile. There can be no assurance that any such financing opportunities will be available on acceptable terms, if at all.

CONTRACTUAL COMMITMENTS AND OBLIGATIONS

The following table sets forth our commitments and obligations as of December 31, 2016 :

	Payments Due by Period				
	2017	2018-2019	2020-2021	2022 and later	Total
	(in thousands)				
Fan Pier Leases	$ 67,206	$ 139,795	$ 145,178	$ 535,032	$ 887,211
Facility leases, excluding Fan Pier Leases	36,391	41,568	39,816	200,626	318,401
Capital lease obligations	21,995	30,171	5,793	543	58,502
Revolving credit facility	300,000	—	—	—	300,000
Research, development and drug supply costs	24,061	—	—	—	24,061
Other	3,119	3,004	226	6,108	12,457
Total contractual commitments and obligations	$ 452,772	$ 214,538	$ 191,013	$ 742,309	$ 1,600,632

Leases

We lease two buildings that are located at Fan Pier in Boston, Massachusetts. We commenced lease payments on these two buildings in December 2013 and the initial lease periods end in December 2028.

In December 2015, we entered into a lease agreement, pursuant to which we agreed to lease approximately 170,000 square feet of office and laboratory space in a building under construction in San Diego, California. The lease will commence upon completion of the building, scheduled for the first half of 2018 and will extend for 16 years from the commencement date. The future minimum rental payments that we are obligated to pay after taking occupancy are included in "Facility leases, excluding Fan Pier Leases."

We currently lease laboratory and office space at our former Kendall Square facility in Cambridge, Massachusetts that will expire in 2018. Our future minimum commitments under our Kendall Square lease are included in "Facility leases, excluding Fan Pier Leases." We have entered into three subleases for a portion of the rentable square footage at the Kendall Square facility to offset our on-going contractual lease obligations. The future minimum committed income from the subleases is $15.7 million for 2017 and $5.2 million total for 2018 . These amounts are not offset against our obligations set forth in the table above.

The table also reflects leases of equipment, leasehold improvements and software licenses that are accounted for as capital leases.

Revolving Credit Facility

In October 2016, we entered into a revolving credit agreement and borrowed $300.0 million under a $500.0 million revolving credit facility. Subject to certain conditions, we may request that the borrowing capacity under this credit agreement be increased by an additional $300.0 million. The outstanding loan bears interest at a rate of LIBOR plus an applicable margin ranging from 1.75% to 2.50%, based on our consolidated leverage ratio (the ratio of our total consolidated funded indebtedness to our consolidated EBITDA for the most recently completed four fiscal quarter period). The table above reflects the $300.0 million outstanding as of December 31, 2016. The above table assumes the repayment of the $300.0 million in 2017 because we repaid the outstanding amounts under the credit agreement in February 2017. We may reborrow and repay amounts under the revolving credit agreement without penalty.

Research, Development and Drug Supply Costs

Research, development and drug supply costs, does not include certain payments we are obligated to make to clinical research organizations, or CROs, because these contracts are cancelable, at our option, with notice. However, we historically have not cancelled such contracts. As of December 31, 2016 , we had accrued $25.1 million related to these contracts for costs incurred for services provided through December 31, 2016 , and we have approximately $175.1 million in cancelable future commitments based on existing contracts as of December 31, 2016 . These amounts reflect planned expenditures based on existing contracts and do not reflect any future modifications to, or terminations of, existing contracts or anticipated or potential new contracts.

Collaborative Arrangements

We have entered into certain research and development collaboration agreements with third parties that include the funding of certain development, manufacturing and commercialization efforts with the potential for future milestone and royalty payments by us upon the achievement of pre-established developmental, regulatory and/or commercial targets. Our obligation to fund these efforts is contingent upon continued involvement in the programs and/or the lack of any adverse events that could cause the discontinuance of the programs. Our payment obligations under these collaborations include the following:

- *CFFT:* CFFT has the right to tiered royalties ranging from single digits to sub-teens on any approved drugs first synthesized and/or tested during a research term on or before February 28, 2014, including KALYDECO, ORKAMBI, lumacaftor and tezacaftor and royalties ranging from low single digits to mid-single digits on potential sales of certain compounds first synthesized and/or tested between March 1, 2014 and August 31, 2016.
- *Parion* : Parion has the potential to receive milestone and royalty payments, including up to $490.0 million in development and regulatory milestone payments for the development of VX-371 and/or VX-551 to treat CF.
- *CRISPR* : CRISPR has the potential to receive milestone and royalty payments, including up to $420.0 million in development, regulatory and commercial milestone payments for each of up to six targets pursuant to the collaboration.
- *Moderna* : Moderna has the potential to receive milestone and royalty payments, including up to $275.0 million in development and regulatory milestones.
- *BioAxone* : BioAxone has the potential to receive milestone and royalty payments, including up to $90.0 million in development and regulatory milestone payments (including a license continuation fee).

Contingent payments under these agreements become due and payable only upon achievement of certain milestones and are not included in the contractual obligations table above.

Tax-related Obligations

We exclude liabilities pertaining to uncertain tax positions from our summary of contractual obligations as we cannot make a reliable estimate of the period of cash settlement with the respective taxing authorities. As of December 31, 2016 , we did not have any liabilities associated with uncertain tax positions. As of December 31, 2016 , we cannot reasonably estimate the amount we expect to pay within the next twelve months in connection with any such settlements.

Other Funding Commitments

Our table detailing contractual commitments and obligations does not include severance payment obligations to certain of our executive officers in the event of a not-for-cause employment termination under existing employment contracts. We provide information regarding these obligations annually in our proxy statement for our annual meeting of shareholders.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements prepared in accordance with generally accepted accounting principles in the United States. The preparation of these financial statements requires us to make certain estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reported periods. These items are monitored and analyzed by management for changes in facts and circumstances, and material changes in these estimates could occur in the future. Changes in estimates are reflected in reported results for the period in which the change occurs. We base our estimates on historical experience and various other assumptions that we believe to be reasonable under the circumstances. Actual results may differ from our estimates if past experience or other assumptions do not turn out to be substantially accurate.

We believe that our application of the following accounting policies, each of which requires significant judgments and estimates on the part of management, are the most critical to aid in fully understanding and evaluating our reported financial results:

- revenue recognition;
- intangible assets;
- collaborations and variable interest entities;
- research and development accruals;
- commercial supplies and inventories;
- income taxes;
- leases;
- restructuring expenses; and
- stock-based compensation expense.

Our accounting policies, including the ones discussed below, are more fully described in the Notes to our consolidated financial statements, including Note A, "Nature of Business and Accounting Policies," included in this Annual Report on Form 10-K.

Revenue Recognition

Product Revenues, Net

We generate product revenues from sales in the United States and in international markets. We sell our products principally to a limited number of specialty pharmacy providers and selected regional wholesalers in North America as well as government-owned and supported customers in international markets, collectively, our customers. Our customers in North America subsequently resell our products to patients and health care providers. We contract with government agencies and various private organizations so that our products will be eligible for purchase by, or partial or full reimbursement from, such third-party payors. We recognize net product revenues from sales of our products upon delivery to our customers as long as:

- there is persuasive evidence that an arrangement exists between us and our customer;
- collectability is reasonably assured; and
- the price is fixed or determinable.

In order to conclude that the price is fixed or determinable, we must be able to calculate our gross product revenues from our customers and reasonably estimate our net product revenues upon delivery to our customers' locations. Our gross product revenues are based on the fixed price for our products that we charge our customers. We estimate our net product revenues by deducting from our gross product revenues (i) trade allowances, such as invoice discounts for prompt payment and customer fees, (ii) estimated government and private payor rebates, chargebacks and discounts, (iii) estimated reserves for expected product returns and (iv) estimated costs of co-pay assistance programs for patients, as well as other incentives for certain indirect customers. We make significant estimates and judgments that materially affect our recognition of net product revenues. Changes in our estimates of net product revenues could have a material effect on net product revenues recorded in the period in which we determine that change occurs.

In certain instances, we may be unable to reasonably conclude that the price is fixed or determinable at the time of delivery, in which case we defer the recognition of revenues. For example, we are distributing ORKAMBI in France pursuant to early access programs but have not recognized any product revenues based on these sales because the price was not fixed or determinable due to the ongoing negotiations regarding the reimbursement rate for ORKAMBI in France. Once we are able to determine that the price is fixed or determinable, we recognize the revenues associated with the units in which revenue recognition was deferred. Our consolidated balance sheets include $73.4 million collected as of December 31, 2016 in France related to ORKAMBI.

The value of the rebates, chargebacks and discounts provided to third-party payors per course of treatment vary significantly and are based on government-mandated discounts and our arrangements with other third-party payors. In order to estimate our total rebates, chargebacks and discounts, we estimate the percentage of prescriptions that will be covered by each third-party payor, which is referred to as the payor mix. We track available information regarding changes, if any, to the

payor mix for our products, to our contractual terms with third-party payors and to applicable governmental programs and regulations and levels of our products in the distribution channel. We adjust our estimated rebates, chargebacks and discounts based on new information, including information regarding actual rebates, chargebacks and discounts for our products, as it becomes available. Claims by third-party payors for rebates, chargebacks and discounts frequently are submitted to us significantly after the related sales, potentially resulting in adjustments in the period in which the new information becomes known.

Our customers generally have the right to return unopened unprescribed packages subject to contractual limitations. To date returns have been minimal and, based on inventory levels held by our customers and our distribution model, we believe that returns of products will continue to be minimal. We track actual returns by individual production lots and will continue to monitor inventory levels in the distribution channel. If necessary, we will adjust our estimated product returns based on new information as it becomes available.

Collaborative Revenues

We recognize revenues generated through collaborative research, development and/or commercialization agreements. The terms of these agreements typically include payment to us of one or more of the following: nonrefundable, up-front license fees; development and commercial milestone payments; funding of research and/or development activities; payments for services we provide through our third-party manufacturing network; and royalties on net sales of licensed products. Each of these types of payments results in collaborative revenues, except for revenues from royalties on net sales of licensed products, which are classified as royalty revenues.

For each collaborative research, development and/or commercialization agreement that results in revenues, we determine (i) whether multiple deliverables exist, (ii) whether the undelivered elements have value to the customer on a stand-alone basis, (iii) how the deliverables should be separated and (iv) how the consideration should be allocated to the deliverables. We allocate consideration in an arrangement using the relative selling price method based on our best estimate of selling price of deliverables if we do not have vendor-specific objective evidence or third-party evidence. As part of the accounting for these agreements, we must develop assumptions that require judgment to determine the best estimate of selling price. We utilize key assumptions to determine the best estimate of selling price, which may include patient enrollment requirements from regulatory authorities, development timelines, reimbursement rates for personnel costs, discount rates, and estimated third-party development costs.

Intangible Assets

We maintain an indefinite-lived in-process research and development asset on our consolidated balance sheet until either the research and development project underlying it is completed or the asset becomes impaired. When we determine that an asset has become impaired or we abandon a project, we write down the carrying value of the related intangible asset to its fair value and take an impairment charge in the period in which the impairment occurs.

We assess the fair value of assets, including intangible assets such as in-process research and development assets, using a variety of methods, including present-value models that are based upon multiple probability-weighted scenarios involving the development and potential commercialization of the acquired drug candidates. The present-value models require us to make significant assumptions regarding the estimates that market participants would make in evaluating a drug candidate, including the probability of successfully completing clinical trials and obtaining regulatory approval to market the drug candidate, the timing of and the expected costs to complete in-process research and development projects, future net cash flows from potential drug sales, which are based on estimates of the sales price of the drug, the number of patients who will be diagnosed and treated and our competitive position in the marketplace, and appropriate discount and tax rates.

We test our intangible assets for impairment on an annual basis as of October 1, and more frequently if indicators are present or changes in circumstance suggest that impairment may exist. Events that could result in an impairment, or trigger an interim impairment assessment, include the receipt of additional clinical or nonclinical data regarding our drug candidate or a potentially competitive drug candidate, changes in the clinical development program for a drug candidate or new information regarding potential sales for the drug. In connection with each annual impairment assessment and any interim impairment assessment, we compare the fair value of the asset as of the date of the assessment with the carrying value of the asset on our consolidated balance sheet.

As of December 31, 2016 , we had $284.3 million of indefinite-lived intangible assets recorded on our balance sheet related to Parion and BioAxone, our variable interest entities, or VIEs.

Collaborations; Variable Interest Entities

Our collaborations require us to apply accounting policies that involve significant judgments and that have a material effect on our consolidated financial statements. We review each collaboration agreement pursuant to which we license assets owned by a collaborator in order to determine whether we have a variable interest via the license agreement with the collaborator and if the variable interest is a variable interest in the collaborator as a whole. In connection with this assessment, we consider and make judgments regarding the following, among other factors: (1) whether the collaborator is a business; (2) the purpose and design of the collaborator; (3) the value of the asset as compared to the value of the collaborator as a whole; and (4) which party has the power to direct the activities that most significantly affect the collaborator's economic performance. For example, in connection with the Parion collaboration we determined that (a) Parion is a business; (b) the purpose and redesign of Parion was to advance the development and commercialization of the licensed assets with a company that is able to effectively develop and commercialize products for the treatment of cystic fibrosis and other pulmonary diseases; (c) the licensed assets represented significantly more than half the value of Parion; and (d) through the joint steering committee, we have the power to direct the development and commercialization of Parion's ENaC inhibitors, which are the activities that most significantly affect the economic performance of Parion. Based on this analysis, we consolidate Parion's financial statements into our financial statements. Similarly, we have determined that BioAxone is a VIE that we consolidate into our financial statements.

We evaluate on a quarterly basis if we continue to have a variable interest in each VIE and are the primary beneficiary of the VIE, and if we later determine that we no longer have a variable interest or are no longer the primary beneficiary, we deconsolidate the applicable VIE. This evaluation involves an assessment of the activities being conducted pursuant to our collaboration agreement with the collaborator, the collaborator's financial statements, discussions with the collaborator's management regarding its other activities, including any new collaborations, financing activities, clinical data and the collaborator's other programs.

We believe that the following effects of the consolidation and deconsolidation of VIEs on our consolidated financial statements are the most significant:

- In each period, we record net income (loss) attributable to our VIEs noncontrolling interest. This net income (loss) reflects our VIEs net income (loss) for the period as adjusted for gains and losses in the fair value of the contingent payments, which consist of milestone, royalty and option payments, payable by us to our VIEs. Determining the fair value of the contingent payments payable by us to our VIEs requires us to make significant estimates regarding the probability and potential timing of achieving each of the milestones pursuant to the agreement, future potential net sales of licensed products and appropriate discount rates. We expect that the net income (loss) attributed to noncontrolling interest will continue to be affected by changes in the fair value of the contingent payments. In 2016, 2015 and 2014, the fair value of contingent payments payable by us increased by $54.9 million , $4.5 million and $0.5 million , respectively. The increase in fair value of the contingent payments in 2016 primarily related to a Phase 2 clinical trial of VX-371, a compound in-licensed from Parion, achieving its primary safety endpoint in the second quarter of 2016. The increases in the fair value of contingent payments increased our net loss attributable to Vertex on a dollar-for-dollar basis.

- We recorded $255.3 million and $29.0 million , respectively, of intangible assets on our consolidated balance sheet based on our estimate of the fair value of Parion's and BioAxone's in-process research and development assets as of the transaction date and made significant estimates regarding: the probability of obtaining regulatory approval of licensed products; the timing and expected costs of clinical trials and other development activities; future potential cash flows from sales of drugs and the appropriate discount rates. If we are successful in developing a drug candidate, we will amortize the carrying value of the relevant intangible asset as part of cost of product revenues. We test these in-process research and development assets for impairment on an annual basis as of October 1, and more frequently if indicators are present or changes in circumstances suggest that impairment may exist. If the fair value of a licensed program becomes impaired as the result of safety or efficacy data from any ongoing or future clinical trial conducted by us or our competitors or because of any other information regarding the prospects of successfully developing or commercializing the licensed drug candidate, we could incur significant charges in the period in which the impairment occurs. We determined the fair value of these in-process research and development assets using probability-weighted present-value models.

- The revenues and expenses of our VIEs that are unrelated to the programs that we in-license from our VIEs and that are consolidated into our financial statements are set forth in the table below and represent less than 1% of our revenues and expenses in each period:

	2016	2015	2014
	(in thousands)		
Revenues	$ 944	$ 2,888	$ —
Research and development expenses	(6,762)	(3,642)	(286)
Sales, general and administrative expenses	(4,160)	(5,836)	(491)
Other (expenses) income, net	(108)	(56)	13
Loss attributable to noncontrolling interest before provision for income taxes	$ (10,086)	$ (6,646)	$ (764)

To the extent that our VIEs pursue other programs, expenses related to those activities would be reflected in our research and development expenses and our sales, general and administrative expenses as a result of the financial statement consolidation. We would not be entitled to any benefits from those activities. In future periods, our VIEs could increase their operating expenses related to other activities and any such increases would affect our operating expenses as presented in our consolidated financial statements.

- We reflect all of our VIEs' cash and cash equivalents under the heading “restricted cash and cash equivalents (VIE)” on our consolidated balance sheets. We do not have any rights to our VIEs cash or cash equivalents, these resources are not available to fund research and development programs pursuant to the collaborations and these amounts do not provide us with any additional liquidity. Our VIEs have control over the restricted cash and cash equivalents (VIE), including the ability to distribute the restricted cash and cash equivalents to their equity holders, and as a result, these assets, although carried on our consolidated balance sheets, are not included in the discussion of our liquidity and should be disregarded when evaluating our financial condition.

In order to account for the fair value of the intangible assets and contingent payments related to collaborations with our VIEs under GAAP, we use present-value models based on assumptions regarding the probability of achieving the relevant milestones, estimates regarding the timing of achieving the milestones, estimates of future product sales and the appropriate discount rates. We base our estimates of the probability of achieving the relevant milestones on industry data for similar assets and our own experience. The discount rates used in the valuation model represent a measure of credit risk and market risk associated with settling the liabilities. Significant judgment is used in determining the appropriateness of these assumptions during each reporting period. Changes in these assumptions could have a material effect on the fair value of the contingent payments and affect the analysis of whether or not an intangible asset is impaired.

Research and Development Accruals

Research and development expenses, including amounts funded through research and development collaborations, are expensed as incurred. When third-party service providers’ billing terms do not coincide with our period-end, we are required to make estimates of our obligations to those third parties, including clinical trial and pharmaceutical development costs, contractual services costs, costs for drug supply, marketing expenses and infrastructure expenses incurred in a given accounting period and record accruals at the end of the period. We base our estimates on our knowledge of the research and development programs, services performed for the period, experience with related activities and the expected duration of the third-party service contract, where applicable.

Commercial Supplies and Inventories

We began capitalizing the costs of our ORKAMBI inventories on July 1, 2014. We capitalize inventories produced in preparation for initiating sales of a drug candidate when the related drug candidate is considered to have a high likelihood of regulatory approval and the related costs are expected to be recoverable through sale of the inventories. In determining whether or not to capitalize such inventories, we evaluate, among other factors, information regarding the drug candidate’s safety and efficacy, the status of regulatory submissions and communications with regulatory authorities and the outlook for commercial sales, including the existence of current or anticipated competitive drugs and the availability of reimbursement. In addition, we evaluate risks associated with manufacturing the drug candidate and the remaining shelf life of the inventories. After we begin capitalizing inventories, we perform an assessment of the recoverability of capitalized inventory during each reporting period, and write down any excess and obsolete inventories to their net realizable value in the period in which the impairment is first identified. Periodic assessments of the recoverability of capitalized costs involve significant estimates and judgments on the part of management.

As of December 31, 2016, all of our inventories are related to KALYDECO and ORKAMBI.

Income Taxes

We maintain a valuation allowance on the majority of our net operating losses and other deferred tax assets because we have an extended history of annual losses. Our U.S. federal net operating loss carryforwards totaled approximately $4.1 billion as of December 31, 2016 . On an annual basis, we reassess the valuation allowance for deferred income tax assets. After consideration of all the evidence, both positive and negative, we continue to maintain a valuation allowance on the deferred tax asset as of December 31, 2016 because it is more likely than not that the deferred tax asset will not be realized. In future periods, if we determine that it is more likely than not that the deferred tax asset will be realized, (i) the valuation allowance would be decreased, (ii) the deferred tax asset would be reflected on our consolidated balance sheet and (iii) we would record non-cash benefits in our consolidated statements of operations related to the reflection of the deferred tax asset on our consolidated balance sheet.

Leases

In 2011, we entered into two leases for our corporate headquarters. Our corporate headquarters were built during the period from 2011 through December 2013. We lease our corporate headquarters pursuant to leases that expire in 2028, subject to our right to extend the leases for an additional 10 years. Because we were involved in the construction project, we were deemed for accounting purposes to be the owner of the buildings during the construction period. Accordingly, we record project construction costs incurred by the landlord as an asset and a related financing obligation in "Property and equipment, net" and "Construction financing lease obligation," respectively, on our consolidated balance sheets.

Upon completion of the construction of the corporate headquarters buildings, we evaluated the leases and determined that the leases did not meet the criteria for "sale-leaseback" treatment. Accordingly, we depreciate the asset and incur interest expense related to the financing obligation recorded on our balance sheet. We bifurcate our lease payments pursuant to the leases into (i) a portion that is allocated to the buildings and (ii) a portion that is allocated to the land on which the buildings were constructed. The portion of the lease obligations allocated to the land is treated as an operating lease. In connection with the leases for our corporate headquarters, we incurred $60.2 million in interest expense, $13.3 million in depreciation expense and $6.5 million in operating expense in 2016 . In 2017 , we expect interest expense, depreciation expense and operating expenses related to the leases for our corporate headquarters to be approximately consistent with that from 2016.

In 2015, we entered into a lease agreement for a research and development facility to be built in San Diego. Because we are involved in the construction project, we are deemed for accounting purposes to be the owner of the building during the construction period and are recording project construction costs incurred by the landlord. We will need to evaluate this lease based on "sale-leaseback" criteria upon completion of the construction. We currently expect this lease will not meet the criteria and will be accounted for in the same manner as we have accounted for the leases for our corporate headquarters.

Restructuring Expenses

We have adopted several plans to restructure our facility operations for which we have incurred restructuring expenses in the three years ended December 31, 2016. In particular, in 2014, we recorded $50.9 million in costs associated with exit and disposal activities related to the relocation of our headquarters in Massachusetts from Cambridge to Boston and maintained a liability related to these activities of $3.6 million as of December 31, 2016. Our initial estimate of our liabilities for net ongoing costs associated with these facility obligations are recorded at fair value. In estimating the expenses and liabilities related to these facilities, we utilize probability-weighted discounted cash-flows of our ongoing lease obligations. In estimating the expense and liability under our lease obligations, we estimate (i) the costs to be incurred to satisfy rental and build-out commitments under the lease (including operating costs), (ii) the lead-time necessary to sublease the space, (iii) the projected sublease rental rates and (iv) the anticipated durations of subleases. We use a credit-adjusted risk-free rate to discount the estimated cash flows.

We review our estimates and assumptions on at least a quarterly basis. We intend to continue such reviews until the termination of these facility lease obligations and will make whatever modifications we believe are necessary, based on our best judgment, to reflect any changed circumstances. Our estimates have changed in the past, and may change in the future, resulting in additional adjustments to the estimate of these liabilities. Changes to our estimate of these liabilities are recorded as additional restructuring expenses (credits). In addition, because our estimate of these liabilities includes the application of a discount rate to reflect the time-value of money, we record imputed interest costs related to these liabilities each quarter. These costs are included in restructuring expenses on our consolidated statements of operations.

Stock-based Compensation Expense

Stock-based compensation expense is determined based on the fair value of the equity award at the grant date, net of estimated forfeitures, and is adjusted each period to reflect actual forfeitures and the outcomes of certain performance

conditions. For awards with performance conditions that accelerate vesting of the award, we estimate the likelihood of satisfaction of the performance conditions, which affects the period over which the expense is recognized, and recognize the expense using the accelerated attribution model. For awards with performance conditions in which the award does not vest unless the performance condition is met, we recognize expense only if we estimate that achievement of the performance condition is probable. If we conclude that vesting is probable, we recognize expense from the date that we reach this conclusion through the estimated vesting date. During 2016, we also granted awards with a variable number of awards. Threshold, target and maximum parameters were established for the metric based half on financial and half on non-financial goals, and will be used to calculate the number of shares that will be issuable when the award vests, which may range from zero to 200% of the target amount. Since 2014, we have provided to employees who have rendered a certain number of years of service and meet certain age requirements, partial or full acceleration of vesting of their equity awards, subject to certain conditions including a notification period, upon a termination of employment other than for cause. If actual forfeitures differ significantly from our estimates, if our estimates regarding the employees who will be eligible for partial or full acceleration of their equity awards, if the likelihood of achievement of a performance conditions changes or if any of our other assumptions or estimates prove incorrect, our stock-based compensation expense, or the period over which our stock-based compensation is recognized, could be materially affected.

RECENT ACCOUNTING PRONOUNCEMENTS

Refer to Note A, "Nature of Business and Accounting Policies," in the accompanying notes to the consolidated financial statements for a discussion of recent accounting pronouncements. There were no new accounting pronouncements adopted during 2016 that had a material effect on our financial statements.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

As part of our investment portfolio, we own financial instruments that are sensitive to market risks. The investment portfolio is used to preserve our capital until it is required to fund operations, including our research and development activities. None of these market risk-sensitive instruments is held for trading purposes. We do not have derivative financial instruments in our investment portfolio.

Interest Rate Risk

We invest our cash in a variety of financial instruments, principally securities issued by the U.S. government and its agencies, investment-grade corporate bonds and commercial paper, and money market funds. These investments are denominated in U.S. dollars. All of our interest-bearing securities are subject to interest rate risk and could decline in value if interest rates fluctuate. Substantially all of our investment portfolio consists of marketable securities with active secondary or resale markets to help ensure portfolio liquidity, and we have implemented guidelines limiting the term-to-maturity of our investment instruments. Due to the conservative nature of these instruments, we do not believe that we have a material exposure to interest rate risk. If interest rates were to increase or decrease by 1%, the fair value of our investment portfolio would increase or decrease by an immaterial amount.

In October 2016, we entered into a credit agreement. Loans under the credit agreement will bear interest, at our option, at either a base rate or a Eurodollar rate, in each case plus an applicable margin. The applicable margin on base rate loans ranges from 0.75% to 1.50% and the applicable margin on Eurodollar loans ranges from 1.75% to 2.50%, in each case, based on our consolidated leverage ratio (as defined in the credit agreement). We do not believe that changes in interest rates related to the credit agreement would have a material effect on our financial statements. As of December 31, 2016, we had approximately $300.7 million of principle and interest outstanding. If interest rates were to increase or decrease by 1% for the year, annual interest expense would increase or decrease by approximately $3.0 million.

Foreign Exchange Market Risk

As a result of our foreign operations, we face exposure to movements in foreign currency exchange rates, primarily the Euro, Swiss Franc, British Pound, Australian Dollar and Canadian Dollar against the U.S. dollar. The current exposures arise primarily from cash, accounts receivable, intercompany receivables, payables and inventories. Both positive and negative affects to our net revenues from international product sales from movements in foreign currency exchange rates are partially mitigated by the natural, opposite affect that foreign currency exchange rates have on our international operating costs and expenses.

We have a foreign currency management program with the objective of reducing the effect of exchange rate fluctuations on our operating results and forecasted revenues and expenses denominated in foreign currencies. We currently have hedges for Euro, British Pound and Australian Dollar. These cash flow hedges qualify for hedge accounting. As of December 31,

2016, we held foreign exchange forward contracts with notional amounts totaling $253.4 million. As of December 31, 2016, our outstanding foreign exchange forward contracts had a net fair value of $15.4 million.

Based on our foreign currency exchange rate exposures at December 31, 2016, a hypothetical 10% adverse fluctuation in exchange rates would decrease the fair value of our foreign exchange forward contracts that are designated as cash flow hedges by approximately $25.3 million at December 31, 2016. The resulting loss on these forward contracts would be offset by the gain on the underlying transactions and therefore would have minimal impact on future anticipated earnings and cash flows. Similarly, adverse fluctuations in exchange rates that would decrease the fair value of our foreign exchange forward contracts that are not designated as hedge instruments would be offset by a positive impact of the underlying monetary assets and liabilities.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The information required by this Item 8 is contained on pages F-1 through F-50 of this Annual Report on Form 10-K.

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

Not applicable.

ITEM 9A. CONTROLS AND PROCEDURES

(1) Evaluation of Disclosure Controls and Procedures. The Company's chief executive officer and chief financial officer, after evaluating the effectiveness of the Company's disclosure controls and procedures (as defined in Rule 13a-15(e) and Rule 15d-15(e) promulgated under the Securities Exchange Act of 1934, as amended) as of the end of the period covered by this Annual Report on Form 10-K, have concluded that, based on such evaluation, the Company's disclosure controls and procedures were effective. In designing and evaluating the disclosure controls and procedures, the Company's management recognized that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and the Company's management necessarily was required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

(2) Management's Annual Report on Internal Control Over Financial Reporting. The 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 Rule 15d-15(f) promulgated under the Securities Exchange Act of 1934, as amended, 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 generally accepted accounting principles. The Company's internal control over financial reporting 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.

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.

The Company's management assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2016 . In making this assessment, it used the criteria set forth in the Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework)(COSO). Based on its

assessment, the Company's management has concluded that, as of December 31, 2016 , the Company's internal control over financial reporting is effective based on those criteria.

The Company's independent registered public accounting firm, Ernst & Young LLP, issued an attestation report on the Company's internal control over financial reporting. See Section 4 below.

(3) Changes in Internal Controls. During the quarter ended December 31, 2016 , there were no changes in the Company's internal control over financial reporting that materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

(4) Report of Independent Registered Public Accounting Firm

The Board of Directors and Shareholders of
Vertex Pharmaceuticals Incorporated

We have audited Vertex Pharmaceuticals Incorporated's internal control over financial reporting as of December 31, 2016 , 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). Vertex Pharmaceuticals Incorporated's management is responsible for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual Report 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 conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). 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.

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.

In our opinion, Vertex Pharmaceuticals Incorporated maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016 , based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated balance sheets of Vertex Pharmaceuticals Incorporated as of December 31, 2016 and 2015 , and the related consolidated statements of operations, comprehensive loss, shareholders' equity and noncontrolling interest, and cash flows for each of the three years in the period ended December 31, 2016 of Vertex Pharmaceuticals Incorporated and our report dated February 23, 2017 expressed an unqualified opinion thereon.

/s/ Ernst & Young LLP

Boston, Massachusetts

February 23, 2017

ITEM 9B. OTHER INFORMATION

Not applicable.

PART III

Portions of our definitive Proxy Statement for the 2017 Annual Meeting of Shareholders, or 2017 Proxy Statement, are incorporated by reference into this Part III of our Annual Report on Form 10-K.

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information regarding directors required by this Item 10 will be included in our 2017 Proxy Statement and is incorporated herein by reference. We expect this information to be provided under "Election of Directors," "Corporate Governance and Risk Management," "Shareholder Proposals for the 2017 Annual Meeting and Nominations for Director," "Section 16(a) Beneficial Ownership Reporting Compliance" and "Code of Conduct." The information regarding executive officers required by this Item 10 as well as certain information regarding our directors is included in Part I of this Annual Report on Form 10-K.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this Item 11 will be included in the 2017 Proxy Statement and is incorporated herein by reference. We expect this information to be provided under "Compensation Committee Interlocks and Insider Participation," "Compensation Discussion and Analysis," "Compensation and Equity Tables," "Director Compensation," "Management Development and Compensation Committee Report" and/or "Corporate Governance and Risk Management."

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by this Item 12 will be included in the 2017 Proxy Statement and is incorporated herein by reference. We expect this information to be provided under "Security Ownership of Certain Beneficial Owners and Management" and "Equity Compensation Plan Information."

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information required by this Item 13 will be included in the 2017 Proxy Statement and is incorporated herein by reference. We expect this information to be provided under " Election of Directors," "Corporate Governance and Risk Management," "Approval of Related Person Transactions" and "Transactions with Related Persons."

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this Item 14 will be included in the 2017 Proxy Statement and is incorporated herein by reference. We expect this information to be provided under "Ratification of the Appointment of Independent Registered Public Accounting Firm."

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a)(1) The Financial Statements required to be filed by Items 8 and 15(c) of Form 10-K, and filed herewith, are as follows:

(a)(2) Financial Statement Schedules have been omitted because they are either not applicable or the required information is included in the consolidated financial statements or notes thereto listed in (a)(1) above.

(a)(3) Exhibits.

The following is a list of exhibits filed as part of this Annual Report on Form 10-K.

Exhibit Number	Exhibit Description	Filed with this report	Incorporated by Reference herein from—Form or Schedule	Filing Date/ Period Covered	SEC File/ Reg. Number
3.1	Restated Articles of Organization of Vertex Pharmaceuticals Incorporated, as amended.		10-Q (Exhibit 3.1)	August 4, 2015	000-19319
3.2	Amended and Restated By-Laws of Vertex Pharmaceuticals Incorporated, as subsequently amended on April 26, 2016.		10-Q (Exhibit 3.1)	May 3, 2016	000-19319
4.1	Specimen stock certificate.		S-1 (Exhibit 4.1)	July 18, 1991	33-40966
Collaboration Agreements					
10.1	Research, Development and Commercialization Agreement, dated as of May 24, 2004, between Vertex Pharmaceuticals Incorporated and Cystic Fibrosis Foundation Therapeutics Incorporated.†		10-Q/A (Exhibit 10.2)	August 19, 2011	000-19319
10.2	Amendment No. 1 to Research, Development and Commercialization Agreement, dated as of January 6, 2006, between Vertex Pharmaceuticals Incorporated and Cystic Fibrosis Foundation Therapeutics Incorporated.†		10-K (Exhibit 10.9)	March 16, 2006	000-19319
10.3	Amendment No. 2 to Research, Development and Commercialization Agreement, dated as of March 17, 2006, between Vertex Pharmaceuticals Incorporated and Cystic Fibrosis Foundation Therapeutics Incorporated.		10-Q/A (Exhibit 10.6)	August 19, 2011	000-19319
10.4	Amendment No. 5 to Research, Development and Commercialization Agreement, effective as of April 1, 2011, between Vertex Pharmaceuticals Incorporated and Cystic Fibrosis Foundation Therapeutics Incorporated.†		10-Q (Exhibit 10.3)	August 9, 2011	000-19319
10.5	Amendment No. 7 to Research, Development and Commercialization Agreement, dated October 13, 2016, between Vertex Pharmaceuticals Incorporated and Cystic Fibrosis Foundation Therapeutics Incorporated. †	X			
10.6	Strategic Collaboration and License Agreement, dated as of June 4, 2015, by and among Parion Sciences, Inc., Vertex Pharmaceuticals Incorporated and Vertex Pharmaceuticals (Europe) Limited.†		10-Q (Exhibit 10.2)	August 4, 2015	000-19319

Exhibit Number	Exhibit Description	Filed with this report	Incorporated by Reference herein from—Form or Schedule	Filing Date/ Period Covered	SEC File/ Reg. Number
10.7	Strategic Collaboration, Option and License Agreement, dated October 26, 2015, by and among CRISPR Therapeutics AG, CRISPR Therapeutics Limited, CRISPR Therapeutics, Inc., Tracr Hematology Ltd., Vertex Pharmaceuticals Incorporated and Vertex Pharmaceuticals (Europe) Limited.†		10-K (Exhibit 10.6)	February 16, 2016	000-19319
Leases					
10.8	Lease, dated May 5, 2011, between Fifty Northern Avenue LLC and Vertex Pharmaceuticals Incorporated.†		10-Q (Exhibit 10.4)	August 9, 2011	000-19319
10.9	Lease, dated May 5, 2011, between Eleven Fan Pier Boulevard LLC and Vertex Pharmaceuticals Incorporated.†		10-Q (Exhibit 10.5)	August 9, 2011	000-19319
10.10	Lease, dated as of January 18, 2001, between Kendall Square, LLC and Vertex Pharmaceuticals Incorporated.†		10-K (Exhibit 10.16)	March 26, 2001	000-19319
10.11	Lease, dated December 2, 2015, between ARE-SD Region No. 23, LLC and Vertex Pharmaceuticals Incorporated.		10-K (Exhibit 10.10)	February 16, 2016	000-19319
Financing Agreements					
10.12	Credit Agreement, dated as of October 13, 2016, among Vertex Pharmaceuticals Incorporated, Bank of America, N.A. and the other lenders party thereto.	X			
10.13	First Amendment to Credit Agreement, dated as of February 9, 2017, among Vertex Pharmaceuticals Incorporated, Bank of America, N.A. and the other lenders party thereto.	X			
Equity Plans					
10.14	1996 Stock and Option Plan, as amended and restated as of March 14, 2005.*		10-K (Exhibit 10.3)	March 16, 2005	000-19319
10.15	Form of Stock Option Grant under 1996 Stock and Option Plan.*		8-K (Exhibit 10.1)	February 9, 2005	000-19319
10.16	Amended and Restated 2006 Stock and Option Plan.*		10-Q (Exhibit 10.3)	August 8, 2012	000-19319
10.17	Form of Stock Option Agreement under Amended and Restated 2006 Stock and Option Plan (granted prior to July 30, 2013).*		8-K (Exhibit 10.2)	May 15, 2006	000-19319
10.18	Form of Restricted Stock Agreement under Amended and Restated 2006 Stock and Option Plan (granted prior to July 30, 2013).*		8-K (Exhibit 10.3)	May 15, 2006	000-19319
10.19	Form of Restricted Stock Agreement (Performance Accelerated Restricted Stock) under Amended and Restated 2006 Stock and Option Plan (granted prior to July 30, 2013).*		8-K (Exhibit 10.4)	May 15, 2006	000-19319
10.20	Form of Stock Option Agreement under Amended and Restated 2006 Stock and Option Plan (granted on or after July 30, 2013).*		10-K (Exhibit 10.20)	February 13, 2015	000-19319
10.21	Form of Restricted Stock Agreement under Amended and Restated 2006 Stock and Option Plan (granted on or after July 30, 2013).*		10-K (Exhibit 10.21)	February 13, 2015	000-19319
10.22	Form of Restricted Stock Unit Agreement under Amended and Restated 2006 Stock and Option Plan (granted on or after July 30, 2013).*		10-K (Exhibit 10.22)	February 13, 2015	000-19319
10.23	Amended and Restated 2013 Stock and Option Plan.*		DEF 14A (Appendix A)	April 30, 2015	000-19319
10.24	Form of Non-Qualified Stock Option Agreement under 2013 Stock and Option Plan.*		10-K (Exhibit 10.17)	February 13, 2015	000-19319
10.25	Form of Restricted Stock Agreement under 2013 Stock and Option Plan.*		10-K (Exhibit 10.18)	February 13, 2015	000-19319
10.26	Form of Restricted Stock Unit Agreement under 2013 Stock and Option Plan (U.S.).*		10-K (Exhibit 10.25)	February 16, 2016	000-19319
10.27	Form of Restricted Stock Unit Agreement under 2013 Stock and Option Plan (International).*		10-K (Exhibit 10.19)	February 13, 2015	000-19319
10.28	Non-Employee Director Deferred Compensation Plan.*		10-K (Exhibit 10.27)	February 16, 2016	000-19319
10.29	Vertex Pharmaceuticals Incorporated Employee Stock Purchase Plan, as amended and restated as of July 12, 2016.*		10-Q (Exhibit 10.1)	August 1, 2016	000-19319
Agreements with Executive Officers and Directors					
10.30	Amended and Restated Employment Agreement, dated November 30, 2016, by and between Vertex Pharmaceuticals Incorporated and Jeffrey M. Leiden, M.D., Ph.D*		8-K (Exhibit 10.1)	November 29, 2016	000-19319

Exhibit Number	Exhibit Description	Filed with this report	Incorporated by Reference herein from—Form or Schedule	Filing Date/ Period Covered	SEC File/ Reg. Number
10.31	Employee Non-disclosure, Non-competition and Inventions Agreement between Jeffrey M. Leiden and Vertex, dated December 14, 2011.*		10-K (Exhibit 10.35)	February 22, 2012	000-19319
10.32	Employment Agreement, dated as of August 27, 2012, between Vertex Pharmaceuticals Incorporated and Stuart Arbuckle.*		10-Q (Exhibit 10.1)	November 6, 2012	000-19319
10.33	Change of Control Agreement, dated as of August 27, 2012, between Vertex Pharmaceuticals Incorporated and Stuart Arbuckle.*		10-Q (Exhibit 10.2)	November 6, 2012	000-19319
10.34	Employment Agreement, dated as of December 12, 2014, between Vertex Pharmaceuticals Incorporated and David Altshuler.*		10-K (Exhibit 10.34)	February 16, 2016	000-19319
10.35	Change of Control Agreement, dated as of December 12, 2014, between Vertex Pharmaceuticals Incorporated and David Altshuler.*		10-K (Exhibit 10.35)	February 16, 2016	000-19319
10.36	Amended and Restated Employment Agreement, dated as of November 8, 2004, between Vertex Pharmaceuticals Incorporated and Ian F. Smith.*		10-Q (Exhibit 10.13)	November 9, 2004	000-19319
10.37	Amendment No. 1 to Amended and Restated Employment Agreement between Ian F. Smith and Vertex Pharmaceuticals Incorporated, dated December 29, 2008.*		10-K (Exhibit 10.66)	February 17, 2009	000-19319
10.38	Employment Agreement, dated as of December 2, 2013, between Vertex Pharmaceuticals Incorporated and Jeffrey Chodakewicz.*		10-Q (Exhibit 10.1)	March 31, 2015	000-19319
10.39	Change of Control Agreement, dated as of December 2, 2013, between Vertex Pharmaceuticals Incorporated and Jeffrey Chodakewicz.*		10-Q (Exhibit 10.2)	March 31, 2015	000-19319
10.40	Employment Agreement, dated as of November 14, 2015, between Vertex Pharmaceuticals Incorporated and Michael Parini.*	X			
10.41	Change of Control Agreement, dated as of November 9, 2015, between Vertex Pharmaceuticals Incorporated and Michael Parini.*	X			
10.42	Third Amended and Restated Employment Agreement, dated as of February 26, 2013, between Vertex Pharmaceuticals Incorporated and Amit Sachdev.*	X			
10.43	Third Amended and Restated Change of Control Agreement, dated as of February 26, 2013, between Vertex Pharmaceuticals Incorporated and Amit Sachdev.*	X			
10.44	Form of Employee Non-Disclosure and Inventions Agreement.*		S-1 (Exhibit 10.4)	May 30, 1991	33-40966
10.45	Vertex Employee Compensation Plan.*		10-K (Exhibit 10.41)	February 16, 2016	000-19319
10.46	Vertex Pharmaceuticals Non-Employee Board Compensation.*		10-K (Exhibit 10.42)	February 16, 2016	000-19319
Subsidiaries					
21.1	Subsidiaries of Vertex Pharmaceuticals Incorporated.	X			
Consent					
23.1	Consent of Independent Registered Public Accounting Firm, Ernst & Young LLP.	X			
Certifications					
31.1	Certification of the Chief Executive Officer under Section 302 of the Sarbanes-Oxley Act of 2002.	X			
31.2	Certification of the Chief Financial Officer under Section 302 of the Sarbanes-Oxley Act of 2002.	X			
32.1	Certification of the Chief Executive Officer and the Chief Financial Officer under Section 906 of the Sarbanes-Oxley Act of 2002.	X			
101.INS	XBRL Instance	X			
101.SCH	XBRL Taxonomy Extension Schema	X			
101.CAL	XBRL Taxonomy Extension Calculation	X			
101.LAB	XBRL Taxonomy Extension Labels	X			
101.PRE	XBRL Taxonomy Extension Presentation	X			
101.DEF	XBRL Taxonomy Extension Definition	X			

* Management contract, compensatory plan or agreement.

†Confidential portions of this document have been filed separately with the Securities and Exchange Commission pursuant to a request for confidential treatment.

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.

Vertex Pharmaceuticals Incorporated

February 23, 2017 By: /s/ Jeffrey M. Leiden

Jeffrey M. Leiden
Chief Executive Officer

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.

Name	Title	Date
/s/ Jeffrey M. Leiden Jeffrey M. Leiden	Chair of the Board, President and Chief Executive Officer (Principal Executive Officer)	February 23, 2017
/s/ Ian F. Smith Ian F. Smith	Executive Vice President, Chief Operating Officer and Chief Financial Officer (Principal Financial Officer)	February 23, 2017
/s/ Paul M. Silva Paul M. Silva	Senior Vice President and Corporate Controller (Principal Accounting Officer)	February 23, 2017
/s/ Sangeeta N. Bhatia Sangeeta N. Bhatia	Director	February 23, 2017
/s/ Joshua S. Boger Joshua S. Boger	Director	February 23, 2017
/s/ Terrence C. Kearney Terrence C. Kearney	Director	February 23, 2017
/s/ Yuchun Lee Yuchun Lee	Director	February 23, 2017
/s/ Margaret G. McGlynn Margaret G. McGlynn	Director	February 23, 2017
/s/ Bruce I. Sachs Bruce I. Sachs	Director	February 23, 2017
/s/ Elaine S. Ullian Elaine S. Ullian	Director	February 23, 2017
/s/ William D. Young William D. Young	Director	February 23, 2017

Report of Independent Registered Public Accounting Firm

The Board of Directors and Shareholders of
Vertex Pharmaceuticals Incorporated

We have audited the accompanying consolidated balance sheets of Vertex Pharmaceuticals Incorporated as of December 31, 2016 and 2015 , and the related consolidated statements of operations, comprehensive loss, shareholders' equity and noncontrolling interest, and cash flows for each of the three years in the period ended December 31, 2016 . These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the consolidated financial position of Vertex Pharmaceuticals Incorporated at December 31, 2016 and 2015 , and the consolidated results of its operations and its cash flows for each of the three years in the period ended December 31, 2016 , 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), Vertex Pharmaceuticals Incorporated's internal control over financial reporting as of December 31, 2016 , based on the criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 23, 2017 expressed an unqualified opinion thereon.

/s/ Ernst & Young LLP

Boston, Massachusetts

February 23, 2017

VERTEX PHARMACEUTICALS INCORPORATED

Consolidated Statements of Operations

(in thousands, except per share amounts)

	Year Ended December 31,		
	2016	**2015**	**2014**
Revenues:			
Product revenues, net	$ 1,683,632	$ 1,000,324	$ 487,821
Royalty revenues	16,600	23,959	40,919
Collaborative revenues	1,945	8,053	51,675
Total revenues	1,702,177	1,032,336	580,415
Costs and expenses:			
Cost of product revenues	206,811	117,151	39,725
Royalty expenses	3,649	7,361	21,262
Research and development expenses	1,047,690	995,922	855,506
Sales, general and administrative expenses	432,829	376,575	305,409
Restructuring expenses	1,262	2,206	50,925
Total costs and expenses	1,692,241	1,499,215	1,272,827
Income (loss) from operations	9,936	(466,879)	(692,412)
Interest expense, net	(81,432)	(84,206)	(72,863)
Other income (expense), net	4,130	(6,715)	30,400
Loss from continuing operations before provision for income taxes	(67,366)	(557,800)	(734,875)
Provision for income taxes	16,665	30,381	6,958
Loss from continuing operations	(84,031)	(588,181)	(741,833)
Loss from discontinued operations, net of tax benefit of $0, $0 and $0, respectively	—	—	(912)
Net loss	(84,031)	(588,181)	(742,745)
(Income) loss attributable to noncontrolling interest	(28,021)	31,847	4,190
Net loss attributable to Vertex	$ (112,052)	$ (556,334)	$ (738,555)
Amounts attributable to Vertex:			
Loss from continuing operations	$ (112,052)	$ (556,334)	$ (737,643)
Loss from discontinued operations	—	—	(912)
Net loss attributable to Vertex	$ (112,052)	$ (556,334)	$ (738,555)
Amounts per share attributable to Vertex common shareholders:			
Net loss from continuing operations:			
Basic	$ (0.46)	$ (2.31)	$ (3.14)
Diluted	$ (0.46)	$ (2.31)	$ (3.14)
Net loss from discontinued operations:			
Basic	$ —	$ —	$ —
Diluted	$ —	$ —	$ —
Net loss:			
Basic	$ (0.46)	$ (2.31)	$ (3.14)
Diluted	$ (0.46)	$ (2.31)	$ (3.14)
Shares used in per share calculations:			
Basic	244,685	241,312	235,307
Diluted	244,685	241,312	235,307

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

VERTEX PHARMACEUTICALS INCORPORATED

Consolidated Statements of Comprehensive Loss

(in thousands)

	Year ended December 31,		
	2016	**2015**	**2014**
Net loss	$ (84,031)	$ (588,181)	$ (742,745)
Changes in other comprehensive income (loss):			
Unrealized holding gains (losses) on marketable securities, net of tax	17,395	249	(165)
Unrealized gains on foreign currency forward contracts, net of tax	7,736	1,767	2,034
Foreign currency translation adjustment	(5,782)	(1,109)	(646)
Total changes in other comprehensive income (loss)	19,349	907	1,223
Comprehensive loss	(64,682)	(587,274)	(741,522)
Comprehensive (income) loss attributable to noncontrolling interest	(28,021)	31,847	4,190
Comprehensive loss attributable to Vertex	$ (92,703)	$ (555,427)	$ (737,332)

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

VERTEX PHARMACEUTICALS INCORPORATED

Consolidated Balance Sheets

(in thousands, except share and per share amounts)

	December 31,	
	2016	**2015**
Assets		
Current assets:		
Cash and cash equivalents	$ 1,183,945	$ 714,768
Marketable securities, available-for-sale	250,612	327,694
Restricted cash and cash equivalents (VIE)	47,762	78,910
Accounts receivable, net	201,083	173,838
Inventories	77,604	57,207
Prepaid expenses and other current assets	70,534	54,736
Total current assets	1,831,540	1,407,153
Property and equipment, net	698,362	697,715
Intangible assets	284,340	284,340
Goodwill	50,384	50,384
Cost method investments	20,276	—
Note receivable	—	30,000
Restricted cash	52	22,083
Other assets	11,833	6,912
Total assets	$ 2,896,787	$ 2,498,587
Liabilities and Shareholders' Equity		
Current liabilities:		
Accounts payable	$ 61,451	$ 74,942
Accrued expenses	315,249	305,820
Deferred revenues, current portion	6,005	16,296
Accrued restructuring expense, current portion	6,047	7,894
Capital lease obligations, current portion	19,426	15,545
Senior secured term loan, current portion	—	71,296
Customer deposits	73,416	—
Credit facility	300,000	—
Other liabilities, current portion	10,943	14,374
Total current liabilities	792,537	506,167
Deferred revenues, excluding current portion	6,632	9,714
Accrued restructuring expense, excluding current portion	1,907	7,464
Capital lease obligations, excluding current portion	34,976	42,923
Deferred tax liability	134,063	110,439
Construction financing lease obligation, excluding current portion	486,359	472,611
Senior secured term loan, excluding current portion	—	223,863
Other liabilities, excluding current portion	102,122	31,778
Total liabilities	1,558,596	1,404,959
Commitments and contingencies		
Shareholders' equity:		
Preferred stock, $0.01 par value; 1,000,000 shares authorized; none issued and outstanding at December 31, 2015 and 2014	—	—
Common stock, $0.01 par value; 500,000,000 shares authorized at December 31, 2016 and 2015; 248,300,517 and 246,306,818 shares issued and outstanding at December 31, 2016 and 2015, respectively	2,450	2,427
Additional paid-in capital	6,506,795	6,197,500
Accumulated other comprehensive income	21,173	1,824
Accumulated deficit	(5,373,836)	(5,261,784)
Total Vertex shareholders' equity	1,156,582	939,967
Noncontrolling interest	181,609	153,661
Total shareholders' equity	1,338,191	1,093,628

Total liabilities and shareholders' equity	$ 2,896,787	$ 2,498,587

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

VERTEX PHARMACEUTICALS INCORPORATED

Consolidated Statements of Shareholders' Equity and Noncontrolling Interest

(in thousands)

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Vertex Shareholders' Equity	Noncontrolling Interest	Total Shareholders' Equity
	Shares	Amount						
Balance, December 31, 2013	233,789	$ 2,320	$ 5,321,286	$ (306)	$ (3,966,895)	$ 1,356,405	$ —	$ 1,356,405
Other comprehensive income, net of tax				1,223		1,223		1,223
Net (loss) income					(738,555)	(738,555)	(4,190)	(742,745)
Issuance of common stock under benefit plans	7,975	65	274,743			274,808		274,808
Stock-based compensation expense			178,965			178,965		178,965
Tax benefit from equity compensation			2,160			2,160		2,160
Noncontrolling interest upon consolidation						—	25,367	25,367
Balance, December 31, 2014	241,764	$ 2,385	$ 5,777,154	$ 917	$ (4,705,450)	$ 1,075,006	$ 21,177	$ 1,096,183
Other comprehensive income, net of tax				907		907		907
Net loss					(556,334)	(556,334)	(31,847)	(588,181)
Issuance of common stock under benefit plans	4,543	42	185,234			185,276	14	185,290
Stock-based compensation expense			235,112			235,112		235,112
Tax benefit from equity compensation			—			—		—
Noncontrolling interest upon consolidation						—	164,317	164,317
Balance, December 31, 2015	246,307	$ 2,427	$ 6,197,500	$ 1,824	$ (5,261,784)	$ 939,967	$ 153,661	$ 1,093,628
Other comprehensive income, net of tax				19,349		19,349		19,349
Net loss					(112,052)	(112,052)	28,021	(84,031)
Issuance of common stock under benefit plans	1,994	23	67,983			68,006	—	68,006
Stock-based compensation expense			241,312			241,312	(73)	241,239
Balance, December 31, 2016	248,301	$ 2,450	$ 6,506,795	$ 21,173	$ (5,373,836)	$ 1,156,582	$ 181,609	$ 1,338,191

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

VERTEX PHARMACEUTICALS INCORPORATED
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,		
	2016	**2015**	**2014**
Cash flows from operating activities:			
Net loss	$ (84,031)	$ (588,181)	$ (742,745)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:			
Stock-based compensation expense	237,705	231,025	177,542
Depreciation and amortization expense	61,398	62,343	63,257
Deferred income taxes	16,961	3,283	281
Impairment of property and equipment	—	2,516	1,689
Excess tax benefit from share-based payment arrangements	—	—	(2,160)
Other non-cash items, net	6,140	9,532	—
Changes in operating assets and liabilities, excluding the effects of the acquisition and deconsolidation of variable interest entities:			
Accounts receivable, net	(33,027)	(104,847)	7,428
Inventories	(16,450)	(23,146)	(16,469)
Prepaid expenses and other assets	(8,699)	(9,260)	(15,771)
Accounts payable	(11,745)	(1,709)	25,048
Accrued expenses and other liabilities	88,649	102,746	(63,183)
Accrued restructuring expense	(7,426)	(30,492)	17,502
Deferred revenues	(13,372)	(19,242)	(25,531)
Net cash provided by provided by (used in) operating activities	236,103	(365,432)	(573,112)
Cash flows from investing activities:			
Maturities of marketable securities	757,562	1,067,443	1,557,938
Purchases of marketable securities	(616,625)	(633,041)	(1,424,172)
Payment for acquisition of variable interest entity	—	(80,000)	(10,000)
Expenditures for property and equipment	(56,563)	(45,302)	(51,201)
Investment in note receivable	(20,000)	(30,000)	—
Investment in CRISPR	(13,075)	—	—
(Decrease) increase in restricted cash and cash equivalents	22,029	(21,981)	—
Decrease in restricted cash and cash equivalents (VIE)	31,148	11,685	1,638
Increase (decrease) in other assets	(7)	52	(244)
Payments returned related to construction financing lease obligation	—	—	8,050
Net cash provided by investing activities	104,469	268,856	82,009
Cash flows from financing activities:			
Issuances of common stock under benefit plans	68,230	185,592	274,615
Payments on construction financing lease obligation	(432)	(381)	(336)
Proceeds from lease financing	11,208	23,662	—
Payments on capital lease financing	(17,597)	(19,954)	(21,443)
Proceeds from senior secured term loan	—	—	294,243
Payments on senior secured term loan	(75,000)	—	—
Proceeds from revolving credit facility	74,965	—	—
Payments of debt issuance costs	(3,103)	—	—
Advance from CFFT	75,000	—	—
Excess tax benefit from share-based payment arrangements	—	—	2,160
Net cash provided by financing activities	133,271	188,919	549,239
Effect of changes in exchange rates on cash	(4,666)	(2,834)	(2,176)
Net increase in cash and cash equivalents	469,177	89,509	55,960
Cash and cash equivalents—beginning of period	714,768	625,259	569,299
Cash and cash equivalents—end of period	$ 1,183,945	$ 714,768	$ 625,259
Supplemental disclosure of cash flow information:			

Cash paid for interest	$ 83,656	$ 85,613	$ 68,963
Cash (received from) paid for income taxes	$ (2,579)	$ 1,806	$ 1,210
Non-cash investing and financing activities:			
Capitalization of costs related to construction financing lease obligation	$ 14,238	$ —	$ 25,564
Assets acquired under capital lease obligations	$ —	$ —	$ 9,188
Issuances of common stock exercises from employee benefit plans receivable	$ 68	$ 361	$ 637
Proceeds from revolving credit facility directly paid to settle all outstanding obligations under the term loan	$ 225,000	$ —	$ —

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

A. Nature of Business and Accounting Policies

Business

Vertex Pharmaceuticals Incorporated ("Vertex" or the "Company") is in the business of discovering, developing, manufacturing and commercializing medicines for serious diseases. The Company uses precision medicine approaches with the goal of creating transformative medicines for patients in specialty markets. The Company is focused on developing and commercializing therapies for the treatment of cystic fibrosis ("CF") and advancing its research and development programs. The Company's two marketed medicines are ORKAMBI and KALYDECO, which are approved to treat patients with CF who have specific mutations in their cystic fibrosis transmembrane conductance regulator ("CFTR") gene.

The Company's net loss attributable to Vertex for 2016 was $112.1 million , or $0.46 per share. As of December 31, 2016 , the Company had cash, cash equivalents and marketable securities of $1.43 billion . The Company expects that cash flows from the sales of its products, together with the Company's cash, cash equivalents and marketable securities, will be sufficient to fund its operations for at least the next twelve months.

Vertex is subject to risks common to companies in its industry including, but not limited to, the dependence on revenues from ORKAMBI and KALYDECO, competition, uncertainty about clinical trial outcomes and regulatory approvals, uncertainties relating to pharmaceutical pricing and reimbursement, uncertainty related to international expansion, uncertain protection of proprietary technology, the need to comply with government regulations, share price volatility, dependence on collaborative relationships and potential product liability.

Basis of Presentation

The consolidated financial statements reflect the operations of (i) the Company, (ii) its wholly-owned subsidiaries and (iii) consolidated variable interest entities (VIEs). In addition, the consolidated financial statements for 2014 reflect the operations of Alios BioPharma, Inc. ("Alios"), a former collaborator, as well as direct expenses Vertex incurred as a result of the Company's agreement with Alios, as discontinued operations. All material intercompany balances and transactions have been eliminated. The Company operates in one segment, pharmaceuticals. Please refer to Note T, "Segment Information," for enterprise-wide disclosures regarding the Company's revenues, major customers and long-lived assets by geographic area. The Company has reclassified certain amounts in the consolidated balance sheets for the period ended December 31, 2015 between Accounts receivable, net and Prepaid expenses and other current assets to conform to the current year presentation.

Use of Estimates

The preparation of consolidated financial statements in accordance with accounting principles generally accepted in the United States of America ("GAAP") requires management to make certain estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements, and the amounts of revenues and expenses during the reported periods. Significant estimates in these consolidated financial statements have been made in connection with the calculation of revenues, inventories, research and development expenses, stock-based compensation expense, restructuring expense, the fair value of intangible assets, goodwill, contingent consideration, noncontrolling interest, the consolidation of VIEs, leases, the fair value of cash flow hedges and the provision for or benefit from income taxes. The Company bases its estimates on historical experience and various other assumptions, including in certain circumstances future projections, that management believes to be reasonable under the circumstances. Actual results could differ from those estimates. Changes in estimates are reflected in reported results in the period in which they become known.

Revenue Recognition

Product Revenues, Net

The Company sells its products principally to a limited number of specialty pharmacy providers and selected regional wholesalers in North America as well as government-owned and supported customers in international markets (collectively, its "Customers"). The Company's Customers in North America subsequently resell the products to patients and health care

providers. The Company recognizes net revenues from product sales upon delivery as long as (i) there is persuasive evidence that an arrangement exists between the Company and the Customer, (ii) collectibility is reasonably assured and (iii) the price is fixed or determinable.

In order to conclude that the price is fixed or determinable, the Company must be able to (i) calculate its gross product revenues from sales to Customers and (ii) reasonably estimate its net product revenues upon delivery to its Customer's locations. The Company calculates gross product revenues based on the price that the Company charges its Customers. The Company estimates its net product revenues by deducting from its gross product revenues (a) trade allowances, such as invoice discounts for prompt payment and Customer fees, (b) estimated government and private payor rebates, chargebacks and discounts, (c) estimated reserves for expected product returns and (d) estimated costs of co-pay assistance programs for patients, as well as other incentives for certain indirect customers.

Trade Allowances: The Company generally provides invoice discounts on product sales to its Customers for prompt payment and pays fees for distribution services, such as fees for certain data that Customers provide to the Company. The payment terms for sales to Customers in the United States generally include a discount for payment within 30 days. The Company expects that, based on its experience, its Customers will earn these discounts and fees, and deducts the full amount of these discounts and fees from its gross product revenues and accounts receivable at the time such revenues are recognized.

Rebates, Chargebacks and Discounts: The Company contracts with government agencies and various private organizations (collectively, its "Third-party Payors") so that products will be eligible for purchase by, or partial or full reimbursement from, such Third-party Payors. The Company estimates the rebates, chargebacks and discounts it will provide to Third-party Payors and deducts these estimated amounts from its gross product revenues at the time the revenues are recognized. For each product, the Company estimates the aggregate rebates, chargebacks and discounts that it will provide to Third-party Payors based upon (i) the Company's contracts with these Third-party Payors, (ii) the government-mandated discounts applicable to government-funded programs, (iii) information obtained from the Company's Customers and other third-party data regarding the payor mix for such product and (iv) historical experience.

Product Returns: The Company estimates the amount of each product that will be returned and deducts these estimated amounts from its gross revenues at the time the revenues are recognized. The Company's Customers have the right to return unopened unprescribed packages, subject to contractual limitations. To date product returns have been minimal and, based on inventory levels held by its Customers and its distribution model, the Company believes that returns of its products will continue to be minimal.

Other Incentives: Other incentives that the Company offers include co-pay mitigation rebates provided by the Company to commercially insured patients who have coverage and who reside in states that permit co-pay mitigation programs. The Company's co-pay mitigation programs are intended to reduce each participating patient's portion of the financial responsibility for a product's purchase price to a specified dollar amount. Based upon the terms of the Company's co-pay mitigation programs, the Company estimates average co-pay mitigation amounts for each of its products in order to establish its accruals for co-pay mitigation rebates and deducts these estimated amounts from its gross product revenues at the later of the date (i) the revenues are recognized or (ii) the incentive is offered. The Company's co-pay mitigation rebates are subject to expiration.

The Company makes significant estimates and judgments that materially affect the Company's recognition of net product revenues. In certain instances, the Company may be unable to reasonably conclude that the price is fixed or determinable at the time of delivery, in which case it defers the recognition of revenues. Once the Company is able to determine that the price is fixed or determinable, it recognizes the revenues associated with the units in which revenue recognition was deferred. ORKAMBI net product revenues do not include any revenues from product sales in France. The Company began distributing ORKAMBI through early access programs in the fourth quarter of 2015. The Company's consolidated balance sheet includes $73.4 million collected as of December 31, 2016 in France related to ORKAMBI that is classified as customer deposits. The Company expects that revenues from these early access programs will be recognized in the period that a formal reimbursement agreement in France is reached based on the terms of such agreement.

The following table summarizes activity in each of the product revenue allowance and reserve categories for the three years ended December 31, 2016 :

	Trade Allowances	Rebates, Chargebacks and Discounts	Product Returns	Other Incentives	Total
			(in thousands)		
2016					
Beginning Balance	$ 2,089	$ 44,669	$ 1,228	$ 1,310	$ 49,296
Provision related to current period sales	20,075	134,198	3,047	6,602	163,922
Adjustments related to prior period sales	(90)	154	(17)	(151)	(104)
Credits/payments made	(19,506)	(97,094)	(766)	(6,547)	(123,913)
Ending Balance	$ 2,568	$ 81,927	$ 3,492	$ 1,214	$ 89,201
2015					
Beginning Balance	$ 1,463	$ 29,102	$ 4,713	$ 745	$ 36,023
Provision related to current period sales	10,890	65,781	779	3,755	81,205
Adjustments related to prior period sales	(214)	(19,410)	(993)	(235)	(20,852)
Credits/payments made	(10,050)	(30,804)	(3,271)	(2,955)	(47,080)
Ending Balance	$ 2,089	$ 44,669	$ 1,228	$ 1,310	$ 49,296
2014					
Beginning Balance	$ 1,535	$ 68,244	$ 15,799	$ 1,555	$ 87,133
Provision related to current period sales	8,468	35,713	2,478	1,347	48,006
Adjustments related to prior period sales	(43)	329	3,056	(72)	3,270
Credits/payments made	(8,497)	(75,184)	(16,620)	(2,085)	(102,386)
Ending Balance	$ 1,463	$ 29,102	$ 4,713	$ 745	$ 36,023

The Company adjusts its estimated rebates, chargebacks and discounts based on new information, including information regarding actual rebates, chargebacks and discounts for its products, as it becomes available. Claims by third-party payors for rebates, chargebacks and discounts frequently are submitted to the Company significantly after the related sales, potentially resulting in adjustments in the period in which the new information becomes known. In each of the periods presented, the Company's adjustments relating to prior period sales principally related to the Company's estimates for INCIVEK. During the fourth quarter of 2014, the Company withdrew INCIVEK from the market in the United States.

Royalty Revenues

The Company's royalty revenues on commercial sales of INCIVO (telaprevir) by Janssen NV were based on net sales of licensed products in licensed territories as provided by Janssen NV. The Company recognized royalty revenues in the period the sales occured.

The Company has sold its rights to receive certain royalties on sales of an HIV protease inhibitor (fosamprenavir) and recognizes the revenues related to this sale as royalty revenues. In the circumstance where the Company has sold its rights to future royalties under a license agreement and also maintains continuing involvement in the royalty arrangement (but not significant continuing involvement in the generation of the cash flows payable to the purchaser of the future royalty rights), the Company defers recognition of the proceeds it receives for the royalty stream and recognizes these deferred revenues over the life of the license agreement pursuant to the units-of-revenue method. The Company's estimates regarding the estimated remaining royalty payments due to the purchaser have changed in the past and may change in the future.

Collaborative Revenues

The Company recognizes revenues generated through collaborative research, development and/or commercialization agreements. The terms of these agreements typically include payment to the Company of one or more of the following: nonrefundable, up-front license fees; development and commercial milestone payments; funding of research and/or

development activities; payments for services the Company provides through its third-party manufacturing network; and royalties on net sales of licensed products. Each of these types of payments results in collaborative revenues, except for revenues from royalties on net sales of licensed products, which are classified as royalty revenues.

For each collaborative research, development and/or commercialization agreement that result in revenues, the Company determines (i) whether multiple deliverables exist, (ii) whether the undelivered elements have value to the customer on a stand-alone basis, (iii) how the deliverables should be separated and (iv) how the consideration should be allocated to the deliverables. For arrangements entered into or materially modified after January 1, 2011, the Company allocates consideration in an arrangement using the relative selling price method based on management's best estimate of selling price of deliverables if it does not have vendor-specific objective evidence or third-party evidence. As part of the accounting for these agreements, the Company must develop assumptions that require judgment to determine the best estimate of selling price. Key assumptions utilized by the Company to determine the best estimate of selling price may include forecasted revenues, patient enrollment requirements from regulatory authorities, development timelines, reimbursement rates for personnel costs, discount rates, and estimated third-party development costs.

The Company evaluates amendments to its existing arrangements to determine whether they have been materially modified. In making its determination that an arrangement has been materially modified, the Company considers whether there have been significant changes to the consideration under the arrangement, the deliverables under the arrangement, the timing of deliverables and the period of the arrangement. If the arrangement is determined to have been materially modified, the Company allocates fixed consideration under the arrangement using its best estimate of selling price to the remaining undelivered elements at the date of material modification. Any consideration remaining after the allocation is recognized as revenue.

Up-front License Fees: If the license to the Company's intellectual property was determined to have stand-alone value from the other deliverables identified in the arrangement, the Company recognized revenues from nonrefundable, up-front license fees upon delivery. If these licenses did not have stand-alone value, the Company recognized revenues from nonrefundable, up-front license fees on a straight-line basis over the contracted or estimated period of performance. The Company evaluates the period of performance each reporting period and adjusts the period of performance on a prospective basis if there are changes to be made.

Milestone Payments: At the inception of each agreement that included research and development milestone payments, the Company evaluated whether each milestone was substantive. The Company recognized revenues related to substantive milestones in full in the period in which the substantive milestone is achieved if payment is reasonably assured. If a milestone is not considered substantive, the Company recognized the applicable milestone payment over the period of performance.

Research and Development Activities/Manufacturing Services: If the Company was entitled to reimbursement from its collaborators for specified research and development expenses and/or was entitled to payments for specified manufacturing services that the Company provided through its third-party manufacturing network, the Company determines whether the research and development funding would result in collaborative revenues or an offset to research and development expenses in accordance with the provisions of gross or net revenue presentation.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to concentration of credit risk consist principally of money market funds and marketable securities. The Company places these investments with highly rated financial institutions, and, by policy, limits the amounts of credit exposure to any one financial institution. These amounts at times may exceed federally insured limits. The Company also maintains a foreign currency hedging program that includes foreign currency forward contracts with several counterparties. The Company has not experienced any credit losses related to these financial instruments and does not believe it is exposed to any significant credit risk related to these instruments.

The Company also is subject to credit risk from its accounts receivable related to its product sales and collaborators. The Company evaluates the creditworthiness of each of its customers and has determined that all of its material customers are creditworthy. To date, the Company has not experienced significant losses with respect to the collection of its accounts receivable. The Company's receivables from Greece, Italy, Portugal and Spain were not material at December 31, 2016. The

Company believes that its allowance for doubtful accounts was adequate at December 31, 2016 . Please refer to Note T, “Segment Information,” for further information.

Cash and Cash Equivalents

The Company considers all highly liquid investments with original maturities of three months or less at the date of purchase to be cash equivalents.

Marketable Securities

The Company’s marketable securities consist of investments in government-sponsored enterprise securities, corporate debt securities, corporate equity securities and commercial paper that are classified as available-for-sale. The Company classifies marketable securities available to fund current operations as current assets on its consolidated balance sheets. Marketable securities are classified as long-term assets on the consolidated balance sheets if (i) they have been in an unrealized loss position for longer than one year and (ii) the Company has the ability and intent to hold them (a) until the carrying value is recovered and (b) such holding period may be longer than one year. The Company’s marketable securities are stated at fair value with their unrealized gains and losses included as a component of accumulated other comprehensive income (loss), which is a separate component of shareholders’ equity, until such gains and losses are realized. The fair value of these securities is based on quoted prices for identical or similar assets.

The Company reviews investments in marketable securities for other-than-temporary impairment whenever the fair value of an investment is less than the amortized cost and evidence indicates that an investment’s carrying amount is not recoverable within a reasonable period of time. To determine whether an impairment is other-than-temporary, the Company considers whether it has an intent to sell, or whether it is more likely than not that the Company will be required to sell, the investment before recovery of the investment’s amortized cost basis. Evidence considered in this assessment includes reasons for the impairment, compliance with the Company’s investment policy, the severity and the duration of the impairment and changes in value subsequent to year-end. If a decline in the fair value is considered other-than-temporary, based on available evidence, the unrealized loss is transferred from other comprehensive income (loss) to the consolidated statements of operations.

Realized gains and losses are determined using the specific identification method and are included in other income (expense), net in the consolidated statements of operations.

Accounts Receivable

The Company deducts trade allowances for prompt payment and fees for distribution services from its accounts receivable based on its experience that the Company’s Customers will earn these discounts and fees. The Company’s estimates for its allowance for doubtful accounts, which have not been significant to date, are determined based on existing contractual payment terms and historical payment patterns.

Stock-based Compensation Expense

The Company expenses the fair value of employee stock options and other forms of stock-based employee compensation over the associated employee service period on a straight-line basis. Stock-based compensation expense is determined based on the fair value of the award at the grant date, net of estimated forfeitures, and is adjusted each period to reflect actual forfeitures and the outcomes of certain performance conditions.

For awards with performance conditions that accelerate vesting of the award, the Company estimates the likelihood of satisfaction of the performance conditions, which affects the period over which the expense is recognized, and recognizes the expense using the accelerated attribution model. For awards with performance conditions in which the award does not vest unless the performance condition is met, the Company recognizes expense if, and to the extent that, the Company estimates that achievement of the performance condition is probable. If the Company concludes that vesting is probable, it recognizes expense from the date it reaches this conclusion through the estimated vesting date.

Effective for equity awards granted on or after February 5, 2014, the Company provides to employees who have rendered a certain number of years’ to the Company and meet certain age requirements, partial or full acceleration of vesting

of these equity awards, subject to certain conditions including a notification period, upon a termination of employment other than for cause. Approximately 5% of the Company's employees were eligible for partial or full acceleration of any of their equity awards as of December 31, 2016. The Company recognizes stock-based compensation expense related to these awards over a service period reflecting qualified employees eligibility for partial or full acceleration of vesting.

Research and Development Expenses

The Company expenses as incurred all research and development expenses, including amounts funded by research and development collaborations. The Company capitalizes nonrefundable advance payments made by the Company for research and development activities and expenses the payments as the related goods are delivered or the related services are performed.

Research and development expenses are comprised of costs incurred by the Company in performing research and development activities, including salary and benefits; stock-based compensation expense; laboratory supplies and other direct expenses; outsourced services, including clinical trial and pharmaceutical development costs; expenses associated with drug supplies that are not being capitalized; and infrastructure costs, including facilities costs and depreciation expense.

Advertising Expenses

The Company expenses the costs of advertising, including promotional expenses, as incurred. Advertising expenses, recorded in sales, general and administrative expenses, were $31.4 million , $24.5 million and $16.2 million in 2016 , 2015 and 2014 , respectively.

Inventories

The Company values its inventories at the lower-of-cost or market. The Company determines the cost of its inventories, which includes amounts related to materials and manufacturing overhead, on a first-in, first-out basis. The Company performs an assessment of the recoverability of capitalized inventory during each reporting period, and writes down any excess and obsolete inventories to their realizable value in the period in which the impairment is first identified. Shipping and handling costs incurred for inventory purchases are capitalized and recorded upon sale in cost of product revenues in the consolidated statements of operations. Shipping and handling costs incurred for product shipments are recorded as incurred in cost of product revenues in the consolidated statements of operations.

The Company capitalizes inventories produced in preparation for initiating sales of a drug candidate when the related drug candidate is considered to have a high likelihood of regulatory approval and the related costs are expected to be recoverable through sales of the inventories. In determining whether or not to capitalize such inventories, the Company evaluates, among other factors, information regarding the drug candidate's safety and efficacy, the status of regulatory submissions and communications with regulatory authorities and the outlook for commercial sales, including the existence of current or anticipated competitive drugs and the availability of reimbursement. In addition, the Company evaluates risks associated with manufacturing the drug candidate and the remaining shelf-life of the inventories.

Property and Equipment

Property and equipment are recorded at cost. Depreciation expense is recorded using the straight-line method over the estimated useful life of the related asset, generally seven to ten years for furniture and equipment, three to five years for computers and software, 40 years for buildings and for leasehold improvements, the shorter of the useful life of the improvements or the estimated remaining life of the associated lease. Amortization expense of assets acquired under capital leases is included in depreciation expense. Maintenance and repairs to an asset that do not improve or extend its life are charged to operations. When assets are retired or otherwise disposed of, the assets and related accumulated depreciation are eliminated from the accounts and any resulting gain or loss is reflected in the Company's consolidated statements of operations. The Company performs an assessment of the fair value of the assets if indicators of impairment are identified during a reporting period and records the assets at the lower of the net book value or the fair value of the assets.

The Company capitalizes internal costs incurred to develop software for internal use during the application development stage. The Company expenses costs related to the planning and post-implementation phases of development of software for

internal use as these costs are incurred. Maintenance and enhancement costs (including costs in the post-implementation stages) are expensed as incurred, unless such costs relate to substantial upgrades and enhancements to the software resulting in added functionality, in which case the costs are capitalized. Amortization of capitalized internally developed software costs is recorded in depreciation expense over the useful life of the related asset.

The Company records certain construction costs incurred by a landlord as an asset and a corresponding financing obligation on the Company's consolidated balance sheets when the Company is determined to be the owner of the buildings during construction for accounting purposes. Upon completion of the project, the Company performs a sale-leaseback analysis to determine if the Company can remove the assets from its consolidated balance sheet.

Capital Leases

The assets and liabilities associated with capital lease agreements are recorded at the present value of the minimum lease payments at the inception of the lease agreement. The assets are depreciated using the straight-line method over the shorter of the useful life of the related asset or the remaining life of the associated lease. Amortization of assets that the Company leases pursuant to a capital lease is included in depreciation expense. The Company performs an assessment of the fair value of the assets if indicators of impairment are identified during a reporting period and records the assets at the lower of the net book value or the fair value of the assets. Assets recorded under capital leases are recorded within "Property and equipment, net" and liabilities related to those assets are recorded within "Capital lease obligations, current portion" and "Capital lease obligations, excluding current portion" on the Company's consolidated balance sheets.

Income Taxes

Deferred tax assets and liabilities are recognized for the expected future tax consequences of temporary differences between the financial statement carrying amounts and the income tax bases of assets and liabilities. A valuation allowance is applied against any net deferred tax asset if, based on the available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

The Company records liabilities related to uncertain tax positions by prescribing a minimum recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. The Company does not believe any such uncertain tax positions currently pending will have a material adverse effect on its consolidated financial statements.

Variable Interest Entities

The Company reviews each collaboration agreement pursuant to which the Company licenses assets owned by a collaborator in order to determine whether or not the Company has a variable interest via the license agreement with the collaborator and if the variable interest is a variable interest in the collaborator as a whole. In assessing whether the Company has a variable interest in the collaborator as a whole, the Company considers and makes judgments regarding the purpose and design of the entity, the value of the licensed assets to the collaborator and the significant activities of the collaborator. If the Company has a variable interest in the collaborator as a whole, the Company assesses whether or not the Company is the primary beneficiary of that VIE based on a number of factors, including (i) which party has the power to direct the activities that most significantly affect the VIE's economic performance, (ii) the parties' contractual rights and responsibilities pursuant to the collaboration agreement and (iii) which party has the obligation to absorb losses of or the right to receive benefits from the VIE that could be significant to the VIE. If the Company determines it is the primary beneficiary of a VIE at the onset of the collaboration agreement, the collaboration is treated as a business combination and the Company consolidates the financial statements of the VIE into the Company's consolidated financial statements. The Company evaluates whether it continues to be the primary beneficiary of any consolidated VIEs on a quarterly basis. If the Company determines that it is no longer the primary beneficiary of a consolidated VIE, or no longer has a variable interest in the VIE, it deconsolidates the VIE in the period that the determination is made.

Assets recorded as a result of consolidating VIEs' financial results into the Company's consolidated balance sheet do not represent additional assets that could be used to satisfy claims against the Company's general assets. With respect to the Company's VIEs, the VIEs' assets are not significant, except for the VIEs' cash and cash equivalents. The Company records the cash and cash equivalents of consolidated VIEs as restricted cash because the Company does not have control over the

VIEs' cash and cash equivalents. The Company also has recorded the liabilities of its consolidated VIEs for which creditors do not have recourse to the Company's general assets outside of the VIE.

Fair Value of In-process Research and Development Assets and Contingent Payments

The present-value models used to estimate the fair values of research and development assets and contingent payments pursuant to collaborations incorporate significant assumptions, including: assumptions regarding the probability of obtaining marketing approval and/or achieving relevant development milestones for a drug candidate; estimates regarding the timing of and the expected costs to develop a drug candidate; estimates of future cash flows from potential product sales and/or the potential to achieve certain commercial milestones with respect to a drug candidate; and the appropriate discount and tax rates.

In-process Research and Development Assets

The Company records the fair value of in-process research and development assets as of the transaction date of a business combination. Each of these assets is accounted for as an indefinite-lived intangible asset and is maintained on the Company's consolidated balance sheet until either the project underlying it is completed or the asset becomes impaired. If the asset becomes impaired or is abandoned, the carrying value of the related intangible asset is written down to its fair value, and an impairment charge is recorded in the period in which the impairment occurs. If a project is completed, the carrying value of the related intangible asset is amortized as a part of cost of product revenues over the remaining estimated life of the asset beginning in the period in which the project is completed. In-process research and development assets are tested for impairment on an annual basis as of October 1, and more frequently if indicators are present or changes in circumstances suggest that impairment may exist.

Goodwill

The difference between the purchase price and the fair value of assets acquired and liabilities assumed in a business combination is allocated to goodwill. Goodwill is evaluated for impairment on an annual basis as of October 1, and more frequently if indicators are present or changes in circumstances suggest that impairment may exist.

Noncontrolling Interest

The Company records noncontrolling interest, which has historically related to consolidated VIEs, on its consolidated balance sheets. The Company records net loss (income) attributable to noncontrolling interest on its consolidated statements of operations, reflecting the VIEs' net loss (income) for the reporting period, adjusted for changes in the noncontrolling interest holders' claim to net assets, including contingent milestone, royalty and option payments, is evaluated each reporting period.

Deconsolidation and Discontinued Operations

Upon the occurrence of certain events and on a regular basis, the Company evaluates whether it no longer has a controlling interest in its subsidiaries, including consolidated VIEs. If the Company determines it no longer has a controlling interest, the subsidiary is deconsolidated. The Company records a gain or loss on deconsolidation based on the difference on the deconsolidation date between (i) the aggregate of (a) the fair value of any consideration received, (b) the fair value of any retained noncontrolling investment in the former subsidiary and (c) the carrying amount of any noncontrolling interest in the subsidiary being deconsolidated, less (ii) the carrying amount of the former subsidiary's assets and liabilities.

The Company assesses whether a deconsolidation is required to be presented as discontinued operations in its consolidated financial statements on the deconsolidation date. This assessment is based on whether or not the deconsolidation represents a strategic shift that has or will have a major effect on the Company's operations or financial results. If the Company determines that a deconsolidation requires presentation as a discontinued operation on the deconsolidation date, or at any point during the one year period following such date, it will present the former subsidiary as a discontinued operation in current and comparative period financial statements.

Derivative Instruments, Embedded Derivatives and Hedging Activities

The Company has entered into financial transactions involving free-standing derivative instruments and embedded derivatives in the past. Embedded derivatives are required to be bifurcated from the host instruments if the derivatives are not clearly and closely related to the host instruments. The Company determines the fair value of each derivative instrument or embedded derivative that is identified on the date of issuance and at the end of each quarterly period. The estimates of the fair value of the derivatives include significant assumptions regarding the estimates market participants would make in order to evaluate these derivatives.

The Company recognizes the fair value of hedging instruments that are designated and qualify as hedging instruments pursuant to GAAP, primarily foreign currency forward contracts, as either assets or liabilities on the consolidated balance sheets. Changes in the fair value of hedging instruments are recorded each period in accumulated other comprehensive income (loss) as unrealized gains and losses until the forecasted underlying transaction occurs. Unrealized gains and losses on these foreign currency forward contracts are included in (i) "Prepaid expenses and other current assets," (ii) Other assets," (iii) "Other liabilities, current portion" and (iv) "Other liabilities, excluding current portion," respectively, on the Company's consolidated balance sheets. Realized gains and losses for the effective portion of such contracts are recognized in "Product revenues, net" in the consolidated statement of operations when the contract is settled with the counterparty. The Company classifies the cash flows from hedging instruments in the same category as the cash flows from the hedged items.

Certain of the Company's hedging instruments are subject to master netting arrangements to reduce the risk arising from such transactions with its counterparties. The Company presents unrealized gains and losses on its foreign currency forward contracts on a gross basis within its consolidated balance sheets.

The Company assesses, both at inception and on an ongoing basis, whether the foreign currency forward contracts used in hedging transactions are highly effective in offsetting the changes in cash flows of the hedged items. The Company also assesses hedge ineffectiveness quarterly and, if determined to be ineffective, records the gain or loss related to the ineffective portion to earnings in "Other income (expense), net" in its consolidated statements of operations.

Restructuring Expenses

The Company records costs and liabilities associated with exit and disposal activities based on estimates of fair value in the period the liabilities are incurred. In periods subsequent to the initial measurement, the Company measures changes to the liability using the credit-adjusted risk-free discount rate applied in the initial period. The Company evaluates and adjusts these liabilities as appropriate for changes in circumstances at least on a quarterly basis.

Comprehensive Income (Loss)

Comprehensive income (loss) consists of net income (loss) and other comprehensive income (loss), which includes foreign currency translation adjustments and unrealized gains and losses on foreign currency forward contracts and certain marketable securities. For purposes of comprehensive income (loss) disclosures, the Company records tax provisions or benefits related to the unrealized gains and losses on foreign currency forward contracts and certain marketable securities. The Company does not record tax provisions or benefits related to the cumulative translation adjustment, as the Company intends to permanently reinvest undistributed earnings in its foreign subsidiaries.

Foreign Currency Translation and Transactions

The Company primarily operates with entities that have the U.S. dollar denominated as their functional currency. Non-U.S. dollar denominated functional currency subsidiaries have assets and liabilities translated into U.S. dollars at rates of exchange in effect at the end of the year. Revenue and expense amounts are translated using the average exchange rates for the period. Net unrealized gains and losses resulting from foreign currency translation are included in accumulated other comprehensive income (loss), which is a separate component of shareholders' equity. Included in accumulated other comprehensive income (loss) are net unrealized losses related to foreign currency translation of $7.9 million , $2.1 million and $1.0 million at December 31, 2016 , 2015 and 2014 , respectively. Net foreign currency exchange transaction gains or losses are included in "net loss" on the Company's consolidated statement of operations. Net transaction gains were $4.0 million for 2016 and net transaction losses were $6.8 million and $6.4 million for 2015 and 2014 , respectively.

Net Loss Per Share Attributable to Vertex Common Shareholders

Basic and diluted net loss per share attributable to Vertex common shareholders are presented in conformity with the two-class method required for participating securities. Under the two-class method, earnings are allocated to (i) Vertex common shares, excluding unvested restricted stock, and (ii) participating securities, based on their respective weighted-average shares outstanding for the period. Shares of unvested restricted stock granted under the Company's Amended and Restated 2006 Stock and Option Plan have the non-forfeitable right to receive dividends on an equal basis with other outstanding common stock. As a result, these unvested shares of restricted stock are considered participating securities under the two-class method. Potentially dilutive shares result from the assumed exercise of outstanding stock options (the proceeds of which are then assumed to have been used to repurchase outstanding stock using the treasury stock method).

Basic net loss per share attributable to Vertex common shareholders is based upon the weighted-average number of common shares outstanding during the period, excluding restricted stock that has been issued but is not yet vested. Diluted net loss per share attributable to Vertex common shareholders is based upon the weighted-average number of common shares outstanding during the period plus additional weighted-average common equivalent shares outstanding during the period when the effect is dilutive.

The Company utilizes income (loss) from continuing operations attributable to Vertex to determine whether potentially outstanding stock options and the assumed conversion of convertible notes are dilutive.

Recent Accounting Pronouncements

In 2014, the Financial Accounting Standards Board ("FASB") issued amended guidance applicable to revenue recognition that will be effective for the year ending December 31, 2018. Early adoption is permitted for the year-ending December 31, 2017. The new guidance applies a more principles based approach to recognizing revenue. Under the new guidance, revenue is recognized when a customer obtains control of promised goods or services and is recognized in an amount that reflects the consideration that an entity expects to receive in exchange for those goods or services. In addition, the standard requires disclosure of the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. The new guidance must be adopted using either a modified retrospective approach or a full retrospective approach for all periods presented. Under the modified retrospective method, the cumulative effect of applying the standard would be recognized at the date of initial application within retained earnings. Under the full retrospective approach, the standard would be applied to each prior reporting period presented. The Company expects to adopt the new guidance using the modified retrospective method. The Company is in the process of evaluating the new guidance and determining whether the expected effect is material to its consolidated financial statements. The process includes identifying and analyzing the impact of the standard by reviewing the Company's current accounting policies and practices to identify potential differences that would result from applying the requirements of the new standard to each revenue contract associated with all of the Company's revenue streams. The new guidance could impact the Company's accounting for product shipments to countries through early access programs, for example the French early access programs, whereby the associated product has received regulatory approval but the reimbursement rate has not been finalized.

In 2016, the FASB issued amended guidance applicable to leases that will be effective for the year ending December 31, 2019. Early adoption is permitted. This update requires an entity to recognize assets and liabilities for leases with lease terms of more than 12 months on the balance sheet. The Company is in the process of evaluating the new guidance and determining the expected effect on its consolidated financial statements.

In 2016, the FASB issued amended guidance applicable to share-based compensation to employees that will be effective for the year ending December 31, 2017 with early adoption permitted. This guidance simplifies the accounting for employee share-based payment transactions, including the accounting for income taxes, forfeitures, and statutory tax withholding requirements, as well as classification in the statement of cash flows. The Company plans to change how it accounts for forfeitures upon adoption and is currently quantifying the adjustment to be recorded to retained earnings related to this change in policy. In addition, the Company will include certain net operating losses and tax credits, offset with a full valuation allowance, as a component of deferred taxes upon adoption of this guidance that were previously not included in deferred taxes. The Company will also record a corresponding valuation allowance against these increased net operating loss carryforwards upon adoption of this new guidance.

In 2016, the FASB issued amended guidance for the classification of certain cash receipts and cash payments on the statement of cash flows to reduce existing diversity in practice. The new accounting guidance is effective for the year ending December 31, 2017. Early adoption is permitted. The Company does not expect a significant effect on its consolidated financial statements upon adoption of this new guidance.

In January 2017, the FASB issued amended guidance related to business combinations. The new guidance clarifies the definition of a business with the objective of adding guidance to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. The new accounting guidance is effective for annual periods beginning after December 15, 2017, including interim periods within those periods. Early adoption is permitted. The Company plans to apply this new guidance to future acquisitions.

In 2014, the FASB issued new guidance on management's responsibility in evaluating whether or not there is substantial doubt about a company's ability to continue as a going concern within one year from the date the financial statements are issued each reporting period. This new accounting guidance became effective for the Company for the year ended December 31, 2016. The adoption of the new guidance did not have a material effect on the Company's consolidated financial statements.

B. Collaborative Arrangements

Cystic Fibrosis Foundation Therapeutics Incorporated

The Company has a research, development and commercialization agreement with Cystic Fibrosis Foundation Therapeutics Incorporated ("CFFT") that was originally entered into in May 2004, and was most recently amended on October 13, 2016 (the "2016 Amendment"). Pursuant to the agreement, as amended, the Company has agreed to pay royalties ranging from low single digits to mid-single digits on potential sales of certain compounds first synthesized and/or tested between March 1, 2014 and August 31, 2016 and tiered royalties ranging from single digits to sub-teens on any approved drugs first synthesized and/or tested during a research term on or before February 28, 2014, including KALYDECO (ivacaftor), ORKAMBI (lumacaftor in combination with ivacaftor), lumacaftor and tezacaftor. For combination products, such as ORKAMBI, sales will be allocated equally to each of the active pharmaceutical ingredients in the combination product.

In each of the fourth quarter of 2015 and first quarter of 2016, CFFT earned a commercial milestone payment of $13.9 million from the Company upon achievement of certain sales levels of lumacaftor. There are no additional commercial milestone payments payable by the Company to CFFT pursuant to the agreement. Pursuant to the 2016 Amendment, the CFFT provided the Company an upfront payment of $75.0 million and agreed to provide development funding to the Company of up to $6.0 million annually. The upfront payment plus any future development funding represent a form of financing pursuant to Accounting Standards Codification (ASC) 730, *Research and Development* , and thus the amounts are recorded as a liability on the consolidated balance sheet, primarily reflected in Other liabilities, excluding current portion. The liability is reduced over the estimated royalty term of the agreement. Reductions in the liability are reflected as an offset to cost of product revenues and as interest expense.

The Company began marketing KALYDECO in the United States and certain countries in the European Union in 2012 and began marketing ORKAMBI in the United States in 2015. The Company received approval for ORKAMBI In the European Union in 2015 and in Canada and Australia in 2016. The Company has royalty obligations to CFFT for ivacaftor, lumacaftor and tezacaftor until the expiration of patents covering those compounds. The Company has patents in the United States and European Union covering the composition-of-matter of ivacaftor that expire in 2027 and 2025, respectively, subject to potential patent extensions. The Company has patents in the United States and European Union covering the composition-of-matter of lumacaftor that expire in 2030 and 2026, respectively, subject to potential extension. The Company has patents in the United States and European Union covering the composition-of-matter of tezacaftor that expire in 2027 and 2028, respectively, subject to potential extension.

CRISPR Therapeutics AG

On October 26, 2015, the Company entered into a strategic collaboration, option and license agreement (the "CRISPR Agreement") with CRISPR Therapeutics AG and its affiliates ("CRISPR") to collaborate on the discovery and development of potential new treatments aimed at the underlying genetic causes of human diseases using CRISPR-Cas9 gene editing technology. The Company has the exclusive right to license up to six CRISPR-Cas9-based targets. In connection with the CRISPR Agreement, the Company made an upfront payment to CRISPR of $75.0 million and a $30.0 million investment in CRISPR pursuant to a convertible loan agreement that converted into preferred stock in January 2016. The Company expensed $75.0 million to research and development, and the $30.0 million investment was recorded at cost and was classified as a long-term asset on the Company's consolidated balance sheet in 2015. In the second quarter of 2016, the Company made an additional preferred stock investment in CRISPR of approximately $3.1 million . In connection with CRISPR's initial public offering in October 2016, the Company purchased $10.0 million of common shares at the public offering price and the Company's preferred stock investments in CRISPR converted into common shares. Pursuant to the terms of a lockup agreement between the Company and the underwriters of CRISPR's initial public offering, the Company agreed not to sell or otherwise dispose of its shares in CRISPR through April 17, 2017. As of December 31, 2016, the Company recorded the CRISPR common shares it holds at fair value and included the fair value of the common shares in its marketable securities and the unrecognized gain related to these common shares in accumulated other comprehensive income (loss) on the consolidated balance sheet.

The Company will fund all of the discovery activities conducted pursuant to the CRISPR Agreement. For potential hemoglobinapathy treatments, including treatments for sickle cell disease, the Company and CRISPR will share equally all research and development costs and worldwide revenues. For other targets that the Company elects to license, the Company would lead all development and global commercialization activities. For each of up to six targets that the Company elects to license, other than hemoglobinapathy targets, CRISPR has the potential to receive up to $420.0 million in development, regulatory and commercial milestones and royalties on net product sales.

The Company may terminate the CRISPR Agreement upon 90 days' notice to CRISPR prior to any product receiving marketing approval or upon 270 days' notice after a product has received marketing approval. The CRISPR Agreement also may be terminated by either party for a material breach by the other, subject to notice and cure provisions. Unless earlier terminated, the CRISPR Agreement will continue in effect until the expiration of the Company's payment obligations under the CRISPR Agreement.

Variable Interest Entities (VIE)

The Company has entered into several agreements pursuant to which it has licensed rights to certain drug candidates from third-party collaborators, which has resulted in the consolidation of the third parties' financial statements into the Company's consolidated financial statements as VIEs. In order to account for the fair value of the contingent payments, which consist of milestone, royalty and option payments, related to these collaborations under GAAP, the Company uses present-value models based on assumptions regarding the probability of achieving the relevant milestones, estimates regarding the timing of achieving the milestones, estimates of future product sales and the appropriate discount rates. The Company bases its estimate of the probability of achieving the relevant milestones on industry data for similar assets and its own experience. The discount rates used in the valuation model represent a measure of credit risk and market risk associated with settling the liabilities. Significant judgment is used in determining the appropriateness of these assumptions at each reporting period. Changes in these assumptions could have a material effect on the fair value of the contingent payments. The following collaborations are reflected in the Company's financial statements as consolidated VIEs:

Parion Sciences, Inc.

License and Collaboration Agreement

In June 2015, the Company entered into a strategic collaboration and license agreement (the "Parion Agreement") with Parion Sciences, Inc. ("Parion"). Pursuant to the agreement, the Company is collaborating with Parion to develop investigational epithelial sodium channel ("ENaC") inhibitors, including VX-371 (formerly P-1037) and VX-551 (formerly P-1055), for the potential treatment of CF and all other pulmonary diseases. The Company is leading development activities

for VX-371 and VX-551 and is responsible for all costs, subject to certain exceptions, related to development and commercialization of the compounds.

Pursuant to the Parion Agreement, the Company has worldwide development and commercial rights to Parion's lead investigational ENaC inhibitors, VX-371 and VX-551, for the potential treatment of CF and all other pulmonary diseases and has the option to select additional compounds discovered in Parion's research program. Parion received an $80.0 million up-front payment and has the potential to receive up to an additional (i) $490.0 million in development and regulatory milestone payments for development of ENaC inhibitors in CF, including $360.0 million related to global filing and approval milestones, (ii) $370.0 million in development and regulatory milestones for VX-371 and VX-551 in non-CF pulmonary indications and (iii) $230.0 million in development and regulatory milestones should the Company elect to develop an additional ENaC inhibitor from Parion's research program. The Company has agreed to pay Parion tiered royalties that range from the low double digits to mid-teens as a percentage of potential sales of licensed products. In the second quarter of 2016, Parion earned a milestone payment of $5.0 million based upon the achievement of a specified milestone under the Parion Agreement.

The Company may terminate the Parion Agreement upon 90 days' notice to Parion prior to any licensed product receiving marketing approval or upon 180 days' notice after a licensed product has received marketing approval. If the Company experiences a change of control prior to the initiation of the first Phase 3 clinical trial for a licensed product, Parion may terminate the Parion Agreement upon 30 days' notice, subject to the Company's right to receive specified royalties on any subsequent commercialization of licensed products. The Parion Agreement also may be terminated by either party for a material breach by the other, subject to notice and cure provisions. Unless earlier terminated, the Parion Agreement will continue in effect until the expiration of the Company's royalty obligations, which expire on a country-by-country basis on the later of (i) the date the last-to-expire patent covering a licensed product expires or (ii) ten years after the first commercial sale in the country.

The Company determined that it has a variable interest in Parion via the Parion Agreement, and that the variable interest represents a variable interest in Parion as a whole since the fair value of the ENaC inhibitors represents more than half of the total fair value of Parion's assets. The Company also concluded that it is the primary beneficiary as it has the power to direct the activities that most significantly affect the economic performance of Parion and it has the obligation to absorb losses and right to receive benefits that potentially could be significant to Parion. Accordingly, the Company consolidated Parion's financial statements beginning on June 4, 2015. However, the Company's interests in Parion are limited to those accorded to the Company in the Parion Agreement.

Consideration for the Parion Agreement

The Company determined that the fair value of the consideration to be transferred from the Company to Parion was $255.3 million as of June 4, 2015, which consisted of (i) an $80.0 million up-front payment, (ii) the estimated fair value of the contingent research and development milestones and (iii) the estimated fair value of potential royalty payments. The Company valued the contingent payments using (a) discount rates ranging from 4.1% to 5.9% for the development milestones and (b) a discount rate of 6.6% for royalties. The up-front payment made and the fair value of the contingent payments payable by the Company pursuant to the Parion Agreement are set forth in the table below:

	June 4, 2015
	(in thousands)
Up-front payment	$ 80,000
Fair value of contingent payments	175,340
Total	$ 255,340

Allocation of Assets and Liabilities

The Company recorded the fair value of the assets and liabilities of Parion on the effective date of the agreement as follows:

	June 4, 2015
	(in thousands)
Consideration transferred	$ —
Noncontrolling interest	164,317
Intangible assets	(255,340)
Net other liabilities	10,468
Deferred tax liability	91,023
Goodwill	$ 10,468

While there was a transfer of $80.0 million to Parion, the cash remained within the Company's consolidated financial statements since Parion is part of the consolidated entity. The cash is classified as restricted cash and cash equivalents (VIE) within the consolidated balance sheet as it is attributed to the noncontrolling interest holders of Parion. When determining the valuation of goodwill, the fair value of consideration for the license is zero since there was no consideration transferred outside the consolidated financial statements. The Company recorded $255.3 million of intangible assets on the Company's consolidated balance sheets for Parion's in-process research and development assets. These in-process research and development assets relate to Parion's pulmonary ENaC platform, including the intellectual property related to VX-371 and VX-551, that are licensed by Parion to the Company. The Company also recorded the fair value of the net assets attributable to noncontrolling interest and deferred tax liability resulting from a basis difference in the intangible assets and certain other net liabilities held by Parion. The difference between the fair values of the consideration and noncontrolling interest and the fair value of Parion's net assets was recorded as goodwill.

BioAxone Biosciences, Inc.

In October 2014, the Company entered into a license and collaboration agreement (the "BioAxone Agreement") with BioAxone Biosciences, Inc. ("BioAxone"), which resulted in the consolidation of BioAxone as a VIE beginning on October 1, 2014. The Company determined that BioAxone is a VIE based on, among other factors, the significance to BioAxone of VX-210, which was licensed to the Company pursuant to the BioAxone Agreement, and on the Company's power to direct the activities that most significantly affect the economic performance of BioAxone. Accordingly, the Company consolidated BioAxone's financial statements beginning in October 2014. The Company paid BioAxone initial payments of $10.0 million in the fourth quarter of 2014.

BioAxone has the potential to receive up to $90.0 million in milestones and fees, including development, regulatory and milestone payments and a license continuation fee. In addition, BioAxone would receive royalties and commercial milestones on future net product sales of VX-210, if any. The Company recorded an in-process research and development intangible asset of $29.0 million for VX-210 and a corresponding deferred tax liability of $11.3 million attributable to BioAxone. The Company holds an option to purchase BioAxone at a predetermined price. The option expires on the earliest of (a) the day the FDA accepts the Biologics License Application submission for VX-210, (b) the day the Company elects to continue the license instead of exercising the option to purchase BioAxone and (c) March 15, 2018, subject to the Company's option to extend this date by one year.

Alios BioPharma, Inc.

In 2011, the Company entered into a license and collaboration agreement (the "Alios Agreement") with Alios, which terminated in the fourth quarter of 2014. Pursuant to the Alios Agreement, which resulted in the consolidation of Alios as a VIE through December 31, 2013, the Company and Alios collaborated on the research, development and commercialization of HCV nucleotide analogues discovered by Alios. As of September 30, 2014, the Company concluded that it no longer had significant continuing involvement with Alios due to its intent and ability to terminate the Alios Agreement, among other factors, and the operations of Alios are presented as discontinued operations in these consolidated financial statements for 2014.

Aggregate VIE Financial Information

An aggregate summary of net loss attributable to noncontrolling interest related to the Company's VIEs for the three years ended December 31, 2016 was as follows:

	2016	2015	2014
		(in thousands)	
Loss attributable to noncontrolling interest before provision for income taxes	$ 10,086	$ 6,646	$ 764
Provision for income taxes	16,743	29,731	3,876
Increase in fair value of contingent payments	(54,850)	(4,530)	(450)
Net (income) loss attributable to noncontrolling interest	$ (28,021)	$ 31,847	$ 4,190

During the years ended December 31, 2016 and 2015 , the noncontrolling interest holders' claim to net assets with respect to the contingent payments related to the Parion Agreement, increased by $64.8 million and $3.6 million , respectively. The increase in the fair value of the contingent payments related to the Parion Agreement in 2016 was primarily due to a Phase 2 clinical trial of VX-371 achieving its primary safety endpoint in the second quarter of 2016 offset by a payment of $5.0 million related to the achievement of a specified milestone under the Parion Agreement. The changes in the fair value of the contingent payments were also due to the changes in market interest rates and the time value of money. As of December 31, 2016 and 2015 , the fair value of the contingent payments related to the Parion Agreement was $238.8 million and $179.0 million , respectively.

During the year ended December 31, 2016 , the noncontrolling interest holders' claim to net assets with respect to the contingent payments related to the BioAxone Agreement decreased by $10.0 million . The decrease in the fair value of the contingent payments was due to changes in certain assumptions used in establishing the fair value including revenue assumptions and the development timeline. During the year ended December 31, 2015 and 2014 , the fair value of the contingent payments related to the BioAxone Agreement increased by $0.9 million and $0.5 million , respectively. As of December 31, 2016 and 2015 , the fair value of the contingent payments related to the BioAxone Agreement was $18.0 million and $28.0 million , respectively.

The following table summarizes items related to the Company's VIEs included in the Company's consolidated balance sheets as of the dates set forth in the table:

	December 31, 2016	December 31, 2015
	(in thousands)	
Restricted cash and cash equivalents (VIE)	$ 47,762	$ 78,910
Prepaid expenses and other current assets	6,812	3,138
Intangible assets	284,340	284,340
Goodwill	19,391	19,391
Other assets	399	455
Accounts payable	415	676
Taxes payable	1,330	24,554
Other current liabilities	2,137	7,100
Deferred tax liability, net	131,446	110,438
Other liabilities	300	300
Noncontrolling interest	181,609	153,661

The Company has recorded the VIEs' cash and cash equivalents as restricted cash and cash equivalents (VIE) because (i) the Company does not have any interest in or control over the VIEs' cash and cash equivalents and (ii) the Company's agreements with each VIE do not provide for the VIEs' cash and cash equivalents to be used for the development of the assets that the Company licensed from the applicable VIE. Assets recorded as a result of consolidating the Company's VIEs' financial condition into the Company's balance sheets do not represent additional assets that could be used to satisfy claims against the Company's general assets.

Other Collaborations

The Company has entered into various agreements pursuant to which it collaborates with third parties, including inlicensing and outlicensing arrangements. Although the Company does not consider any of these arrangements to be material, the most notable of these arrangements are described below.

Moderna Therapeutics, Inc.

In July 2016, the Company entered into a strategic collaboration and licensing agreement (the "Moderna Agreement") with Moderna Therapeutics, Inc. ("Moderna") pursuant to which the parties are seeking to identify and develop messenger Ribonucleic Acid ("mRNA") Therapeutics for the treatment of CF. In connection with the Moderna Agreement in the third quarter of 2016, the Company made an upfront payment to Moderna of $20.0 million and a $20.0 million cost-method investment in Moderna pursuant to a convertible promissory note that converted into preferred stock in August 2016. Moderna has the potential to receive future development and regulatory milestones of up to $275.0 million , including $220.0 million in approval and reimbursement milestones, as well as tiered royalty payments on future sales.

Under the terms of the Moderna Agreement, Moderna will lead discovery efforts and the Company will lead all preclinical, development and commercialization activities associated with the advancement of mRNA Therapeutics that result from this collaboration and will fund all expenses related to the collaboration.

The Company may terminate the Moderna Agreement by providing advanced notice to Moderna, with the required length of notice dependent on whether any product developed under the Moderna Agreement has received marketing approval. The Moderna Agreement also may be terminated by either party for a material breach by the other, subject to notice and cure provisions. Unless earlier terminated, the Moderna Agreement will continue in effect until the expiration of the Company's payment obligations under the Moderna Agreement.

Janssen Pharmaceuticals, Inc.

In June 2014, the Company entered into an agreement (the "Janssen Influenza Agreement") with Janssen Pharmaceuticals, Inc. ("Janssen Inc."), which was amended in October 2014 to clarify certain roles and responsibilities of the parties.

Pursuant to the Janssen Influenza Agreement, Janssen Inc. has an exclusive worldwide license to develop and commercialize certain drug candidates for the treatment of influenza, including JNJ-3872 (formerly VX-787). The Company received non-refundable payments of $35.0 million from Janssen Inc. in 2014, which were recorded as collaborative revenues. The Company has the potential to receive development, regulatory and commercial milestone payments as well as royalties on future product sales, if any.

Janssen Inc. is responsible for costs related to the development and commercialization of the compounds. The Company recorded reimbursement for these development activities of $14.7 million , $22.8 million and $9.1 million in 2016 , 2015 and 2014 , respectively. The reimbursements are recorded as a reduction to development expense in the Company's consolidated statements of operations primarily due to the fact that Janssen Inc. directs the activities and selects the suppliers associated with these activities. Janssen Inc. may terminate the Janssen Influenza Agreement, subject to certain exceptions, upon six months' notice.

Janssen Pharmaceutica NV

The Company has a collaboration agreement (the "Janssen HCV Agreement") with Janssen Pharmaceutica NV ("Janssen NV") for the development, manufacture and commercialization of telaprevir, which Janssen NV began marketing under the brand name INCIVO in certain of its territories in September 2011. Pursuant to the Janssen HCV Agreement, as amended, Janssen NV has a fully-paid license to manufacture and commercialize INCIVO in its territories including Europe, South America, the Middle East, Africa and Australia, subject to the payment of third-party royalties on net sales of INCIVO. In addition to the collaborative revenues, the Company recorded royalty revenues and corresponding royalty expenses related to third-party royalties that Janssen NV remains responsible for based on INCIVO net sales.

During the three years ended December 31, 2016 , the Company recognized the following revenues attributable to the Janssen HCV collaboration:

	2016	2015	2014
		(in thousands)	
Royalty revenues	$ 71	$ 1,518	$ 13,481
Collaborative revenues	$ (155)	$ 1,946	$ 7,104
Total revenues attributable to the Janssen HCV collaboration	$ (84)	$ 3,464	$ 20,585

Subsequent Event

Merck KGaA

On January 10, 2017, the Company entered into a Strategic Collaboration and License Agreement (the "Merck KGaA Agreement") with Merck KGaA, Darmstadt, Germany ("Merck KGaA"). Pursuant to the Merck KGaA Agreement, the Company granted Merck KGaA an exclusive worldwide license to research, develop and commercialize four oncology research and development programs. Under the Merck KGaA Agreement, the Company granted Merck KGaA exclusive, worldwide rights to our two clinical-stage programs targeting DNA damage repair: its ataxia telangiectasia and Rad3-related protein inhibitor program, including VX-970 and VX-803, and its DNA-dependent protein kinase inhibitor program, including VX-984. In addition, the Company granted Merck KGaA exclusive, worldwide rights to two pre-clinical programs.

Under the Merck KGaA Agreement, the Company will receive an up-front payment of $230.0 million . In addition, it will receive tiered royalties on potential sales of licensed products, calculated as a percentage of net sales, that range from (i)

mid-single digits to mid-twenties for clinical-stage programs and (ii) mid-single digits to high single digits for the pre-clinical research programs. Merck KGaA will assume full responsibility for development and commercialization costs for all programs. The licenses granted pursuant to the Merck KGaA Agreement and the up-front payment are subject to the expiration of the waiting period under the Hart-Scott-Rodino Antitrust Improvements Act.

Merck KGaA may terminate the Merck KGaA Agreement or any individual program by providing 90 days' notice, or, in the case of termination of a program with a product that has received marketing approval, 180 days' notice. The Merck KGaA Agreement may also be terminated by either party for a material breach by the other party, subject to notice and cure provisions. Unless earlier terminated, the Merck KGaA Agreement will continue in effect until the date on which the royalty term and all payment obligations with respect to all products in all countries have expired.

C. Earnings Per Share

Basic net loss per share attributable to Vertex common shareholders is based upon the weighted-average number of common shares outstanding during the period, excluding restricted stock and restricted stock units that have been issued but are not yet vested. Diluted net loss per share attributable to Vertex common shareholders is based upon the weighted-average number of common shares outstanding during the period plus additional weighted-average common equivalent shares outstanding during the period when the effect is dilutive.

The Company did not include the securities in the following table in the computation of the net loss from continuing operations per share attributable to Vertex common shareholders calculations because the effect would have been anti-dilutive during each period.

	2016	2015	2014
		(in thousands)	
Stock options	12,642	11,145	12,003
Unvested restricted stock and restricted stock units	3,546	3,024	3,091

D. Fair Value Measurements

The fair value of the Company's financial assets and liabilities reflects the Company's estimate of amounts that it would have received in connection with the sale of the assets or paid in connection with the transfer of the liabilities in an orderly transaction between market participants at the measurement date. In connection with measuring the fair value of its assets and liabilities, the Company seeks to maximize the use of observable inputs (market data obtained from sources independent from the Company) and to minimize the use of unobservable inputs (the Company's assumptions about how market participants would price assets and liabilities). The following fair value hierarchy is used to classify assets and liabilities based on the observable inputs and unobservable inputs used in order to value the assets and liabilities:

Level 1: Quoted prices in active markets for identical assets or liabilities. An active market for an asset or liability is a market in which transactions for the asset or liability occur with sufficient frequency and volume to provide pricing information on an ongoing basis.

Level 2: Observable inputs other than Level 1 inputs. Examples of Level 2 inputs include quoted prices in active markets for similar assets or liabilities and quoted prices for identical assets or liabilities in markets that are not active.

Level 3: Unobservable inputs based on the Company's assessment of the assumptions that market participants would use in pricing the asset or liability.

The Company's investment strategy is focused on capital preservation. The Company invests in instruments that meet the credit quality standards outlined in the Company's investment policy. This policy also limits the amount of credit exposure to any one issue or type of instrument. As of December 31, 2016 , the Company's investments were in money market funds, government-sponsored enterprise securities, corporate equity securities, corporate debt securities and commercial paper.

As of December 31, 2016 , all of the Company's financial assets that were subject to fair value measurements were valued using observable inputs. The Company's financial assets valued based on Level 1 inputs consisted of a money market funds, corporate equity securities and government-sponsored enterprise securities. The Company's financial assets valued based on Level 2 inputs consisted of corporate debt securities and commercial paper, which consisted of investments in highly-rated investment-grade corporations. The fair value of the Company's foreign currency forward contracts was based on Level 2 inputs using third party pricing services. During 2016 , 2015 and 2014 , the Company did not record an other-than-temporary impairment charge related to its financial assets.

The following table sets forth the Company's financial assets (excluding VIE cash and cash equivalents) subject to fair value measurements:

	Fair Value Measurements as of December 31, 2016			
		Fair Value Hierarchy		
	Total	Level 1	Level 2	Level 3
	(in thousands)			
Financial instruments carried at fair value (asset position):				
Cash equivalents:				
Money market funds	$ 280,560	$ 280,560	$ —	$ —
Marketable securities:				
Government-sponsored enterprise securities	15,508	15,508	—	—
Corporate equity securities	64,560	64,560	—	—
Commercial paper	59,404	—	59,404	—
Corporate debt securities	111,140	—	111,140	—
Prepaid and other current assets:				
Foreign currency forward contracts	14,407	—	14,407	—
Other assets:				
Foreign currency forward contracts	1,186	$ —	1,186	$ —
Total financial assets	$ 546,765	$ 360,628	$ 186,137	$ —
Financial instruments carried at fair value (liability position):				
Other liabilities, current portion:				
Foreign currency forward contracts	$ (144)	$ —	$ (144)	$ —
Total financial liabilities	$ (144)	$ —	$ (144)	$ —

	Fair Value Measurements as of December 31, 2015			
		Fair Value Hierarchy		
	Total	Level 1	Level 2	Level 3
	(in thousands)			
Financial instruments carried at fair value (asset position):				
Cash equivalents:				
Money market funds	$ 199,507	$ 199,507	$ —	$ —
Government-sponsored enterprise securities	85,994	85,994	—	—
Commercial paper	34,889	—	34,889	—
Corporate debt securities	11,533	—	11,533	—
Marketable securities:				
Government-sponsored enterprise securities	87,162	87,162	—	—
Commercial paper	99,123	—	99,123	—
Corporate debt securities	141,409	—	141,409	—
Prepaid and other current assets:				
Foreign currency forward contracts	5,161	—	5,161	—
Other assets:				
Foreign currency forward contracts	605	$ —	605	$ —
Total financial assets	$ 665,383	$ 372,663	$ 292,720	$ —
Financial instruments carried at fair value (liability position):				
Other liabilities, current portion:				
Foreign currency forward contracts	$ (769)	$ —	$ (769)	$ —
Other liabilities, excluding current portion:				
Foreign currency forward contracts	(132)	—	(132)	—
Total financial liabilities	$ (901)	$ —	$ (901)	$ —

VIEs had cash equivalents of $46.1 million as of December 31, 2016 that consisted of money market funds, which are valued based on Level 1 inputs. These cash equivalents are not included in the table above. The Company's noncontrolling interest related to VIEs includes the fair value of the contingent payments, which are valued based on Level 3 inputs. Please refer to Note B, "Collaborative Arrangements," for further information.

The Company's Credit Facility carries a variable interest rate set at current market rates, and as such, the carrying value approximates fair values. As of December 31, 2016 , the fair value and carrying value of the Company's Credit Facility was $300.0 million .

E. Marketable Securities

A summary of the Company's cash, cash equivalents and marketable securities is shown below:

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
		(in thousands)		
December 31, 2016				
Cash and cash equivalents:				
Cash and money market funds	$ 1,183,945	$ —	$ —	$ 1,183,945
Total cash and cash equivalents	$ 1,183,945	$ —	$ —	$ 1,183,945
Marketable securities:				
Government-sponsored enterprise securities (matures within 1 year)	$ 15,506	$ 2	$ —	$ 15,508
Corporate equity securities (matures within 1 year)	43,213	21,347	—	64,560
Commercial paper (matures within 1 year)	59,331	73	—	59,404
Corporate debt securities (matures within 1 year)	111,225	—	(85)	111,140
Total marketable securities	229,275	21,422	(85)	250,612
Total cash, cash equivalents and marketable securities	$ 1,413,220	$ 21,422	$ (85)	$ 1,434,557
December 31, 2015				
Cash and cash equivalents:				
Cash and money market funds	$ 582,352	$ —	$ —	$ 582,352
Government-sponsored enterprise securities	85,994	—	—	85,994
Commercial paper	34,889	—	—	34,889
Corporate debt securities	11,533	—	—	11,533
Total cash and cash equivalents	$ 714,768	$ —	$ —	$ 714,768
Marketable securities:				
Government-sponsored enterprise securities (matures within 1 year)	$ 87,176	$ —	$ (14)	$ 87,162
Commercial paper (matures within 1 year)	98,877	246	—	99,123
Corporate debt securities (matures within 1 year)	141,515	—	(106)	141,409
Total marketable securities	327,568	246	(120)	327,694
Total cash, cash equivalents and marketable securities	1,042,336	246	(120)	1,042,462

The Company has a limited number of marketable securities in insignificant loss positions as of December 31, 2016 , which the Company does not intend to sell and has concluded it will not be required to sell before recovery of the amortized costs for the investment at maturity. There were no charges recorded for other-than-temporary declines in fair value of marketable securities nor gross realized gains or losses recognized in 2016 , 2015 or 2014 .

F. Accumulated Other Comprehensive Income

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

	Foreign currency translation adjustment	Unrealized holding gains (losses) on marketable securities, net of tax	Unrealized (losses) gains on foreign currency forward contracts, net of tax	Total
	(in thousands)			
Balance at December 31, 2013	$ (325)	$ 42	$ (23)	$ (306)
Other comprehensive (loss) income before reclassifications	(646)	(165)	3,591	2,780
Amounts reclassified from accumulated other comprehensive loss	—	—	(1,557)	(1,557)
Net current period other comprehensive (loss) income	(646)	(165)	2,034	1,223
Balance at December 31, 2014	$ (971)	$ (123)	$ 2,011	$ 917
Other comprehensive (loss) income before reclassifications	(1,109)	249	6,493	5,633
Amounts reclassified from accumulated other comprehensive loss	—	—	(4,726)	(4,726)
Net current period other comprehensive (loss) income	(1,109)	249	1,767	907
Balance at December 31, 2015	$ (2,080)	$ 126	$ 3,778	$ 1,824
Other comprehensive (loss) income before reclassifications	(5,782)	17,395	17,383	28,996
Amounts reclassified from accumulated other comprehensive loss	—	—	(9,647)	(9,647)
Net current period other comprehensive (loss) income	(5,782)	17,395	7,736	19,349
Balance at December 31, 2016	$ (7,862)	$ 17,521	$ 11,514	$ 21,173

G. Hedging

The Company maintains a hedging program intended to mitigate the effect of changes in foreign exchange rates for a portion of the Company's forecasted product revenues denominated in certain foreign currencies. The program includes foreign currency forward contracts that are designated as cash flow hedges under GAAP having contractual durations from one to eighteen months.

The Company formally documents the relationship between foreign currency forward contracts (hedging instruments) and forecasted product revenues (hedged items), as well as the Company's risk management objective and strategy for undertaking various hedging activities, which includes matching all foreign currency forward contracts that are designated as cash flow hedges to forecasted transactions. The Company also formally assesses, both at the hedge's inception and on an ongoing basis, whether the foreign currency forward contracts are highly effective in offsetting changes in cash flows of hedged items on a prospective and retrospective basis. If the Company determines that a (i) foreign currency forward contract is not highly effective as a cash flow hedge, (ii) foreign currency forward contract has ceased to be a highly effective hedge or (iii) forecasted transaction is no longer probable of occurring, the Company would discontinue hedge accounting treatment prospectively. The Company measures effectiveness based on the change in fair value of the forward contracts and the fair value of the hypothetical foreign currency forward contracts with terms that match the critical terms of the risk being hedged. As of December 31, 2016 , all hedges were determined to be highly effective and the Company had not recorded any ineffectiveness related to the hedging program.

The following table summarizes the notional amount of the Company ' s outstanding foreign currency forward contracts designated as cash flow hedges:

Foreign Currency	As of December 31, 2016	As of December 31, 2015
	(in thousands)	
Euro	$ 164,368	$ 103,362
British pound sterling	65,237	78,756
Australian dollar	23,776	27,167
Total foreign currency forward contracts	$ 253,381	$ 209,285

The following table summarizes the fair value of the Company's outstanding foreign currency forward contracts designated as cash flow hedges under GAAP included on the Company's consolidated balance sheets:

As of December 31, 2016			
Assets		Liabilities	
Classification	Fair Value	Classification	Fair Value
	(in thousands)		
Prepaid and other current assets	$ 14,407	Other liabilities, current portion	$ (144)
Other assets	1,186	Other liabilities, excluding current portion	—
Total assets	$ 15,593	Total liabilities	$ (144)

As of December 31, 2015			
Assets		Liabilities	
Classification	Fair Value	Classification	Fair Value
	(in thousands)		
Prepaid and other current assets	$ 5,161	Other liabilities, current portion	$ (769)
Other assets	605	Other liabilities, excluding current portion	(132)
Total assets	$ 5,766	Total liabilities	$ (901)

The following table summarizes the potential effect of offsetting derivatives by type of financial instrument on the Company's consolidated balance sheets:

	As of December 31, 2016				
	Gross Amounts Recognized	Gross Amounts Offset	Gross Amount Presented	Gross Amount Not Offset	Legal Offset
Foreign currency forward contracts			(in thousands)		
Total assets	$ 15,593	$ —	$ 15,593	$ (144)	$ 15,449
Total liabilities	$ (144)	$ —	$ (144)	$ 144	$ —

	As of December 31, 2015				
	Gross Amounts Recognized	Gross Amounts Offset	Gross Amount Presented	Gross Amount Not Offset	Legal Offset
Foreign currency forward contracts			(in thousands)		
Total assets	$ 5,766	$ —	$ 5,766	$ (901)	$ 4,865
Total liabilities	(901)	—	(901)	901	—

H. Inventories

Inventories consisted of the following:

	As of December 31,	
	2016	2015
	(in thousands)	
Raw materials	$ 6,348	$ 8,696
Work-in-process	56,672	40,695
Finished goods	14,584	7,816
Total	$ 77,604	$ 57,207

I. Property and Equipment

Property and equipment, net consisted of the following:

	As of December 31,	
	2016	2015
	(in thousands)	
Buildings	$ 548,232	$ 531,627
Furniture and equipment	236,634	218,623
Software	134,321	124,469
Leasehold improvements	108,702	106,768
Computers	58,271	52,295
Total property and equipment, gross	1,086,160	1,033,782
Less: accumulated depreciation	(387,798)	(336,067)
Total property and equipment, net	$ 698,362	$ 697,715

Total property and equipment, gross, as of December 31, 2016 and 2015 , included $101.3 million and $106.8 million , respectively, for property and equipment recorded under capital leases. Accumulated depreciation, as of December 31, 2016 and 2015 , included $37.9 million and $30.4 million , respectively, for property and equipment recorded under capital leases.

As of December 31, 2016 , included in property and equipment, net were $17.8 million and $9.2 million in capitalized internally developed software costs and related amortization, respectively. As of December 31, 2015 , included in property and equipment, net were $15.4 million and $4.1 million in capitalized internally developed software costs and related amortization, respectively.

The Company recorded depreciation expense of $60.8 million , $60.0 million and $62.3 million in 2016 , 2015 and 2014 , respectively.

J. Intangible Assets and Goodwill

Intangible Assets

As of each of December 31, 2016 and December 31, 2015 , in-process research and development intangible assets of $284.3 million were recorded on the Company's consolidated balance sheets.

In June 2015, in connection with entering into the Parion Agreement, the Company recorded an in-process research and development intangible asset of $255.3 million based on the Company's estimate of the fair value of Parion's lead investigational ENaC inhibitors, including VX-371 and VX-551, that were licensed by the Company from Parion. The Company aggregated the fair value of the ENaC inhibitors into a single intangible asset because the phase, nature and risks of development as well as the amount and timing of benefits associated with the assets were similar. The Company used a discount rate of 7.1% in the present-value models to estimate the fair values of the ENaC inhibitors intangible assets. The Company also conducted an evaluation of Parion's other programs at the effective date of the Parion Agreement and

determined that market participants would not have ascribed value to those programs because of the stage of development of the assets in each program and uncertainties related to the potential development and commercialization of the programs.

Goodwill

As of each of December 31, 2016 and December 31, 2015 , goodwill of $50.4 million was recorded on the Company's consolidated balance sheet.

K. Additional Balance Sheet Detail

Prepaid and other current assets consisted of the following:

	As of December 31,	
	2016	2015
	(in thousands)	
Prepaid expenses	$ 36,134	$ 22,058
Fair value foreign currency forward contracts	14,407	5,161
Taxes receivable	3,213	14,682
Other	16,780	12,835
Total	$ 70,534	$ 54,736

Accrued expenses consisted of the following:

	As of December 31,	
	2016	2015
	(in thousands)	
Payroll and benefits	$ 86,387	$ 87,873
Research, development and commercial contract costs	62,756	55,677
Product revenue allowances	86,533	47,209
Royalty payable	52,845	60,191
Taxes payable and reserves (including VIE taxes payable)	6,883	30,953
Professional fees	6,512	7,455
Interest	1,390	4,642
Other	11,943	11,820
Total	$ 315,249	$ 305,820

Other liabilities, excluding current portion consisted of the following:

	As of December 31,	
	2016	2015
	(in thousands)	
Advance from CFFT	$ 73,423	$ —
Deferred rent	19,551	22,235
Other	9,148	9,543
Total	$ 102,122	$ 31,778

L. Long Term Obligations

Fan Pier Leases

In 2011, the Company entered into two lease agreements, pursuant to which the Company leases approximately 1.1 million square feet of office and laboratory space in two buildings (the "Buildings") at Fan Pier in Boston, Massachusetts (the

"Fan Pier Leases"). The Company commenced lease payments in December 2013, and will make lease payments pursuant to the Fan Pier Leases through December 2028. The Company has an option to extend the term of the Fan Pier Leases for an additional 10 years.

Because the Company was involved in the construction project, the Company was deemed for accounting purposes to be the owner of the Buildings during the construction period and recorded project construction costs incurred by the landlord. Upon completion of the Buildings, the Company evaluated the Fan Pier Leases and determined that the Fan Pier Leases did not meet the criteria for "sale-leaseback" treatment. Accordingly, the Company began depreciating the asset and incurring interest expense related to the financing obligation in 2013. The Company bifurcates its lease payments pursuant to the Fan Pier Leases into (i) a portion that is allocated to the Buildings and (ii) a portion that is allocated to the land on which the Buildings were constructed. The portion of the lease obligations allocated to the land is treated as an operating lease that commenced in 2011. The Company recorded interest expense of $60.2 million in each of 2016 , 2015 and 2014 . The Company recorded depreciation expense of $13.3 million in each of 2016 , 2015 and $13.4 million in 2014 , respectively. In each of 2016 , 2015 and 2014 , the Company recorded rent expense of $6.5 million .

Property and equipment, net, included $489.0 million and $502.3 million as of December 31, 2016 and 2015 , respectively, related to construction costs for the Buildings. The carrying value of the construction financing lease obligation related to the Buildings, which excludes interest that will be imputed over the course of the Company's lease agreement for the Buildings, was $472.6 million and $473.0 million , as of December 31, 2016 and 2015 , respectively.

San Diego Lease

On December 2, 2015, the Company entered into a lease agreement for 3215 Merryfield Row, San Diego, California with ARE-SD Region No. 23, LLC. Pursuant to this agreement, the Company agreed to lease approximately 170,000 square feet of office and laboratory space in a building under construction in San Diego, California ("San Diego Lease"). Lease payments pursuant to the San Diego Lease will commence upon completion of the building, scheduled for the first half of 2018, and will extend for 16 years from the commencement date. Pursuant to the San Diego Lease, during the initial 16-year term, the Company will pay an average of approximately $10.2 million per year in aggregate rent, exclusive of operating expenses. The Company has the option to extend the lease term for up to two additional five -year terms.

Because the Company is involved in the construction project, the Company is deemed for accounting purposes to be the owner of the San Diego building during the construction period and recorded project construction costs incurred by the landlord. The Company bifurcates its lease payments pursuant to the San Diego Lease into (i) a portion that is allocated to the San Diego building and (ii) a portion that is allocated to the land on which the San Diego building was constructed. Although the Company will not begin making lease payments pursuant to the San Diego Lease until the commencement date, the portion of the lease obligation allocated to the land is treated for accounting purposes as an operating lease that commenced in the fourth quarter of 2016. Upon completion of the San Diego building, the Company will evaluate the San Diego Lease and determine if the San Diego Lease meets the criteria for "sale-leaseback" treatment. If the San Diego Lease meets the "sale-leaseback" criteria, the Company will remove the asset and the related liability from its consolidated balance sheet and treat the San Diego Lease as either an operating or a capital lease based on the Company's assessment of the accounting guidance. The Company expects that upon completion of construction of the San Diego building the San Diego Lease will not meet the "sale-leaseback" criteria. If the San Diego Lease does not meet "sale-leaseback" criteria, the Company will treat the San Diego Lease as a financing obligation and will depreciate the asset over its estimated useful life.

Revolving Credit Facility

In October 2016, the Company entered into a Credit Agreement (the "Credit Agreement") with Bank of America, N.A., as administrative agent and the lenders referred to therein. The Credit Agreement provides for a $500.0 million revolving facility, $300.0 million of which was drawn at closing (the "Loans"). The Credit Agreement also provides that, subject to satisfaction of certain conditions, the Company may request that the borrowing capacity under the Credit Agreement be increased by an additional $300.0 million . The Credit Agreement matures on October 13, 2021.

The proceeds of the borrowing under the Credit Agreement were used primarily to repay the Company's existing indebtedness under the Macquarie Loan. The Loans will bear interest, at the Company's option, at either a base rate or a

Eurodollar rate, in each case plus an applicable margin. Under the Credit Agreement, the applicable margins on base rate loans range from 0.75% to 1.50% and the applicable margins on Eurodollar loans range from 1.75% to 2.50% , in each case based on the Company's consolidated leverage ratio (the ratio of the Company's total consolidated debt to the Company's trailing twelve-month EBITDA).

The Loans are guaranteed by certain of the Company's domestic subsidiaries and secured by substantially all of the Company's assets and the assets of the Company's domestic subsidiaries (excluding intellectual property, owned and leased real property and certain other excluded property) and by the equity interests of the Company's subsidiaries, subject to certain exceptions. Under the terms of the Credit Agreement, the Company must maintain, subject to certain limited exceptions, a consolidated leverage ratio of 3.00 to 1.00 and consolidated EBITDA of at least $200.0 million , in each case to be measured on a quarterly basis.

The Credit Agreement contains customary representations and warranties and usual and customary affirmative and negative covenants. The Credit Agreement also contains customary events of default. In the case of a continuing event of default, the administrative agent would be entitled to exercise various remedies, including the acceleration of amounts due under outstanding loans.

Term Loan

On July 9, 2014, the Company entered into a credit agreement with the lenders party thereto, and Macquarie US Trading LLC (“Macquarie”), as administrative agent. The credit agreement provided for a $300.0 million senior secured term loan (“Macquarie Loan”). On October 13, 2016, the Company terminated and repaid all outstanding obligations under the Macquarie Loan. The Company incurred a charge of $2.2 million in the fourth quarter of 2016 related to a loss on extinguishment attributable to the Macquarie Loan that was recorded as Interest Expense in the Company’s consolidated statements of operations.

The Macquarie Loan initially bore interest at a rate of 7.2% per annum, which was reduced to 6.2% per annum based on the FDA’s approval of ORKAMBI. The Macquarie Loan bore interest at a rate of LIBOR plus 5.0% per annum during the third year of the term. If the Company had not terminated and repaid all outstanding obligations, the maturity date of all loans under the facilities would have been July 9, 2017.

Based on the Company's evaluation of the Macquarie Loan, the Company determined that the Macquarie Loan contained several embedded derivatives. These embedded derivatives were clearly and closely related to the host instrument because they related to the Company's credit risk; therefore, they did not require bifurcation from the host instrument, the Macquarie Loan.

The Company incurred $5.3 million in fees paid to Macquarie that were recorded as a discount on the Term Loan and that were recorded as additional interest expense using the effective interest method over the term of the loan in the Company’s consolidated statements of operations. As of December 31, 2016 and 2015 , the unamortized discount associated with the Term Loan that was included in the senior secured term loan caption on the Company’s consolidated balance sheets was zero and $4.6 million , respectively.

Subsequent Event

In February 2017, the Company repaid all $300.0 million outstanding under the Credit Agreement. The Company may reborrow and repay amounts under the revolving credit agreement without penalty.

M. Common Stock, Preferred Stock and Equity Plans

The Company is authorized to issue 500,000,000 shares of common stock. Holders of common stock are entitled to one vote per share. Holders of common stock are entitled to receive dividends, if and when declared by the Company’s Board of Directors, and to share ratably in the Company’s assets legally available for distribution to the Company’s shareholders in the event of liquidation. Holders of common stock have no preemptive, subscription, redemption or conversion rights. The holders of common stock do not have cumulative voting rights.

The Company is authorized to issue 1,000,000 shares of preferred stock in one or more series and to fix the powers, designations, preferences and relative participating, option or other rights thereof, including dividend rights, conversion rights, voting rights, redemption terms, liquidation preferences and the number of shares constituting any series, without any further vote or action by the Company's shareholders. As of December 31, 2016 and 2015 , the Company had no shares of preferred stock issued or outstanding.

Stock and Option Plans

The purpose of each of the Company's stock and option plans is to attract, retain and motivate its employees, consultants and directors. Awards granted under these plans can be incentive stock options ("ISOs"), nonstatutory stock options ("NSOs"), restricted stock ("RSs"), restricted stock units ("RSUs") or other equity-based awards, as specified in the individual plans.

Shares issued under all of the Company's plans are funded through the issuance of new shares. The following table contains information about the Company's equity plans:

			As of December 31, 2016	
Title of Plan	**Group Eligible**	**Type of Award Granted**	**Awards Outstanding**	**Additional Awards Authorized for Grant**
2013 Stock and Option Plan	Employees, Non-employee Directors and Consultants	NSO, RS and RSU	9,832,269	9,180,002
2006 Stock and Option Plan	Employees, Non-employee Directors and Consultants	NSO, RS and RSU	6,355,357	—
		Total	16,187,626	9,180,002

All options granted under the Company's 2013 Stock and Option Plan ("2013 Plan") and 2006 Stock and Option Plan ("2006 Plan") were granted with an exercise price equal to the fair value of the underlying common stock on the date of grant. As of December 31, 2016 , the stock and option plan under which the Company makes new equity awards is the Company's 2013 Plan. Under the 2013 Plan, no stock options can be awarded with an exercise price less than the fair market value on the date of grant. The Company's shareholders (i) approved an increase in the number of shares authorized for issuance pursuant to the 2013 Plan of 7,800,000 shares, plus the number of shares that remained available for issuance under the Company's 2006 Stock and Option Plan, which rolled-over into the 2013 Stock and Option Plan in 2015 and (ii) approved an increase in the number of shares authorized for issuance pursuant to the 2013 Plan of 9,500,000 shares in 2014.

During the three years ended December 31, 2016 , grants to current employees and directors primarily had a grant date that was the same as the date the award was approved by the Company's Board of Directors. During the three years ended December 31, 2016 , for grants to new employees and directors, the date of grant for awards was the employee's first day of employment or the date the director was elected to the Company's Board of Directors. All options awarded under the Company's stock and option plans expire not more than 10 years from the grant date.

Historically, all shares of restricted stock and restricted stock units have been granted at a price equal to $0.01 , the par value of the Company's common stock. Beginning with awards approved by the Company's Board of Directors in July 2016, the Company stopped granting restricted stock units at par value and instead grants the awards at a purchase price equal to $0.00 . Vesting of options, restricted stock and restricted stock units generally is ratable over specified periods and is determined by the Company's Board of Directors.

The following table summarizes information related to the outstanding and exercisable options during the year ended December 31, 2016 :

	Stock Options	Weighted-average Exercise Price	Weighted-average Remaining Contractual Life	Aggregate Intrinsic Value
	(in thousands)	(per share)	(in years)	(in thousands)
Outstanding at December 31, 2015	11,145	$ 75.99		
Granted	3,183	$ 91.36		
Exercised	(1,064)	$ 45.61		
Forfeited	(544)	$ 94.62		
Expired	(78)	$ 107.51		
Outstanding at December 31, 2016	12,642	$ 81.41	7.06	$ 124,939
Exercisable at December 31, 2016	7,323	$ 68.92	6.00	$ 121,671
Exercisable and Expected to Vest at December 31, 2016	12,200	$ 80.76	7.00	$ 124,892

The aggregate intrinsic value in the table above represents the total pre-tax amount, net of exercise price, that would have been received by option holders if all option holders had exercised all options with an exercise price lower than the market price on December 30, 2016 , which was $74.11 based on the average of the high and low price of the Company's common stock on that date.

The total intrinsic value (the amount by which the fair market value exceeded the exercise price) of stock options exercised during 2016 , 2015 and 2014 was $48.6 million , $252.9 million and $316.5 million , respectively. The total cash received by the Company as a result of employee stock option exercises during 2016 , 2015 and 2014 was $48.5 million , $165.6 million and $255.5 million , respectively.

The following table summarizes information about stock options outstanding and exercisable at December 31, 2016 :

	Options Outstanding			Options Exercisable	
Range of Exercise Prices	Number Outstanding	Weighted-average Remaining Contractual Life	Weighted-average Exercise Price	Number Exercisable	Weighted-average Exercise Price
	(in thousands)	(in years)	(per share)	(in thousands)	(per share)
$18.93–$20.00	137	1.10	$ 18.93	137	$ 18.93
$20.01–$40.00	1,696	3.19	$ 33.94	1,696	$ 33.94
$40.01–$60.00	1,867	5.59	$ 48.26	1,762	$ 48.44
$60.01–$80.00	1,345	7.11	$ 75.90	891	$ 75.60
$80.01–$100.00	4,529	8.45	$ 90.60	1,548	$ 89.61
$100.01–$120.00	1,604	8.05	$ 109.33	702	$ 109.29
$120.01–$134.69	1,464	8.53	$ 130.58	587	$ 130.17
Total	12,642	7.06	$ 81.41	7,323	$ 68.92

The following table summarizes the restricted stock and restricted stock unit activity of the Company during the year ended December 31, 2016 :

	Restricted Stock		Restricted Stock Units	
	Number of Units	Weighted-average Grant-date Fair Value	Number of Shares	Weighted-average Grant-date Fair Value
	(in thousands)	(per share)	(in thousands)	(per share)
Unvested at December 31, 2015	2,831	$ 98.80	193	$ 98.36
Granted	857	$ 91.49	847	$ 90.46
Vested	(817)	$ 79.28	(59)	$ 83.13
Cancelled	(258)	$ 98.56	(48)	$ 94.54
Unvested at December 31, 2016	2,613	$ 102.54	933	$ 92.35

The total fair value of restricted stock that vested during 2016 , 2015 and 2014 (measured on the date of vesting) was $74.1 million , $124.0 million and $54.5 million , respectively. The total fair value of restricted stock units that vested during 2016 , 2015 and 2014 (measured on the date of vesting) was $5.3 million , $8.0 million and $2.9 million , respectively.

Employee Stock Purchase Plan

The Company has an employee stock purchase plan (the “ESPP”). The ESPP permits eligible employees to enroll in a twelve -month offering period comprising two six -month purchase periods. Participants may purchase shares of the Company’s common stock, through payroll deductions, at a price equal to 85% of the fair market value of the common stock on the first day of the applicable twelve -month offering period, or the last day of the applicable six -month purchase period, whichever is lower. Purchase dates under the ESPP occur on or about May 14 and November 14 of each year. As of December 31, 2016 , there were 891,353 shares of common stock authorized for issuance pursuant to the ESPP.

In 2016 , the following shares were issued to employees under the ESPP:

	Year Ended December 31, 2016
	(in thousands, except per share amount)
Number of shares	272
Average price paid per share	$ 70.70

N. Stock-based Compensation Expense

The Company recognizes share-based payments to employees as compensation expense using the fair value method. The fair value of stock options and shares purchased pursuant to the ESPP is calculated using the Black-Scholes option pricing model. The fair value of restricted stock and restricted stock units is based on the intrinsic value on the date of grant. Stock-based compensation, measured at the grant date based on the fair value of the award, is typically recognized as expense ratably over the requisite service period. The expense recognized over the requisite service period includes an estimate of awards that will be forfeited.

The effect of stock-based compensation expense during the three years ended December 31, 2016 was as follows:

	2016	2015	2014
	(in thousands)		
Stock-based compensation expense by line item:			
Research and development expenses	$ 153,451	$ 152,955	$ 116,998
Sales, general and administrative expenses	84,254	78,070	60,544
Total stock-based compensation expense included in costs and expenses	$ 237,705	$ 231,025	$ 177,542

The stock-based compensation expense by type of award during the three years ended December 31, 2016 was as follows:

	2016	2015	2014
		(in thousands)	
Stock-based compensation expense by type of award:			
Stock options	$ 114,768	$ 129,276	$ 99,961
Restricted stock and restricted stock units	118,709	98,811	70,678
ESPP share issuances	7,835	7,025	8,326
Less: stock-based compensation expense capitalized to inventories	(3,607)	(4,087)	(1,423)
Total stock-based compensation expense included in costs and expenses	$ 237,705	$ 231,025	$ 177,542

The Company capitalizes stock-based compensation expense to inventories, all of which is attributable to employees who support the Company's manufacturing operations for the Company's products.

The following table sets forth the Company's unrecognized stock-based compensation expense, net of estimated forfeitures, as of December 31, 2016 , by type of award and the weighted-average period over which that expense is expected to be recognized:

	As of December 31, 2016	
	Unrecognized Expense Net of Estimated Forfeitures	Weighted-average Recognition Period
	(in thousands)	(in years)
Type of award:		
Stock options	$ 157,819	2.50
Restricted stock and restricted stock units	$ 176,972	2.39
ESPP share issuances	$ 4,080	0.58

Stock Options

The Company issues stock options with service conditions, which are generally the vesting periods of the awards. The Company uses the Black-Scholes option pricing model to estimate the fair value of stock options at the grant date. The Black-Scholes option pricing model uses the option exercise price as well as estimates and assumptions related to the expected price volatility of the Company's stock, the rate of return on risk-free investments, the expected period during which the options will be outstanding, and the expected dividend yield for the Company's stock to estimate the fair value of a stock option on the grant date. The options granted during 2016 , 2015 and 2014 had a weighted-average grant-date fair value per share of $37.93 , $52.16 and $39.95 , respectively.

The fair value of each option granted during 2016 , 2015 and 2014 was estimated on the date of grant using the Black-Scholes option pricing model with the following weighted-average assumptions:

	2016	2015	2014
Expected stock price volatility	46.77%	47.29%	50.86%
Risk-free interest rate	1.32%	1.61%	1.77%
Expected term of options (in years)	4.91	5.28	5.47
Expected annual dividends	—	—	—

The weighted-average valuation assumptions were determined as follows:

- *Expected stock price volatility:* Expected stock price volatility is calculated using the trailing one month average of daily implied volatilities prior to grant date. Implied volatility is based on options to purchase the Company's stock with remaining terms of greater than one year that are regularly traded in the market.

- *Risk-free interest rate:* The Company bases the risk-free interest rate on the interest rate payable on U.S. Treasury securities in effect at the time of grant for a period that is commensurate with the assumed expected option term.
- *Expected term of options:* The expected term of options represents the period of time options are expected to be outstanding. The Company uses historical data to estimate employee exercise and post-vest termination behavior. The Company believes that all groups of employees exhibit similar exercise and post-vest termination behavior and therefore does not stratify employees into multiple groups in determining the expected term of options.
- *Expected annual dividends:* The estimate for annual dividends is $0.00 because the Company has not historically paid, and does not intend for the foreseeable future to pay, a dividend.

Restricted Stock and Restricted Stock Units

The Company awards restricted stock and restricted stock units with service conditions, which are generally the vesting periods of the awards. Until 2017, the Company also awarded, to certain members of senior management, on an annual basis restricted stock and restricted stock units that vest upon the earlier of the satisfaction of (i) a performance condition or (ii) a service condition.

In February 2016, the Company began granting performance-based restricted stock units ("PSUs") to certain members of senior management. Threshold, target and maximum parameters were established for the financial and half on non-financial goals, and will be used to calculate the number of shares that will be issuable when the award vests, which may range from zero to 200% of the target amount. The financial-based PSUs vest in three equal installments over a three -year period and are expensed ratably over that same period based upon an assessment of the likelihood of achievement. The non-financial based PSUs cliff vest at the end of the three -year performance period and are expensed on a straight-line basis over that same period based upon an assessment of the likelihood of achievement.

In addition, in 2015 and 2014, the Company issued, pursuant to a retention program, restricted stock awards to certain members of senior management that will vest upon the satisfaction of both (i) a performance condition and (ii) a service condition.

Employee Stock Purchase Plan

The weighted-average fair value of each purchase right granted during 2016 , 2015 and 2014 was $26.86 , $37.84 and $29.59 , respectively. The following table reflects the weighted-average assumptions used in the Black-Scholes option pricing model for 2016 , 2015 and 2014 :

	2016	2015	2014
Expected stock price volatility	48.22%	47.20%	60.32%
Risk-free interest rate	0.56%	0.40%	0.09%
Expected term (in years)	0.75	0.72	0.75
Expected annual dividends	—	—	—

The expected stock price volatility for ESPP offerings is based on implied volatility. The Company bases the risk-free interest rate on the interest rate payable on U.S. Treasury securities in effect at the time of grant for a period that is commensurate with the assumed expected term. The expected term represents purchases and purchase periods that take place within the offering period. The expected annual dividends estimate is $0.00 because the Company has not historically paid, and does not for the foreseeable future intend to pay, a dividend.

O. Other Arrangements

Sale of HIV Protease Inhibitor Royalty Stream

In 2008, the Company sold to a third party its rights to receive royalty payments from GlaxoSmithKline plc, net of royalty amounts to be earned by and due to a third party, for a one-time cash payment of $160.0 million . These royalty

payments relate to net sales of HIV protease inhibitors, which had been developed pursuant to a collaboration agreement between the Company and GlaxoSmithKline plc. As of December 31, 2016 , the Company had $12.6 million in deferred revenues related to the one-time cash payment, which it is recognizing over the life of the collaboration agreement with GlaxoSmithKline plc based on the units-of-revenue method. In addition, the Company continues to recognize royalty revenues equal to the amount of the third-party subroyalty and an offsetting royalty expense for the third-party subroyalty payment.

Other income (expense), net

In April 2014, the Company received a one-time cash payment of $36.7 million from its landlord pursuant to the Fan Pier Leases. This payment related to bonds issued pursuant to an Infrastructure Development Assistance Agreement between The Commonwealth of Massachusetts and the Company's landlord. The bonds were issued in connection with the landlord's contribution to infrastructure improvements and also were dependent upon employment levels at the Company through the bond issuance date. The Company accounted for the cash payment as a government grant as it was provided in part related to the Company's employment level in Massachusetts. Such grants are recognized in income in the period in which the conditions of the grant are met and there is reasonable assurance that the grant will be received, provided it is not subject to refund. In the second quarter of 2014, the Company recorded $36.7 million as a credit to other income (expense), net in its consolidated statements of operations because the Company's employment obligations related to these funds were satisfied as of the date of issuance of the bonds and the payment received is not subject to refund.

P. Income Taxes

The components of loss from continuing operations before provision for income taxes during the three years ended December 31, 2016 consisted of the following:

	2016	2015	2014
		(in thousands)	
United States	$ (147,860)	$ (272,326)	$ (645,465)
Foreign	80,494	(285,474)	(89,410)
Loss from continuing operations before provision for income taxes	$ (67,366)	$ (557,800)	$ (734,875)

The components of the provision for income taxes from continuing operations during the three years ended December 31, 2016 consisted of the following:

	2016	2015	2014
		(in thousands)	
Current taxes:			
United States	$ (3,821)	$ 25,623	$ 2,853
Foreign	1,794	831	2,457
State	1,836	3,629	1,366
Total current taxes	$ (191)	$ 30,083	$ 6,676
Deferred taxes:			
United States	$ 18,659	$ 497	$ 244
Foreign	(3,359)	(355)	—
State	1,556	156	38
Total deferred taxes	$ 16,856	$ 298	$ 282
Provision for income taxes	$ 16,665	$ 30,381	$ 6,958

The difference between the Company's "expected" tax provision (benefit), as computed by applying the U.S. federal corporate tax rate of 35% to loss from continuing operations before provision for income taxes, and actual tax is reconciled as follows:

	2016	2015	2014
		(in thousands)	
Loss from continuing operations before provision for income taxes	$ (67,366)	$ (557,800)	$ (734,875)
Expected tax provision (benefit)	(23,578)	(195,230)	(257,206)
State taxes, net of federal benefit	3,621	3,800	1,124
Foreign rate differential	21,346	47,402	39,335
Tax credits	(47,773)	(55,696)	(33,788)
Unbenefitted operating losses (gains)	14,837	226,169	241,037
Non-deductible expenses	24,749	5,817	18,756
Rate change	12,836	(1,224)	(1,826)
Tax attribute expiration	9,947	—	—
Other	680	(657)	(474)
Provision for income taxes	$ 16,665	$ 30,381	$ 6,958

The foreign rate differential in the tax rate reconciliation table reflects the effect of operations in jurisdictions with tax rates that are different from the United States. As set forth in the components of loss before provision for income taxes, the Company had income in 2016 and losses in 2015 and 2014 in foreign jurisdictions in each year presented. Due to lower foreign tax rates, particularly in the United Kingdom, the Company's tax expense (benefit) in foreign jurisdictions is less than the "expected" tax expense (benefit) that would have resulted from income (losses) in these jurisdictions at corporate tax rates in the United States. The difference between the tax expense (benefit) at foreign corporate tax rates and the "expected" expense (benefit) based on corporate tax rates in the United States is reflected in the tax reconciliation table under the caption "foreign rate differential."

The unbenefitted operating losses in the tax rate reconciliation table primarily reflect a change in the valuation allowance on deferred tax assets related to the United States, United Kingdom and Switzerland. In 2016, the valuation allowance increased primarily due to an increase in tax credits in the United States and an increase in the net operating loss in the United Kingdom, both due to the uncertainty in the Company's ability to use them in future periods. In 2015 and 2014, the valuation allowance increased primarily related to an increase in net operating losses that have been incurred with no corresponding benefit due to the uncertainty in the Company's ability to use them in future periods.

In 2016, the effect of non-deductible expenses is related to equity compensation, Orphan Drug Credits, foreign amortization and partial disallowance of expenses related to dissolution of a foreign subsidiary.

Deferred tax assets and liabilities are determined based on the difference between financial statement and tax bases using enacted tax rates in effect for the year in which the differences are expected to reverse. The components of the deferred taxes were as follows:

	As of December 31,	
	2016	2015
	(in thousands)	
Deferred tax assets:		
Net operating loss	$ 1,232,399	$ 1,250,642
Tax credit carryforwards	367,402	315,535
Property and equipment	22	—
Intangible assets	34,938	14,673
Deferred revenues	31,205	9,341
Stock-based compensation	110,446	93,404
Inventories	4,705	5,913
Accrued expenses	23,078	27,236
Currency translation adjustment	—	222
Unrealized loss	5	—
Construction financing lease obligation	177,735	176,250
Gross deferred tax assets	1,981,935	1,893,216
Valuation allowance	(1,731,186)	(1,716,349)
Total deferred tax assets	250,749	176,867
Deferred tax liabilities:		
Property and equipment	(169,089)	(175,424)
Acquired intangibles	(134,063)	(110,439)
Deferred revenue	$ (73,357)	$ —
Unrealized gain	$ (7,967)	$ (1,088)
Net deferred tax liabilities	$ (133,727)	$ (110,084)

The Company presents its deferred tax assets and deferred tax liabilities gross on its consolidated balance sheets. As of December 31, 2016 , $134.0 million of the deferred tax liabilities are attributable to the Company's collaborations with BioAxone and Parion. As of December 31, 2015 , $110.4 million of the deferred tax liabilities are attributable to the Company's collaborations with BioAxone and Parion.

For federal income tax purposes, as of December 31, 2016 , the Company has net operating loss carryforwards of approximately $4.1 billion and tax credits of $262.9 million , which may be used to offset future federal income and tax liability, respectively. In addition, the Company will record an increase of approximately $1.2 billion of the federal net operating loss carryforward with a corresponding valuation allowance upon adoption of the new stock compensation guidance in the first quarter 2017.

For state income tax purposes, the Company has net operating loss carryforwards of approximately $975.8 million and tax credits of $103.8 million , which may be used to offset future state income and tax liability, respectively. In addition, the Company will record an increase of approximately $190.0 million of the state net operating loss carryforward with a corresponding valuation allowance upon adoption of the new stock compensation guidance in the first quarter 2017.

These federal and state operating loss carryforwards and tax credits expire at various dates through 2036. After consideration of all the evidence, both positive and negative, the Company continues to maintain a valuation allowance for the majority of the 2016 deferred tax asset because it is more likely than not that the deferred tax asset will not be realized. In future periods, if management determines that it is more likely than not that the deferred tax asset will be realized, (i) the valuation allowance would be decreased, (ii) the deferred tax asset would be reflected on the Company's consolidated balance sheet and (iii) the Company would record non-cash benefits in its consolidated statements of operations related to the reflection of the deferred tax asset on its consolidated balance sheets.

The valuation allowance increased by $14.8 million from December 31, 2015 to December 31, 2016 primarily due to an increase in research tax credit carry forwards in the United States and other timing items.

Unrecognized tax benefits during the two years ended December 31, 2016 consisted of the following:

	2016	2015
	(in thousands)	
Unrecognized tax benefits beginning of year	$ 425	$ 880
Decrease due to statute of limitations expiring	(425)	—
Decrease due to settlements and payments	—	(455)
Unrecognized tax benefits end of year	$ —	$ 425

The Company had gross unrecognized tax benefits of zero and $0.4 million , respectively, as of December 31, 2016 and 2015 . The Company recognizes interest and penalties related to income taxes as a component of income tax expense. As of December 31, 2016 , no interest and penalties have been accrued.

The Company files United States federal income tax returns and income tax returns in various state, local and foreign jurisdictions. The Company is no longer subject to any tax assessment from an income tax examination in the United States or any other major taxing jurisdiction for years before 2011, except where the Company has net operating losses or tax credit carryforwards that originate before 2011. The Company currently is under examination by Canada Revenue Agency for the years ending December 31, 2011 through December 31, 2013. No adjustments have been reported. The Company is not under examination by any other jurisdictions for any tax year. The Company concluded audits with Internal Revenue Service, Delaware, Pennsylvania, Texas and Revenue Quebec during 2016, and Massachusetts and New York during 2015, with no material adjustments.

At December 31, 2016 , foreign earnings, which were not significant, have been retained indefinitely by foreign subsidiary companies for reinvestment; therefore, no provision has been made for income taxes that would be payable upon the distribution of such earnings and it would not be practicable to determine the amount of the related unrecognized deferred income tax liability. Upon repatriation of those earnings, in the form of dividends or otherwise, the Company would be subject to U.S. federal income taxes (subject to an adjustment for foreign tax credits) and withholding taxes payable to the various foreign countries.

Q. Restructuring Expenses

Facility Lease Obligations

The Company has adopted several plans to restructure its facility operations for which it has incurred restructuring expenses in the three years ended December 31, 2016 . The Company's initial estimate of its liabilities for net ongoing costs associated with these facility obligations are recorded at fair value on the cease use date. In estimating the expenses and liabilities related to these facilities, the Company utilizes the probability-weighted discounted cash-flows of the Company's ongoing lease obligations. In estimating the expense and liability under its lease obligations, the Company estimated (i) the costs to be incurred to satisfy rental and build-out commitments under the lease (including operating costs), (ii) the lead-time necessary to sublease the space, (iii) the projected sublease rental rates and (iv) the anticipated durations of subleases. The Company uses a credit-adjusted risk-free rate to discount the estimated cash flows.

The Company reviews its estimates and assumptions on at least a quarterly basis, intends to continue such reviews until the termination of these facility lease obligations, and will make whatever modifications the Company believes necessary, based on the Company's best judgment, to reflect any changed circumstances. The Company's estimates have changed in the past, and may change in the future, resulting in additional adjustments to the estimate of these liabilities. Changes to the Company's estimate of these liabilities are recorded as additional restructuring expenses (credits). In addition, because the Company's estimate of these liabilities includes the application of a discount rate to reflect the time-value of money, the Company records imputed interest costs related to these liabilities each quarter. These costs are included in restructuring expenses on the Company's consolidated statements of operations.

2003 Kendall Restructuring

In 2003, the Company adopted a plan to restructure its operations (the "2003 Kendall Restructuring") to coincide with its increasing internal emphasis on advancing drug candidates through clinical development to commercialization. The restructuring was designed to re-balance the Company's relative investments in research and development to better support the Company's long-term strategy. At that time, the restructuring plan included a workforce reduction, write-offs of certain assets and a decision not to occupy approximately 290,000 square feet of specialized laboratory and office space in Cambridge, Massachusetts under lease to Vertex (the "Kendall Square Lease"). The Kendall Square Lease commenced in January 2003 and has a 15 -year term. In 2005, the Company revised its assessment of its real estate requirements and decided to use approximately 120,000 square feet of the facility subject to the Kendall Square Lease (the "Kendall Square Facility") for its operations, beginning in 2006. The rentable square footage of the Kendall Square Facility related to the 2003 Kendall Restructuring currently is subleased to third parties.

The restructuring expense incurred from the second quarter of 2003 through the end of the first quarter of 2005 (i.e., immediately prior to the Company's decision to use a portion of the Kendall Square Facility for its operations) related to the estimated incremental net ongoing lease obligations associated with the entire Kendall Square Facility, together with imputed interest costs relating to the restructuring liability. The restructuring expense incurred in the period beginning in the second quarter of 2005 relates only to the portion of the Kendall Square Facility that the Company was not occupying and did not intend to occupy for its operations. The Company uses a discount rate of 10% related to this restructuring activity.

The remaining lease obligations, which are associated with the 120,000 square foot portion of the Kendall Square Facility that the Company occupied and used for its operations, were recorded as rental expense in the period incurred until the Company incurred a cease use charge related to this portion of the Kendall Square Facility in the third quarter of 2014 in connection with transitioning its Massachusetts operations to Fan Pier in Boston, Massachusetts (the "Fan Pier Move Restructuring").

The activity related to restructuring and other liability for 2003 was as follows:

	Restructuring Expense	Cash Payments	Non-cash Expense	Liability as of December 31, 2003
		(in thousands)		
Lease restructuring and other operating lease expense	$ 84,726	$ (15,200)	$ —	$ 69,526
Employee severance, benefits and related costs	2,616	(2,616)	—	—
Leasehold improvements and asset impairments	4,482	—	(4,482)	—
Total	$ 91,824	$ (17,816)	$ (4,482)	$ 69,526

In 2003, the lease restructuring and other operating lease expense included $78.7 million of lease restructuring expense and $6.0 million of lease operating expense incurred prior to the decision not to occupy the Kendall Square Facility. The restructuring accrual as of December 31, 2003 related only to the lease restructuring expense.

The activities related to 2003 restructuring liability for 2004 through 2016 were as follows:

	2016	2015	2014	2004-2016
		(in thousands)		
Liability, beginning of the period	$ 7,944	$ 11,596	$ 19,115	$ 69,526
Cash payments	(15,841)	(14,625)	(17,494)	(226,912)
Cash received from subleases	11,892	11,089	12,912	111,601
Credit for portion of facility Vertex decided to occupy in 2005	—	—	—	(10,018)
Restructuring expense	333	(116)	(2,937)	60,131
Liability, end of the period	$ 4,328	$ 7,944	$ 11,596	$ 4,328

Fan Pier Move Restructuring

In connection with the relocation of its Massachusetts operations to Fan Pier in Boston, Massachusetts, which commenced in 2013, the Company is incurring restructuring charges related to its remaining lease obligations at its facilities in Cambridge, Massachusetts. The majority of these restructuring charges were recorded in the third quarter of 2014 upon decommissioning three facilities in Cambridge. The Company discounted the estimated cash flows related to the facilities at a discount rate of 9% . The Company will continue to incur charges through April 2018 related to the difference between the Company's estimated future cash flows related to its lease obligations, which include an estimate for sublease income to be received if applicable, and its actual cash flows. The Fan Pier Move Restructuring included lease obligations related to the 120,000 square feet of the Kendall Square Facility that the Company continued to use for its operations following its 2013 Kendall Restructuring. The remaining rentable square footage of the Kendall Square Facility related to the Fan Pier Move Restructuring was subleased to a third party in February 2015.

The activities related to the Fan Pier relocation restructuring liability for the three years ended December 31, 2016 were as follows:

	2016	2015	2014
		(in thousands)	
Liability, beginning of the period	$ 5,964	$ 33,390	$ 797
Cash payments	(12,674)	(30,022)	(18,271)
Cash received from subleases	9,751	4,229	—
Restructuring expense	585	(1,633)	50,864
Liability, end of the period	$ 3,626	$ 5,964	$ 33,390

Other Restructuring Activities

The Company has engaged in several other restructuring activities that are unrelated to its 2003 Kendall Restructuring and the Fan Pier Move Restructuring. The most significant activity commenced in October 2013 when the Company adopted a restructuring plan that included (i) a workforce reduction primarily related to the commercial support of INCIVEK following the continued and rapid decline in the number of patients being treated with INCIVEK as new medicines for the treatment of HCV infection neared approval and (ii) the write-off of certain assets. This action resulted from the Company's decision to focus its investment on future opportunities in CF and other research and development programs.

The activities related to the Company's other restructuring liabilities for the three years ended December 31, 2016 were as follows:

	2016	2015	2014
		(in thousands)	
Liability, beginning of the period	$ 1,450	$ 869	$ 8,441
Cash payments	(1,794)	(3,374)	(10,570)
Restructuring expense	344	3,955	2,998
Liability, end of the period	$ —	$ 1,450	$ 869

R. Employee Benefits

The Company has a 401(k) retirement plan (the "Vertex 401(k) Plan") in which substantially all of its permanent U.S. employees are eligible to participate. Participants may contribute up to 60% of their annual compensation to the Vertex 401(k) Plan, subject to statutory limitations. The Company may declare discretionary matching contributions to the Vertex 401(k) Plan. Beginning in mid-2013, the Company began paying matching contributions in the form of cash. For the years ended December 31, 2016 , 2015 and 2014 , the Company contributed approximately $11.8 million , $12.8 million and $12.0 million to the plan, respectively. As of December 31, 2016 , 755,000 shares of common stock remained available for grant under the Vertex 401(k) Plan.

S. Commitments and Contingencies

Lease Obligations

The Company moved into its corporate headquarters to Boston, Massachusetts in January 2014. In December 2015, the Company entered into a lease agreement for 3215 Merryfield Row, San Diego, California. Please refer to Note L, "Long Term Obligations," for additional information regarding both of these commitments.

The Kendall Square Lease began in January 2003 and will expire in April 2018. The Company occupied and used for its operations approximately 120,000 square feet of the Kendall Square Facility until 2014 when it moved its operations to Fan Pier. The Company has sublease arrangements in place for the remaining rentable square footage of the Kendall Square Facility, with terms that expire concurrently with the Kendall Square Lease. Please refer to Note Q, "Restructuring Expenses," for further information.

As of December 31, 2016 , future minimum commitments under the facility leases with terms of more than one year and contractual sublease income under the Company's subleases for the Kendall Square Facility were as follows:

Year	Fan Pier Leases	San Diego Leases	Kendall Square Lease	Kendall Sublease Income	Other Leases	Total Lease Commitments (Net of Sublease Income)
			(in thousands)			
2017	$ 67,206	$ 3,147	$ 20,088	$ (15,687)	$ 13,156	$ 87,910
2018	67,206	3,245	6,696	(5,236)	12,975	84,886
2019	72,589	6,906	—	—	11,746	91,241
2020	72,589	9,208	—	—	11,100	92,897
2021	72,589	9,208	—	—	10,300	92,097
Thereafter	535,032	138,217	—	—	62,409	735,658
Total minimum lease payments	$ 887,211	$ 169,931	$ 26,784	$ (20,923)	$ 121,686	$ 1,184,689

During 2016 , 2015 and 2014 , rental expense was $19.1 million , $18.1 million and $38.9 million , respectively. The majority of the Company's lease payments related to the Fan Pier Leases are recorded as interest expense because the Company is deemed for accounting purposes to be the owner of the Buildings. Please refer to Note L, "Long Term Obligations," for further information.

The Company has outstanding leases, which are accounted for as capital leases, for equipment, leasehold improvements and software licenses. The capital leases bear interest at rates ranging from less than 1% to 9% per year. The following table sets forth the Company's future minimum payments due under capital leases as of December 31, 2016 :

Year	(in thousands)
2017	$ 21,995
2018	21,393
2019	8,778
2020	3,336
2021	2,457
Thereafter	543
Total payments	58,502
Less: amount representing interest	(4,100)
Present value of payments	$ 54,402

In addition, the Company has committed to make potential future milestone and royalty payments pursuant to certain collaboration agreements. Payments generally become due and payable upon the achievement of certain developmental, regulatory and/or commercial milestones. Please refer to Note B, "Collaborative Arrangements," for further information.

Litigation

On May 28, 2014, a purported shareholder class action *Local No. 8 IBEW Retirement Plan & Trust v. Vertex Pharmaceuticals Incorporated, et al.* was filed in the United States District Court for the District of Massachusetts, naming the Company and certain of the Company's current and former officers and directors as defendants. The lawsuit alleged that the Company made material misrepresentations and/or omissions of material fact in the Company's disclosures during the period from May 7, 2012 through May 29, 2012, all in violation of Section 10(b) of the Securities Exchange Act of 1934, as amended, and Rule 10b-5 promulgated thereunder. The purported class consists of all persons (excluding defendants) who purchased the Company's common stock between May 7, 2012 and May 29, 2012. The plaintiffs sought unspecified monetary damages, costs and attorneys' fees as well as disgorgement of the proceeds from certain individual defendants' sales of the Company's stock. On October 8, 2014, the Court approved Local No. 8 IBEW Retirement Fund as lead plaintiff, and Scott and Scott LLP as lead counsel for the plaintiff and the putative class. On September 30, 2015, the court granted the Company's motion to dismiss. On October 15, 2015, the plaintiff filed a notice of appeal. In 2016, the parties filed briefs with, and presented oral arguments to, the First Circuit Court of Appeals. On October 3, 2016, the First Circuit Court of Appeals affirmed the district court's dismissal of the plaintiff's complaint. The times for petitioning the U.S. Court of Appeals for the First Circuit for an en banc rehearing as well as filing a petition for certiorari to the U.S. Supreme Court both have passed. As of December 31, 2016 , the Company has not recorded any reserves for this purported class action.

Guaranties and Indemnifications

As permitted under Massachusetts law, the Company's Articles of Organization and By-laws provide that the Company will indemnify certain of its officers and directors for certain claims asserted against them in connection with their service as an officer or director. The maximum potential amount of future payments that the Company could be required to make under these indemnification provisions is unlimited. However, the Company has purchased directors' and officers' liability insurance policies that could reduce its monetary exposure and enable it to recover a portion of any future amounts paid. No indemnification claims currently are outstanding, and the Company believes the estimated fair value of these indemnification arrangements is minimal.

The Company customarily agrees in the ordinary course of its business to indemnification provisions in agreements with clinical trial investigators and sites in its drug development programs, sponsored research agreements with academic and not-for-profit institutions, various comparable agreements involving parties performing services for the Company, and its real estate leases. The Company also customarily agrees to certain indemnification provisions in its drug discovery, development and commercialization collaboration agreements. With respect to the Company's clinical trials and sponsored research agreements, these indemnification provisions typically apply to any claim asserted against the investigator or the investigator's institution relating to personal injury or property damage, violations of law or certain breaches of the Company's contractual obligations arising out of the research or clinical testing of the Company's compounds or drug candidates. With respect to lease agreements, the indemnification provisions typically apply to claims asserted against the landlord relating to personal injury or property damage caused by the Company, to violations of law by the Company or to certain breaches of the Company's contractual obligations. The indemnification provisions appearing in the Company's collaboration agreements are similar to those for the other agreements discussed above, but in addition provide some limited indemnification for its collaborator in the event of third-party claims alleging infringement of intellectual property rights. In each of the cases above, the indemnification obligation generally survives the termination of the agreement for some extended period, although the Company believes the obligation typically has the most relevance during the contract term and for a short period of time thereafter. The maximum potential amount of future payments that the Company could be required to make under these provisions is generally unlimited. The Company has purchased insurance policies covering personal injury, property damage and general liability that reduce its exposure for indemnification and would enable it in many cases to recover all or a portion of any future amounts paid. The Company has never paid any material amounts to defend lawsuits or settle claims related to these indemnification provisions. Accordingly, the Company believes the estimated fair value of these indemnification arrangements is minimal.

Other Contingencies

The Company has certain contingent liabilities that arise in the ordinary course of its business activities. The Company accrues a reserve for contingent liabilities when it is probable that future expenditures will be made and such expenditures can be reasonably estimated. There were no material contingent liabilities accrued as of December 31, 2016 or 2015 .

T. Segment Information

Segment reporting is prepared on the same basis that the Company's chief executive officer, who is the Company's chief operating decision maker, manages the business, makes operating decisions and assesses performance. The Company operates in one segment, pharmaceuticals. Enterprise-wide disclosures about revenues, significant customers, and property and equipment, net by location are presented below.

Revenues by Product

Product revenues, net consisted of the following:

	2016	2015	2014
		(in thousands)	
KALYDECO	$ 703,432	$ 631,674	$ 463,750
ORKAMBI	979,590	350,663	—
INCIVEK	610	17,987	24,071
Total product revenues, net	$ 1,683,632	$ 1,000,324	$ 487,821

Revenues by Geographic Location

Total revenues from external customers and collaborators by geographic region consisted of the following. Product revenues are attributed to countries based on the location of the customer. Collaborative revenues are attributed to the operations of the Company in the United States. Royalty revenues are attributed to countries based on the location of the collaborator.

	2016	2015	2014
		(in thousands)	
United States	$ 1,321,807	$ 763,316	$ 361,074
Outside of the United States			
Europe	320,456	219,596	197,611
Other	59,914	49,424	21,730
Total revenues outside of the United States	380,370	269,020	219,341
Total revenues	$ 1,702,177	$ 1,032,336	$ 580,415

In 2016, 2015 and 2014, revenues attributable to the United Kingdom were the largest contributor to the Company's European revenues.

Significant Customers

Gross revenues and accounts receivable from each of the Company's customers who individually accounted for 10% or more of total gross revenues and/or 10% or more of total gross accounts receivable consisted of the following:

	Percent of Total Gross Revenues			Percent of Gross Accounts Receivable	
	Year Ended December 31,			As of December 31,	
	2016	2015	2014	2016	2015
Walgreen Co.	19%	20%	12%	15%	15%
CVS/Caremark	19%	17%	<10%	17%	17%
Accredo/Curascript	15%	15%	<10%	10%	16%

Property and Equipment, Net by Location

Property and equipment, net by location consisted of the following:

	As of December 31,	
	2016	2015
	(in thousands)	
United States	$ 665,552	$ 661,421
Outside of the United States		
United Kingdom	26,921	32,793
Other	5,889	3,501
Total property and equipment, net outside of the United States	32,810	36,294
Total property and equipment, net	$ 698,362	$ 697,715

U. Quarterly Financial Data (unaudited)

The following table sets forth the Company's quarterly financial data for the two years ended December 31, 2016 .

	Three Months Ended			
	March 31, 2016	June 30, 2016	September 30, 2016	December 31, 2016
	(in thousands, except per share amounts)			
Revenues:				
Product revenues, net	$ 394,410	$ 425,651	$ 409,689	$ 453,882
Royalty revenues	3,596	5,282	3,835	3,887
Collaborative revenues	74	675	259	937
Total revenues	398,080	431,608	413,783	458,706
Costs and expenses:				
Cost of product revenues	49,789	44,154	53,222	59,646
Royalty expenses	860	1,098	855	836
Research and development expenses (1)	255,860	271,008	272,370	248,452
Sales, general and administrative expenses	105,214	111,652	106,055	109,908
Restructuring expenses	687	343	8	224
Total costs and expenses	412,410	428,255	432,510	419,066
(Loss) income from operations	(14,330)	3,353	(18,727)	39,640
Interest expense, net	(20,698)	(20,155)	(20,140)	(20,439)
Other income (expense), net	4,411	(1,219)	(167)	1,105
(Loss) income before provision for income taxes	(30,617)	(18,021)	(39,034)	20,306
Provision for (benefit from) income taxes	5,485	18,130	503	(7,453)
Net (loss) income	(36,102)	(36,151)	(39,537)	27,759
(Income) loss attributable to noncontrolling interest	(5,529)	(28,374)	696	5,186
Net (loss) income attributable to Vertex	$ (41,631)	$ (64,525)	$ (38,841)	$ 32,945
Amounts per share attributable to Vertex common shareholders:				
Net (loss) income:				
Basic	$ (0.17)	$ (0.26)	$ (0.16)	$ 0.13
Diluted	$ (0.17)	$ (0.26)	$ (0.16)	$ 0.13
Shares used in per share calculations:				
Basic	243,831	244,482	244,920	245,454
Diluted	243,831	244,482	244,920	247,757

	Three Months Ended			
	March 31, 2015	June 30, 2015	September 30, 2015	December 31, 2015
	(in thousands, except per share amounts)			
Revenues:				
Product revenues, net	$ 130,875	$ 160,388	$ 302,511	$ 406,550
Royalty revenues	6,792	5,077	5,759	6,331
Collaborative revenues	842	611	1,546	5,054
Total revenues	138,509	166,076	309,816	417,935
Costs and expenses:				
Cost of product revenues	9,381	15,409	30,269	62,092
Royalty expenses	2,926	1,451	1,691	1,293
Research and development expenses (2)	215,599	223,858	246,284	310,181
Sales, general and administrative expenses	85,860	94,394	99,772	96,549
Restructuring (income) expenses	(3,272)	2,128	1,826	1,524
Total costs and expenses	310,494	337,240	379,842	471,639
Loss from operations	(171,985)	(171,164)	(70,026)	(53,704)
Interest expense, net	(21,307)	(21,111)	(21,134)	(20,654)
Other (expense) income, net	(5,113)	1,414	(1,326)	(1,690)
Loss before provision for (benefit from) income taxes	(198,405)	(190,861)	(92,486)	(76,048)
Provision for (benefit from) income taxes	299	30,131	1,330	(1,379)
Net loss	(198,704)	(220,992)	(93,816)	(74,669)
Loss (income) attributable to noncontrolling interest	98	32,144	(1,333)	938
Net loss attributable to Vertex	$ (198,606)	$ (188,848)	$ (95,149)	$ (73,731)
Amounts per share attributable to Vertex common shareholders:				
Net loss:				
Basic and diluted	$ (0.83)	$ (0.78)	$ (0.39)	$ (0.30)
Shares used in per share calculations:				
Basic and diluted	239,493	240,757	241,969	242,987

1. In the second quarter of 2016, the Company incurred research and development expenses of approximately $10.0 million to acquire certain early-stage research assets. In the third quarter of 2016, the Company incurred research and development expenses related to a $20.0 million upfront payment to Moderna Therapeutics, Inc. See Note B, “Collaborative Arrangements,” for further information.

2. In the fourth quarter of 2015, the Company made a $75.0 million upfront payment to CRISPR Therapeutics in connection with the collaboration, which was recorded as a research and development expense. See Note B, “Collaborative Arrangements,” for further information.

V. Subsequent Events

In February 2017, the Company decided to consolidate its research activities into its Boston, Milton Park and San Diego locations. As a result, the Company plans to close its Laval, Canada site. In connection with this decision, approximately 70 positions were affected and the Company estimates that it will incur aggregate restructuring expenses of approximately $ 10 million in the first quarter of 2017.

In January 2017, the Company entered into the Merck KGaA Agreement. A description of the Merck KGaA Agreement is set forth in Note B, “Collaborative Arrangements.” In February 2017, the Company repaid all outstanding borrowings under the Credit Agreement. Further information on the Credit Agreement, including the February 2017 repayment, is set forth in Note L, “Long Term Obligations.”

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Triple asterisks denote omission.

Amendment No. 7

Research, Development and Commercialization Agreement,

Dated May 24, 2004 by and between

Vertex Pharmaceuticals Incorporated

And

Cystic Fibrosis Foundation Therapeutics Incorporated

Whereas, Cystic Fibrosis Foundation Therapeutics Incorporated, a Delaware corporation (" CFFT "), and Vertex Pharmaceuticals Incorporated, a Massachusetts corporation (" Vertex "), are parties to that certain Research, Development and Commercialization Agreement dated May 24, 2004, as previously amended by Amendment No. 1 thereto dated January 6, 2006, Amendment No. 2 thereto dated as of January 1, 2006, Amendment No. 3 thereto dated November 20, 2006, Amendment No. 4 thereto dated August 20, 2007, Amendment No. 5 thereto dated as of April 1, 2011, and Amendment No. 6 thereto dated March 29, 2012 (collectively, the " Agreement "). Capitalized terms used herein without specific definition shall have the meanings set forth in the Agreement.

Whereas, CFFT and Vertex have been engaged in discussions relating to several aspects of the Agreement, including (a) the appropriate means for allocating Net Sales of Combination Products among the components thereof for purposes of determining royalties under the Agreement, (b) the application of certain royalty provisions of the Agreement to Net Sales of certain Drug Products, and (c) the rights and obligations of the parties with respect to certain chemical compounds that Vertex represented were first synthesized and/or tested after February 28, 2014. The parties have reached agreement on the matters under discussion, and wish to memorialize such agreement pursuant to this Amendment No. 7 executed on October 13, 2016 (the " Execution Date ").

Whereas, CFFT entered into an agreement with RPI Finance Trust (" RP ") pursuant to which it has assigned and transferred to RP certain of its rights under the Agreement, including its right to receive certain royalty payments from Vertex under the Agreement. Solely for purposes of Sections 6, 8, 9, 10, 11, 12.1 and 13 of this Amendment No. 7, and as a material inducement for Vertex to enter into this Amendment No. 7, RP is a signatory to this Amendment No. 7.

Whereas, nothing in this Amendment No. 7. is intended to alter CFFT's original charitable purpose for entering into the Agreement.

Whereas, in connection with this Amendment No. 7, on or about the date hereof, the Cystic Fibrosis Foundation and Vertex are entering into a Data License Agreement.

Now, therefore, in consideration of the mutual covenants set forth in this Amendment No. 7, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, effective as of September 1, 2016 (the " Amendment No. 7 Effective Date "), the parties agree as follows:

1. Definitions .

1.1 Additional Definitions . The following defined terms shall be added to Section 1 of the Agreement in alphabetical order:

(a) " Additional Compound " means each chemical compound listed on Exhibit 2016-A and [***]. Vertex represents that each such compound was first synthesized and/or tested by or under the direction of Vertex on or after March 1, 2014 and on or prior to August 31, 2016 (the " Additional Term ") in connection with Vertex's research and development of Correctors for the treatment of cystic fibrosis. A list of the Additional Compounds (other than [***]) is set forth in Exhibit 2016-A. Each such compound is listed by its VRT number, a designation given to each unique chemical structure by Vertex. Any compound first synthesized and/or tested by Vertex after the Additional Term that is assigned its own VRT number consistent with Vertex's historical practices, including any such compound derived from any Additional Compound, shall not be an Additional Compound for purposes of this Agreement unless such compound is [***] of a compound set forth in Exhibit 2016-A.

(b) " Additional Product " means a pharmaceutical product or formulation comprising, in whole or in part, an Additional Compound. For clarity, in no event will an Additional Product be deemed to be a Drug Product.

(c) " Corrector " means any compound which as its principal mode of therapeutic action, modulates the biological effect of CFTR by increasing the amount of functional del508 CFTR present at the apical cell membrane.

(d) " CF Spend " means, with respect to a given period, the aggregate (i) [***] (ii) [***] in each case incurred by [***]during such period in connection with [***], including, without limitation, [***].

(e) " FTE Rate " means [***]; *provided* that such rate will increase or decrease on [***]. The FTE Rate includes (i) all wages and salaries, employee benefits, bonus, travel and entertainment, supplies and other direct expenses and (ii) indirect allocations, including all general and administrative expenses, human resources, finance, occupancy and depreciation.

(f) A [***] of an Additional Compound shall mean a compound that (A) is [***]such Additional Compound as evidenced by [***], and (B) at [***], such Additional Compound represents in [***] of the compound and its [***].

1.2 Net Sales . Section 1.25 of the Agreement is deleted in its entirety and replaced with the following:

1.25 " Net Sales " with respect to any Drug Product or Additional Product shall mean the gross amount invoiced by Vertex and any Vertex Affiliate, licensee, sublicensee, assignee or transferee for that Drug Product or Additional Product sold in bona fide, arms-length transactions to Third Parties for use in the Field, less (i) quantity and/or cash discounts from the gross invoice price which are actually allowed or taken; (ii) freight, postage and insurance included in the invoice price; (iii) amounts repaid or credited by reasons of rejections or return of goods or because of retroactive price reductions specifically identifiable to the Drug Product or Additional Product; (iv) amounts payable resulting from government (or agency thereof) mandated rebate programs; (v) third-party rebates to the extent actually allowed; (vi) invoiced customs duties and sales taxes

(excluding income, value-added and similar taxes), if any, actually paid and directly related to the sale that are not reimbursed by the buyer; and (vii) any other specifically identifiable amounts included in the Drug Product's or Additional Product's gross invoice price that should be credited for reasons substantially equivalent to those listed above; all as determined in accordance with Vertex's usual and customary accounting methods, which are in accordance with generally accepted accounting principles.

1.25.1 In the case of any sale or other disposal of a Drug Product or Additional Product between or among Vertex and its Affiliates, licensees, sublicensees, assignees or transferees for resale, Net Sales shall be calculated as above only on the value charged or invoiced on the first arm's-length sale thereafter to a Third Party;

1.25.2 In the case of any sale which is not invoiced or is delivered before invoice, Net Sales shall be calculated at the time of shipment or when the Drug Product or Additional Product is paid for, if paid for before shipment or invoice;

1.25.3 In the case of any sale or other disposal for value, such as barter or counter-trade, of any Drug Product or Additional Product, or part thereof, other than in an arm's length transaction exclusively for money, Net Sales shall be calculated as above on the value of [***] or the [***] of the Drug Product or Additional Product in the country of sale or disposal;

1.25.4. If the Drug Product or Additional Product is sold in finished dosage form with one or more other active pharmaceutical ingredients (" Combination Product "), which may include Drug Product(s), Additional Product(s) and other active pharmaceutical ingredients that are not Drug Product(s) or Additional Product(s) (each such other ingredient, a " Non-royalty Bearing Component "), the Net Sales of each Drug Product or Additional Product, for the purposes of determining royalty payments under this Agreement, shall be determined by multiplying the Net Sales of the Combination Product by the fraction 1/n, where "n" is the total number of active ingredients (including the Drug Product(s), Additional Product(s) and Non-royalty Bearing Component(s)) in such Combination Product. For example, if a Combination Product consists of one Drug Product, one Additional Product and one Non-royalty Bearing Component, then Net Sales of the Combination Product shall be allocated one-third to each of the three (3) active pharmaceutical ingredients in such Combination Product (*i.e.* 1/3 rd to the Drug Product, 1/3 rd to the Additional Product and 1/3 rd to the Non-royalty Bearing Component). For the avoidance of doubt, no royalty will be paid to CFFT under this Agreement with respect to any portion of Net Sales allocated to a Non-royalty Bearing Component as provided above.

2. Royalties . Section 5.3.1 of the Agreement is deleted in its entirety and replaced with the following:

5.3.1 Net Sales in the Field .

(a) Original Drug Products . Vertex shall pay to CFFT the following royalties on aggregate Net Sales of [***] Drug Product, First [***]) and Second Generation Corrector Drug Products (together, the " Original Drug Products ") in the Field:

(i) [***]Net Sales of Original Drug Products in the Field that are [***];

(ii) [***]Net Sales of Original Drug Products in the Field [***].

The foregoing rates shall be effective as of [***]. All royalties payable on the Original Drug Products for the period from [***] through [***] shall be payable in accordance with the methodology for calculating royalties on Original Drug Products contained in the royalty reports delivered by Vertex to CFFT for the first and second calendar quarters of 2016.

(b) [Intentionally Omitted].

(c) [Intentionally Omitted].

(d) Additional Products . Vertex shall pay to CFFT the following royalties on Net Sales of Additional Products in the Field:

i. For Additional Products containing Additional Compounds first synthesized and/or tested by or under the direction of Vertex during the period commencing on [***]and ending on and including [***]: [***] of annual Net Sales of such Additional Product in the Field;

ii. For Additional Products containing Additional Compounds first synthesized and/or tested by or under the direction of Vertex during the period commencing on [***] and ending on and including [***]: [***] of annual Net Sales of such Additional Products in the Field; and

iii. For Additional Products containing Additional Compounds first synthesized and/or tested by or under the direction of Vertex during the period commencing on [***]and ending on and including [***]: [***] of annual Net Sales of such Additional Products in the Field.

(e) Royalties Payable Once . Royalties on Net Sales of any Drug Product and Additional Product will be payable only once and if there are Drug Products and/or Additional Products in a Combination Product, royalties shall only be paid once for each Drug Product or Additional Product, as applicable, with respect to the portion of the Net Sales of the Combination Product that is allocated to such Drug Product or Additional Product as provided in Section 1.25.4.

(f) Application of Royalty Provisions to ORKAMBI Net Sales . For purposes of clarity, (1) ORKAMBI is a Combination Product consisting of two Original Drug Products, VX-770 Drug Product and VX-809 Drug Product, and (2) accordingly, royalties on Net Sales of ORKAMBI shall be payable as follows: under the Combination Product principles set forth in Section 1.25.4, 1/n, where n=2, or fifty percent (50%) of Net Sales of ORKAMBI shall be allocated to each of the VX-770 Drug Product and the VX-809 Drug Product. An illustrative example of the calculation of royalties on Net Sales of ORKAMBI and KALYDECO (*i.e.,* VX-770 Drug Product sold not as a Combination Product) is attached hereto as Exhibit 2016-B.

(g) Additional Example . For purposes of clarity, if Vertex were to sell a Combination Product consisting of VX-770 Drug Product, an Additional Product described in Section 5.3.1(d)(i) and an Additional Product described in Section 5.3.1(d)(ii), royalties on Net Sales of such Combination Product shall be payable as follows: under the Combination Product principles set forth in Section 1.25.4, one third (1/3) of Net Sales of such Combination Product shall be allocated to each of the VX-770 Drug Product and the first and second Additional Products, and royalties on the portion of Net Sales allocated to the VX-770 Drug Product would be payable under Section 5.3.1(a), royalties on the portion of Net Sales allocated to the Additional Product described in

Section 5.3.1(d)(i) would be payable under Section 5.3.1(d)(i) and royalties on the portion of Net Sales allocated to the Additional Product described in Section 5.3.1(d)(ii) would be payable under Section 5.3.1(d)(ii). An illustrative example of such calculation is attached hereto as Exhibit 2016-C.

(h) Calendar Year . For the avoidance of doubt, each calculation of annual Net Sales shall be calculated on the basis of a calendar year from January 1 of such calendar year through December 31 of such calendar year.

(i) Third Party Compounds . For purposes of this Agreement, Compounds and Additional Compounds shall not include any chemical compound as to which rights are or were acquired by Vertex or any of its Affiliates from *bona fide* Third Party entities after [***], whether by merger, acquisition of shares, asset acquisition, license or other means of conveyance whether or not Vertex or its Affiliates or any third party acting under Vertex's or its Affiliate's direction evaluated such compound prior to [***]. For example, [***].

(j) Reporting on Additional Product . The reporting and payment provisions set forth in Section 5.4 of the Agreement shall apply to Additional Products (substituting "Additional Product" for "Drug Product" therein).

3. Dispute Resolution . Section 12.2 of the Agreement is deleted in its entirety and replaced with the following:

12.2 Dispute Resolution Process .

(a) In the event of any dispute, controversy or claim arising out of or relating to this Agreement, or the rights and obligations of Vertex, CFFT and RP in relation thereto, Vertex, CFFT and RP, each on its own behalf and on behalf of its predecessors, successors, assigns, officers, directors, employees, trustees, parents, subsidiaries and Affiliates, shall, before initiating any action under Section 12.2(b), refer the relevant dispute, controversy or claim to the Chief Executive Officers of Vertex, CFFT and (in the event RP has an interest in such dispute, controversy or claim) RP, who shall, as soon as practicable, attempt in good faith to resolve the dispute, controversy or claim. If such dispute, controversy or claim is not resolved within [***] after the referral of the matter to the Chief Executive Officers, Vertex or CFFT (jointly with RP, if applicable) may initiate proceedings pursuant to Section 12.2(b) below.

(b) (i) Any dispute, controversy or claim arising out of or relating to this Agreement, or the breach thereof, shall be adjudicated by confidential arbitration administered by the American Arbitration Association in accordance with its Commercial Arbitration Rules (including Procedures for Large Complex Cases) and judgment on the award rendered by the arbitrators shall be final, not subject to appeal and may be entered in any court having jurisdiction thereof. The place of arbitration shall be New York, New York.

(ii) Claims shall be heard by a panel of three arbitrators. Each party shall select (or, if RP is a party to such claim, CFFT and RP shall jointly select) one arbitrator and shall provide notice of such selection with its initial pleading. The two arbitrators selected by the parties (and RP, if applicable) shall select a third arbitrator within thirty days after the notice of the second arbitrator's selection. If the arbitrators selected by the parties (and RP, if applicable) are unable or fail to agree upon the third arbitrator, the third arbitrator shall be selected by the American

Arbitration Association from its Large, Complex Commercial Case Panel. Each party (and RP, if applicable) shall bear its own costs and expenses and an equal share (with CFFT and RP jointly bearing [***], if applicable) of the arbitrators' fees and administrative fees of arbitration. The award of the arbitrators shall be accompanied by a reasoned opinion. Except as may be required by law, neither a party nor RP nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior written consent of both parties (and RP, if applicable).

4. Confidentiality .

4.1 Undertaking . The phrase "During the term of this Agreement" shall be deleted from the first sentence of Section 6.1 of the Agreement.

4.2 Survival . Section 6.4 of the Agreement is deleted in its entirety and replaced with the following:

The provisions of this Article VI shall survive until the [***] of the date of expiration of all payment obligations under this Agreement.

5. Additional Exhibits . The new Exhibits 2016-A, Exhibit 2016-B and Exhibit 2016-C shall be added to and become part of the Agreement.

6. Acknowledgement Regarding Past Royalties and Drug Products and Additional Products .

6.1 CFFT and RP acknowledge and agree that no royalties in excess of the royalties already paid by Vertex to CFFT (and its assignees) are due to CFFT (or its assignees) based on Net Sales of Drug Products occurring prior to June 30, 2016.

6.2 CFFT and RP agree that subject to the definitions of Compound and Additional Compound, no chemical compound that is first synthesized and/or tested by or under the direction of Vertex after August 31, 2016 shall be considered a Compound or Additional Compound under the Agreement regardless of any such chemical compound's structural, chemical or other similarity to a chemical compound first synthesized and/or tested by or under the direction of Vertex prior to August 31, 2016.

7. Program Awards by CFFT to Vertex .

7.1 CFFT shall award Vertex a one-time, non-refundable, non-creditable sum of $75.0 million payable [***] after the Execution Date by wire transfer of immediately available funds to an account designated by Vertex for expenditures in connection with research and development efforts regarding Original Drug Products and Additional Products.

7.2 For so long as Vertex is conducting (or has a bona fide intention of conducting in the future) at least [***] to evaluate an Original Drug Product or an Additional Product, CFFT shall provide [***] awards to Vertex of [***], with the first payment due on [***], to support research and development efforts regarding Original Drug Products and Additional Products; *provided* , *that* if Vertex and its Affiliates have collectively incurred [***] in CF Spend during the [***] period ending on the [***] (the "[***] Period "), the amount to be paid by CFFT on the applicable payment date will be reduced to an amount equal to [***] less the amount by which the aggregate amount of CFFT's awards under this Section 7.2 during such [***] Period exceed [***] of the applicable CF Spend during such [***] Period. Any negative amount will be carried forward

and used to reduce any awards otherwise due hereunder. For so long as CFFT is obligated to provide Vertex with funding under this Section 7.2, at least [***] prior to the date on which each such payment is due, Vertex will provide CFFT with a high-level summary of the CF Spend during the applicable [***] Period (including the total number of FTEs and a break-out of the total amount of internal costs and out-of-pocket costs incurred), together with a certificate of an officer of Vertex certifying the accuracy of such high-level summary.

8. Release .

8.1 CFFT and RP and each of their predecessors, successors, assigns, officers, directors, employees, trustees, parents, subsidiaries and Affiliates fully, finally and forever release, relinquish, acquit and discharge Vertex and each of its predecessors, successors, assigns, officers, directors, employees, trustees, parents, subsidiaries, Affiliates, customers, suppliers and distributors (each individually a " Vertex Releasee ") of and from, and covenant not to sue, not to assign to any other entity a right to sue, and not to authorize any other entity to sue any Vertex Releasee for any and all Losses (as defined below) of every name and nature, both at law and in equity, known or unknown, suspected or unsuspected, accrued or unaccrued that (a) arise out of or relate to the Agreement and (b) existed as of the Execution Date. This release shall not prevent or impair the right of CFFT or RP to bring a claim for any breach of the Agreement, as amended, arising on or after the Execution Date or for breach of a representation, warranty, or covenant made in this Amendment No. 7.

8.2 Vertex and each of its predecessors, successors, assigns, officers, directors, employees, trustees, parents, subsidiaries and Affiliates fully, finally and forever release, relinquish, acquit and discharge CFFT and RP and each of their predecessors, successors, assigns, officers, directors, employees, trustees, parents, subsidiaries, Affiliates, customers, suppliers and distributors (each individually a " CFFT Releasee " or " RP Releasee "), of and from, and covenant not to sue, not to assign to any other entity a right to sue and not to authorize any other entity to sue, any CFFT Releasee or RP Releasee for any and all Losses of every name and nature, both at law and in equity, known or unknown, suspected or unsuspected, accrued or unaccrued that (a) arise out of and relate to the Agreement and (b) existed as of the Execution Date. This release shall not prevent or impair Vertex from making a claim for any breach of the Agreement, as amended, arising on or after the Execution Date or for breach of a representation, warranty, or covenant made in this Amendment No. 7.

8.3 Each party waives to the fullest extent permitted by law the provisions and benefits of Section 1542 of the California Civil code, which provides that:

> "A general release does not extend to claims which the creditor does not know or suspect to exist in his or her favor at the time of executing the release, which if known by him or her must have materially affected his or her settlement to the debtor."

8.4 " Losses " shall mean claims, actions, causes of actions, suits, defenses, judgments, debts, offsets, accounts, covenants, contracts, agreements, torts, damages and any and all demands and liabilities whatsoever, including costs, expenses and attorneys' fees.

8.5 Each party represents, warrants and covenants that it has not heretofore assigned or transferred to any person or entity any matters released by such party in this Section 8,

and such party agrees to indemnify and hold harmless the other party and its Releasees from and against any Losses arising from any such alleged or actual assignment or transfer.

9. Agreement to be Bound. RP (on its own behalf and on behalf of its predecessors, successors, assigns, officers, directors, employees, trustees, parents, subsidiaries and Affiliates) agrees to be bound by (a) the dispute resolution procedures set forth in Section 12.2 of the Agreement (as amended by Section 3 of this Amendment No. 7) and (ii) Sections 6, 8, 9, 10, 11, 12.1 and 13 of this Amendment No. 7.

10. Communications. Notwithstanding Section 6.3 of the Agreement, Vertex, CFFT and RP (and their respective predecessors, successors, assigns, officers, directors, employees, trustees, parents, subsidiaries and Affiliates) agree that any public or private communication regarding the terms of this Amendment No. 7, shall be made in the form of, or in a manner consistent with, Schedule 1 to this Amendment No. 7; *provided that* (a) Vertex, CFFT and RP may disclose the terms of this Amendment No. 7 to the extent required by applicable law and/or in connection with arbitration under this Agreement, (b) RP and CFFT may disclose the terms of this Amendment No. 7 in their audited financial statements to the extent so required by their independent accountants, and include comparable disclosure in its unaudited quarterly financial statements, (c) RP may disclose the terms of this Amendment No. 7 to its existing and prospective lenders and equity investors so long as such parties are subject to reasonable restrictions of confidentiality and (d) CFFT may disclose the terms of this Amendment No. 7 to Canada Pension Plan Investment Board.

11. [***]. Vertex agrees that it shall not at any time [***] regarding [***] current or former directors, officers, stockholders, employees, agents, attorneys or representatives, any of the other CFFT Releasees or RP Releasees under Section 8, or regarding CFFT's or RP's [***]. CFFT [***] each agree that neither of them shall at any time [***] regarding Vertex or Vertex's current or former directors, officers, stockholders, employees, agents, attorneys or representatives, any of the other Vertex Releasees under Section 8, or regarding Vertex's [***].

12. Representations and Warranties; Covenants.

12.1 Mutual Representations. Each party represents and warrants to the other party that (a) such party is duly organized, validly existing, and in good standing under the laws of the jurisdiction of its establishment or incorporation, (b) such party has taken all action necessary to authorize it to enter into this Agreement and perform its obligations under this Amendment No. 7, (c) this Amendment No. 7 has been duly executed and delivered on behalf of such party and constitutes a legal, valid and binding obligation of such party and (d) neither the execution of this Amendment No. 7 nor the performance of such party's obligations hereunder will conflict with, result in a breach of, or constitute a default under any provision of such party's organizational documents, or of any law, rule, regulation, authorization or approval of any government entity, or of any agreement to which it is a party or by which it is bound.

12.2 Vertex Representation. Vertex represents and warrants to CFFT that Exhibit 2016-A was prepared in good faith by Vertex based on its business records and includes all compounds first synthesized and/or tested by Vertex in connection with its research and development of Correctors during the Additional Term, [***]. If the parties agree (or the arbitrators acting under Section 12.2 of the Agreement determine) that any compound that was first synthesized and/or tested by Vertex in connection with its research and development of Correctors during the Additional

Term is not included in Exhibit 2016-A, such compound shall be added to Exhibit 2016-A, will be an Additional Compound, and shall be treated as having been included in Exhibit 2016-A as of the Amendment No. 7 Effective Date. The addition of such compound to Exhibit 2016-A and the application of the terms of this Agreement to such compound will be CFFT's sole and exclusive remedies for any good-faith failure to include such compound on Exhibit 2016-A. Vertex represents and warrants as of the Amendment No. 7 Effective Date that no Correctors other than [***]have been advanced into clinical trials and that Vertex has a bona fide intention to advance one or more Additional Products other than [***],[***] into clinical trials in the [***] following the Amendment No. 7 Effective Date, subject to further assessment of efficacy and safety.

12.3 Vertex Covenant . If, at any time following the Amendment No. 7 Effective Date, Vertex files a new drug application with the United States Food and Drug Administration for marketing approval pursuant to 21 C.F.R. § 314.3 or submits a similar application to any regulatory authority in any other country or jurisdiction, in each case, with respect to any product containing a Corrector, if requested by CFFT in writing, Vertex will provide CFFT with reasonably detailed information regarding the date on which each such compound was first synthesized and/or tested by or at the direction of Vertex as part of its research and development of Correctors. Except as set forth in this Section 12.3, and subject to CFFT's right to enforce representations and obligation herein, Vertex will not be obligated to provide CFFT with any information regarding the date on which any compound was first synthesized and/or tested by or at the direction of Vertex as part of its research and development of Correctors.

13. Assignment . None of the Agreement, nor any Compound, any Original Drug Product or Additional Compound, or any rights to any Compound or Additional Compound, may be transferred or assigned by Vertex without the prior written consent of CFFT, except that, Vertex may transfer all of its rights in the Agreement and all Compounds, Original Drug Products, and Additional Compounds, but only if the transferee or assignee executes and delivers to CFFT an agreement to assume all of Vertex's obligations under the Agreement. CFFT may transfer or assign its rights under the Agreement solely as provided in the Agreement. RP may not assign or transfer its rights under this Amendment No. 7.

14. Existing Agreement Ratified . As amended and supplemented hereby, all terms and provisions of the Agreement in effect immediately prior to the Amendment No. 7 Effective Date shall remain in full force and effect. For the avoidance of doubt, the following sections from the Agreement remain in effect, as amended by this Amendment No. 7 and prior amendments: Articles V, VI (for the period of time specified therein), VII (for the period of time specified therein), VIII, IX, XI, XII, XIII and any other provision of the Agreement that, by its terms, survives the termination of the Agreement. If specific provisions of this Amendment No. 7 are inconsistent with specific provisions of the Agreement, the provisions of this Amendment No. 7 shall control. This Amendment No. 7 may be executed in any number of counterparts, each of which shall be deemed an original, and all of which, taken together, shall constitutes one and the same agreement. Vertex, CFFT and RP may execute this Amendment No. 7 by electronically transmitted signature and such electronically transmitted signature will be as effective as an original executed signature page.

[Signature Page Follows]

In WITNESS WHEREOF, the undersigned have executed this Amendment No. 7 on the Execution Date effective as of the Amendment No. 7 Effective Date.

CYSTIC FIBROSIS FOUNDATION THERAPEUTICS INCORPORATED		VERTEX PHARMACEUTICALS INCORPORATED	
By:	/s/ Preston Campbell	By:	/s/ Ian Smith
Name:	Preston Campbell	Name:	Ian Smith
Title:	President & CEO	Title:	EVP& CFO

SOLELY FOR PURPOSES OF SECTIONS 6, 8, 9, 10, 11, 12.1 AND 13 OF THIS AMENDMENT NO. 7, RP HAS EXECUTED THIS AMENDMENT NO. 7 ON THE EXECUTION DATE EFFECTIVE AS OF THE AMENDMENT NO. 7 EFFECTIVE DATE.

RPI FINANCE TRUST

By: Wilmington Trust Company, not
in its individual capacity but
solely in its capacity as owner trustee

RPI FINANCE TRUST

By: Wilmington Trust Company, not
in its individual capacity but
solely in its capacity as owner trustee

By: s/ Eric A Kardash

Name: Eric A Kardash

Title: Assistant Vice President

It is expressly understood and agreed by the parties hereto that (i) this Agreement is executed and delivered by Wilmington Trust Company, not individually or personally, but solely as owner trustee of RPI Finance Trust, (ii) nothing herein contained shall be construed as creating any liability on Wilmington Trust Company, individually or personally, any such liability, if any, being expressly waived by the parties hereto and by any person claiming by, through or under the parties hereto, and (iii) under no circumstances shall Wilmington Trust Company be personally liable for the payment of any indebtedness or expenses of RPI Finance Trust.

Exhibit 2016-A

Additional Compounds

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. A total of 99 page were omitted. [***]

Exhibit 2016-B

KALYDECO & ORKAMBI Example

If annual Net Sales of KALYDECO are equal to [***] and annual Net Sales of ORKAMBI are equal to [***], and no other products containing VX-770 Drug Product or VX-809 Drug Product or any other Original Drug Product are sold in the applicable calendar year, the royalty payable to CFFT by Vertex would be calculated as follows:

[***]	$[***]
[***]	$[***]

[***]	$[***]
[***]	$[***]
[***]	
	$[***]

Royalty Paid on Original Drug Products :	
[***]	$[***]
[***]	$[***]
Total Royalty :	$[***]

Exhibit 2016-C

Additional Example

If annual Net Sales of the Combination Product described in Section 5.3.1(g) are equal to [***] and no other products containing any of the components of such Combination Product or any Original Drug Product or Additional Product either separately or as part of another unrelated Combination Product, are sold in the applicable year, the royalty payable to CFFT by Vertex would be calculated as follows:

[***]	$[***]

[***]	$[***]
[***]	$[***]
[***]	$[***]

[***]:	
[***]	$[***]
[***]	$[***]
Royalty Paid on Additional Product under Section 5.3.1(d)(i) :	
Total Annual Net Sales [***]	$[***]
Royalty Paid on Additional Product under Section 5.3.1(d)(ii) :	
Total Annual Net Sales [***]	$[***]
Total Royalty :	$[***]

Schedule 1

Publicity

Item 1.01. Entry into a Material Definitive Agreement

The information contained in Item 8.01 regarding the Amendment is incorporated herein by reference.

Item 8.01 Other Events

On October 13, 2016, we amended and expanded our Research, Development and Commercialization Agreement (the "Collaboration Agreement"), dated May 24, 2004, by and between Cystic Fibrosis Foundation Therapeutics Incorporated ("CFFT") and Vertex Pharmaceuticals Incorporated (the "Amendment"), in order to update and clarify the terms of our relationship. The Amendment provides for an upfront program award from CFFT to us of $75.0 million and development funding from CFFT to us of up to $6.0 million annually. Pursuant to the Amendment, we have agreed to pay royalties ranging from low single digits to mid-single digits on certain compounds first synthesized and/or tested between March 1, 2014 and August 31, 2016. We will continue to pay royalties ranging from single digits to sub-teens on any approved drugs first synthesized and/or tested on or before February 28, 2014. The parties also clarified that net sales on combination products will be allocated equally to each of the active pharmaceutical ingredients in the combination product consistent with the allocation of net sales for ORKAMBI and provided further clarification with respect to the calculation of royalties on products covered by the Collaboration Agreement.

Independently, we entered into a data license agreement with the Cystic Fibrosis Foundation pursuant to which we will pay for continuing access to data from the CFF's patient registry, which we believe will be important for research, development and approval of future CF medicines.

EXHIBIT 10.12

CREDIT AGREEMENT

Dated as of October 13, 2016

among

VERTEX PHARMACEUTICALS INCORPORATED,
as the Borrower,

CERTAIN SUBSIDIARIES OF THE BORROWER PARTY HERETO,
as the Subsidiary Guarantors,

BANK OF AMERICA, N.A.,
as Administrative Agent, Swingline Lender and
an L/C Issuer,

and

THE LENDERS PARTY HERETO

MERRILL LYNCH, PIERCE, FENNER & SMITH INCORPORATED,

and

SUNTRUST ROBINSON HUMPHREY, INC.
as Joint Lead Arrangers and Joint Bookrunners

and

SUNTRUST BANK
as Syndication Agent

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CREDIT AGREEMENT

This **CREDIT AGREEMENT** is entered into as of October 13, 2016, among **VERTEX PHARMACEUTICALS INCORPORATED** , a Massachusetts corporation (the " Borrower "), the Subsidiaries of the Borrower as are or may from time to time become parties to this Agreement as Subsidiary Guarantors (defined herein), the Lenders (defined herein), and **BANK OF AMERICA, N.A.,** as Administrative Agent, Swingline Lender and an L/C Issuer.

PRELIMINARY STATEMENTS:

WHEREAS, the Borrower has requested that the Lenders, the Swingline Lender and the L/C Issuers make loans and other financial accommodations to the Borrower in an aggregate amount of $500,000,000, in the form of a revolving credit facility.

WHEREAS, the Lenders, the Swingline Lender and the L/C Issuers have agreed to make such loans and other financial accommodations to the Loan Parties on the terms and subject to the conditions set forth herein.

NOW THEREFORE, in consideration of the mutual covenants and agreements herein contained, the parties hereto covenant and agree as follows:

ARTICLE I

DEFINITIONS AND ACCOUNTING TERMS

1.01 Defined Terms .

As used in this Agreement, the following terms shall have the meanings set forth below:

" Acquisition " means the acquisition, whether through a single transaction or a series of related transactions, of (a) a majority of the Voting Stock or other controlling ownership interest in another Person (including the purchase of an option, warrant or convertible or similar type security to acquire such a controlling interest at the time it becomes exercisable by the holder thereof), whether by purchase of such equity or other ownership interest or upon the exercise of an option or warrant for, or conversion of securities into, such equity or other ownership interest, or (b) assets of another Person which constitute all or substantially all of the assets of such Person or of a division, line of business or other business unit of such Person.

" Act " has the meaning set forth in Section 11.19.

" Additional Secured Obligations " means (a) all obligations arising under Secured Cash Management Agreements and Secured Hedge Agreements and (b) all costs and expenses incurred in connection with enforcement and collection of the foregoing, including the fees, charges and disbursements of counsel, in each case whether direct or indirect (including those acquired by assumption), absolute or contingent, due or to become due, now existing or hereafter arising and including interest, expenses and fees that accrue after the commencement by or against any Loan Party or any Affiliate thereof of any proceeding under any Debtor Relief Laws naming such Person

as the debtor in such proceeding, regardless of whether such interest, expenses and fees are allowed claims in such proceeding; provided that (x) obligations of the Borrower or any of its Subsidiaries under any Secured Cash Management Agreement or Secured Hedge Agreement shall be secured and guaranteed pursuant to the Collateral Documents to the extent that, and for so long as, the other Obligations are so secured and guaranteed and (y) any release of Collateral or Guarantors effected in a manner permitted by this Agreement and the other Loan Documents shall not require the consent of holders of obligations under Secured Cash Management Agreements or Secured Hedge Agreements; provided further that Additional Secured Obligations of a Loan Party shall exclude any Excluded Swap Obligations with respect to such Loan Party.

" Adjusted Consolidated Leverage Ratio " has the meaning specified in Section 7.11(a) .

" Administrative Agent " means Bank of America (or any of its designated branch offices or affiliates), in its capacity as administrative agent under any of the Loan Documents, or any successor administrative agent.

" Administrative Agent's Office " means the Administrative Agent's address and, as appropriate, account as set forth on Schedule 1.01(a) , or such other address or account as the Administrative Agent may from time to time notify the Borrower and the Lenders.

" Administrative Questionnaire " means an Administrative Questionnaire in substantially the form of Exhibit A or any other form approved by the Administrative Agent.

" Affiliate " means, with respect to a specified Person, another Person that directly, or indirectly through one or more intermediaries, Controls or is Controlled by or is under common Control with the Person specified.

" Aggregate Revolving Commitments " means the Revolving Commitments of all the Lenders.

" Agreement " means this Credit Agreement.

" Agreement Currency " has the meaning specified in Section 11.21.

" Alternative Currency " means each of the following currencies: Australian Dollars, Canadian Dollars, Euro, Sterling, and Swiss Francs, together with each other currency (other than Dollars) that is approved in accordance with Section 1.09; provided that for each Alternative Currency, such requested currency is an Eligible Currency at the time of the applicable Credit Extension.

" Alternative Currency Equivalent " means, at any time, with respect to any amount denominated in Dollars, the equivalent amount thereof in the applicable Alternative Currency as determined by the Administrative Agent or the applicable L/C Issuer, as the case may be, at such time on the basis of the Spot Rate (determined in respect of the most recent Revaluation Date) for the purchase of such Alternative Currency with Dollars.

" Applicable Percentage " means the percentage (carried out to the ninth decimal place) of the Revolving Facility represented by such Revolving Lender's Revolving Commitment at such time, subject to adjustment as provided in Section 2.15. If the Revolving Commitment of all of the Revolving Lenders to make Revolving Loans and the obligation of the L/C Issuers to make L/C Credit Extensions have been terminated pursuant to Section 8.02, or if the Revolving Commitments have expired, then the Applicable Percentage of each Revolving Lender in respect of the Revolving Facility shall be determined based on the Applicable Percentage of such Revolving Lender in respect of the Revolving Facility most recently in effect, giving effect to any subsequent assignments. The Applicable Percentage of each Lender is set forth opposite the name of such Lender on Schedule 1.01(b) as of the Closing Date (and as automatically updated pursuant to Section 2.16) or in the Assignment and Assumption pursuant to which such Lender becomes a party hereto or in any documentation executed by such Lender pursuant to Section 2.16.

" Applicable Rate " means, for any day, the rate per annum set forth below opposite the applicable Level then in effect (based on the Consolidated Leverage Ratio), it being understood that the Applicable Rate for (a) Revolving Loans that are Base Rate Loans shall be the percentage set forth under the column "Base Rate Loans", (b) Revolving Loans that are Eurodollar Rate Loans shall be the percentage set forth under the column "Eurodollar Rate Loans & Letter of Credit Fee", (c) the Letter of Credit Fee shall be the percentage set forth under the column "Eurodollar Rate Loans & Letter of Credit Fee", and (d) the Commitment Fee shall be the percentage set forth under the column "Commitment Fee":

Applicable Rate				
Level	**Consolidated Leverage Ratio**	**Eurodollar Rate Loans & Letter of Credit Fee**	**Base Rate Loans**	**Commitment Fee**
1	≥ 2.50 to 1.00	2.50%	1.50%	0.35%
2	≥ 1.50 to 1.00 but < 2.50 to 1.00	2.25%	1.25%	0.30%
3	≥ 0.75 to 1.00 but < 1.50 to 1.00	2.00%	1.00%	0.25%
4	< 0.75 to 1.00	1.75%	0.75%	0.20%

Any increase or decrease in the Applicable Rate resulting from a change in the Consolidated Leverage Ratio shall become effective as of the first Business Day immediately following the date a Compliance Certificate is delivered pursuant to Section 6.02(a); provided , however , that if a Compliance Certificate is not delivered when due in accordance with such Section, then, upon the request of the Required Lenders, Level 1 shall apply, in each case as of the first Business Day after the date on which such Compliance Certificate was required to have been delivered and in each case shall remain in effect until the first Business Day following the date on which such Compliance Certificate is delivered.

Notwithstanding anything to the contrary contained in this definition, (x) the determination of the Applicable Rate for any period shall be subject to the provisions of Section 2.10(b), and (y) the

initial Applicable Rate shall be set forth in Level 2 until the first Business Day immediately following the date a Compliance Certificate is delivered pursuant to Section 6.02(a) for the fiscal year ending December 31, 2016. Any adjustment in the Applicable Rate shall be applicable to all Credit Extensions then existing or subsequently made or issued.

" Applicable Revolving Percentage " means with respect to any Revolving Lender at any time, such Revolving Lender's Applicable Percentage in respect of the Revolving Facility at such time.

" Applicable Time " means, with respect to any borrowings and payments in any Alternative Currency, the local time in the place of settlement for such Alternative Currency as may be determined by the Administrative Agent or the applicable L/C Issuer, as the case may be, to be necessary for timely settlement on the relevant date in accordance with normal banking procedures in the place of payment.

" Appropriate Lender " means, at any time, (a) with respect to the Revolving Facility, a Lender that has a Revolving Commitment or holds a Revolving Loan thereunder at such time, (b) with respect to the Letter of Credit Sublimit, (i) the L/C Issuers, and (ii) if any Letters of Credit have been issued pursuant to Section 2.03, the Revolving Lenders and (c) with respect to the Swingline Sublimit, (i) the Swingline Lender and (ii) if any Swingline Loans are outstanding pursuant to Section 2.04(a), the Revolving Lenders.

" Approved Fund " means any Fund that is administered or managed by (a) a Lender, (b) an Affiliate of a Lender or (c) an entity or an Affiliate of an entity that administers or manages a Lender.

" Arrangers " means (a) MLPFS (or any other registered broker-dealer wholly-owned by Bank of America Corporation to which all or substantially all of Bank of America Corporation's or any of its Subsidiaries' investment banking, commercial lending services or related businesses may be transferred following the date of this Agreement), and (b) SunTrust Robinson Humphrey, Inc., in their respective capacities as joint lead arrangers and joint bookrunners.

" Assignment and Assumption " means an assignment and assumption entered into by a Lender and an Eligible Assignee (with the consent of any party whose consent is required by Section 11.06(b)(iii)), and accepted by the Administrative Agent, in substantially the form of Exhibit B or any other form (including an electronic documentation form generated by use of an electronic platform) approved by the Administrative Agent.

" Attributable Indebtedness " means, on any date and without duplication, (a) in respect of any Capitalized Lease of any Person, the capitalized amount thereof that would appear on a balance sheet of such Person prepared as of such date in accordance with GAAP (excluding Capitalized Leases in respect of the Specified Leased Properties), (b) in respect of any Synthetic Lease Obligation, the capitalized amount of the remaining lease or similar payments under the relevant lease or other applicable agreement or instrument that would appear on a balance sheet of such Person prepared as of such date in accordance with GAAP if such lease or other agreement or instrument were accounted for as a Capitalized Lease, and (c) in respect of any Sale and Leaseback

Transaction, the present value (discounted in accordance with GAAP at the debt rate implied in the applicable lease) of the obligations of the lessee for rental payments during the term of such lease.

" Audited Financial Statements " means the audited Consolidated balance sheet of the Borrower and its Restricted Subsidiaries for the fiscal year ended December 31, 2015, and the related Consolidated statements of income or operations, shareholders' equity and cash flows for such fiscal year of the Borrower and its Restricted Subsidiaries, including the notes thereto.

" Australian Dollar " means the lawful currency of Australia.

" Availability Period " means the period from and including the Closing Date to the earliest of (a) the Maturity Date, (b) the date of termination of the Revolving Commitments pursuant to Section 2.06, and (c) the date of termination of the Revolving Commitment of each Revolving Lender to make Revolving Loans and of the obligation of each L/C Issuer to make L/C Credit Extensions pursuant to Section 8.02.

" Bail-In Action " means the exercise of any Write-Down and Conversion Powers by the applicable EEA Resolution Authority in respect of any liability of an EEA Financial Institution.

" Bail-In Legislation " means, with respect to any EEA Member Country implementing Article 55 of Directive 2014/59/EU of the European Parliament and of the Council of the European Union, the implementing law for such EEA Member Country from time to time which is described in the EU Bail-In Legislation Schedule.

" Bankruptcy Code " means Title 11 of the United States Code (11 U.S.C. Section 101 et. seq.) as now or hereafter in effect, or any successor statute thereto.

" Bank of America " means Bank of America, N.A. and its successors.

" Base Rate " means for any day a fluctuating rate of interest per annum equal to the highest of (a) the Federal Funds Rate plus 0.50%, (b) the rate of interest in effect for such day as publicly announced from time to time by Bank of America as its "prime rate," and (c) the Eurodollar Rate plus 1.00%, provided that if the Base Rate shall be less than zero, such rate shall be deemed zero for purposes of this Agreement. The "prime rate" is a rate set by Bank of America based upon various factors including Bank of America's costs and desired return, general economic conditions and other factors, and is used as a reference point for pricing some loans, which may be priced at, above, or below such announced rate. Any change in such prime rate announced by Bank of America shall take effect at the opening of business on the day specified in the public announcement of such change.

" Base Rate Loan " means a Revolving Loan that bears interest based on the Base Rate.

" Borrower " has the meaning specified in the introductory paragraph hereto.

" Borrower Materials " has the meaning specified in Section 6.02.

" Borrowing " means a Revolving Borrowing or a Swingline Borrowing, as the context may require.

" Business Day " means any day other than a Saturday, Sunday or other day on which commercial banks are authorized to close under the Laws of, or are in fact closed in, the state where the Administrative Agent's Office is located and:

(a) if such day relates to any interest rate settings as to a Eurodollar Rate Loan or Letter of Credit denominated in Dollars, any issuance, fundings, disbursements, settlements and payments in Dollars in respect of any such Credit Extension, or any other dealings in Dollars to be carried out pursuant to this Agreement in respect of any such Credit Extension, means any such day that is also a London Banking Day;

(b) if such day relates to any issuance, fundings, disbursements, settlements and payments in Euro in respect of any Letter of Credit denominated in Euro, or any other dealings in Euro to be carried out pursuant to this Agreement in respect of any such Credit Extension, means a TARGET Day;

(c) if such day relates to any Letter of Credit denominated in a currency other than Dollars or Euro, means any such day on which dealings in deposits in the relevant currency are conducted by and between banks in the London or other applicable offshore interbank market for such currency; and

(d) if such day relates to any issuance, fundings, disbursements, settlements and payments in a currency other than Dollars or Euro in respect of any Letter of Credit denominated in a currency other than Dollars or Euro, or any other dealings in any currency other than Dollars or Euro to be carried out pursuant to this Agreement in respect of any such Credit Extension, means any such day on which banks are open for foreign exchange business in the principal financial center of the country of such currency.

" Canadian Dollar " and " CAD " means the lawful currency of Canada.

" Capitalized Leases " means all leases that have been or should be, in accordance with GAAP, recorded as capitalized leases.

" Capped Call Transactions " means one or more call options referencing the Borrower's Equity Interests purchased by the Borrower in connection with the issuance of Convertible Bond Indebtedness with a strike or exercise price (howsoever defined) initially equal to the conversion price (howsoever defined) of the related Convertible Bond Indebtedness (subject to rounding) and limiting the amount deliverable to the Borrower upon exercise thereof based on a cap or upper strike price (howsoever defined).

" Cash Collateralize " means, to pledge and deposit with or deliver to the Administrative Agent, for the benefit of one or more of the L/C Issuers or Swingline Lender (as applicable) or the Lenders, as collateral for L/C Obligations, the Obligations in respect of Swingline Loans, or obligations of the Revolving Lenders to fund participations in respect of either thereof (as the context

may require), cash or deposit account balances pursuant to documentation in form and substance reasonably satisfactory to the Administrative Agent and such L/C Issuer or Swingline Lender (as applicable). "Cash Collateral" shall have a meaning correlative to the foregoing and shall include the proceeds of such cash collateral and other credit support.

" Cash Equivalents " means any of the following types of Investments, to the extent owned by the Borrower or any of its Restricted Subsidiaries free and clear of all Liens (other than Permitted Liens):

(a) readily marketable obligations issued or directly and fully guaranteed or insured by the United States or any agency or instrumentality thereof having maturities of not more than three hundred sixty days (360) days from the date of acquisition thereof; provided that the full faith and credit of the United States is pledged in support thereof;

(b) time deposits with, or insured certificates of deposit or bankers' acceptances of, any commercial bank that (i) (A) is a Lender or (B) is organized under the laws of the United States, any state thereof or the District of Columbia or is the principal banking Subsidiary of a bank holding company organized under the laws of the United States, any state thereof or the District of Columbia, and is a member of the Federal Reserve System, (ii) issues (or the parent of which issues) commercial paper rated as described in clause (c) of this definition and (iii) has combined capital and surplus of at least $1,000,000,000, in each case with maturities of not more than one hundred eighty (180) days from the date of acquisition thereof;

(c) commercial paper issued by any Person organized under the laws of any state of the United States and rated at least "Prime-1" (or the then equivalent grade) by Moody's or at least "A-1" (or the then equivalent grade) by S&P, in each case with maturities of not more than one hundred eighty (180) days from the date of acquisition thereof;

(d) Investments, classified in accordance with GAAP as current assets of the Borrower or any of its Restricted Subsidiaries, in money market investment programs registered under the Investment Company Act of 1940, which are administered by financial institutions that have the highest rating obtainable from either Moody's or S&P, and the portfolios of which are limited solely to Investments of the character, quality and maturity described in clauses (a), (b) and (c) of this definition;

(e) repurchase obligations for underlying securities of the types described in clauses (a) and (b) entered into with any financial institution or recognized securities dealer meeting the qualifications specified in clause (b) above; and

(f) other Investments held by the Borrower and its Restricted Subsidiaries in accordance with the Borrower's Investment Policy.

" Cash Management Agreement " means any agreement to provide treasury or cash management services, including deposit accounts, overnight draft, credit cards, debit cards, p-cards (including purchasing cards and commercial cards), funds transfer, automated clearinghouse, zero

balance accounts, returned check concentration, controlled disbursement, lockbox, account reconciliation and reporting and trade finance services and other cash management services.

" Cash Management Bank " means any Person in its capacity as a party to a Cash Management Agreement that, (a) at the time it enters into a Cash Management Agreement with a Loan Party or any Subsidiary, is a Lender or an Affiliate of a Lender, or (b) at the time it (or its Affiliate) becomes a Lender, is a party to a Cash Management Agreement with a Loan Party or any Subsidiary, in each case in its capacity as a party to such Cash Management Agreement (even if such Person ceases to be a Lender or such Person's Affiliate ceased to be a Lender); provided , however , that for any of the foregoing to be included as a "Secured Cash Management Agreement" on any date of determination by the Administrative Agent, the applicable Cash Management Bank (other than the Administrative Agent or an Affiliate of the Administrative Agent) must have delivered a Secured Party Designation Notice to the Administrative Agent prior to such date of determination.

" CERCLA " means the Comprehensive Environmental Response, Compensation and Liability Act of 1980.

" CF Asset Subsidiary " means each Restricted Subsidiary of the Borrower (other than Vertex Europe) that (i) owns, possesses the right to use, or controls any Intellectual Property, or (ii) owns or controls any of the material economic rights derived from any Intellectual Property, in each case with respect to clause (i) or (ii), covering the Cystic Fibrosis Drug Franchise Assets. For the avoidance of doubt, Restricted Subsidiaries of the Borrower that provide commercial distribution services shall not constitute "CF Asset Subsidiaries" pursuant to clause (ii) above as a result of intercompany distributor relationships in the ordinary course of business and any reimbursement arrangements pursuant thereto. As of the Closing Date, there are no CF Asset Subsidiaries.

" CFC " means a Person that is a controlled foreign corporation under Section 957 of the Code.

" Change in Law " means the occurrence, after the Closing Date, of any of the following: (a) the adoption or taking effect of any law, rule, regulation or treaty, (b) any change in any law, rule, regulation or treaty or in the administration, interpretation, implementation or application thereof by any Governmental Authority or (c) the making or issuance of any request, rule, guideline or directive (whether or not having the force of law) by any Governmental Authority; provided that notwithstanding anything herein to the contrary, (i) the Dodd-Frank Wall Street Reform and Consumer Protection Act and all requests, rules, guidelines or directives thereunder or issued in connection therewith and (ii) all requests, rules, guidelines or directives promulgated by the Bank for International Settlements, the Basel Committee on Banking Supervision (or any successor or similar authority) or the United States or foreign regulatory authorities, in each case pursuant to Basel III, shall in each case be deemed to be a "Change in Law", regardless of the date enacted, adopted or issued.

" Change of Control " means an event or series of events by which:

(a) any "person" or "group" (as such terms are used in Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, but excluding any employee benefit plan of such

person or its Subsidiaries, and any person or entity acting in its capacity as trustee, agent or other fiduciary or administrator of any such plan) becomes the "beneficial owner" (as defined in Rules 13d-3 and 13d-5 under the Securities Exchange Act of 1934, except that a person or group shall be deemed to have "beneficial ownership" of all securities that such person or group has the right to acquire, whether such right is exercisable immediately or only after the passage of time (such right, an " option right ")), directly or indirectly, of thirty-five percent (35)% or more of the Equity Interests of the Borrower entitled to vote for members of the board of directors or equivalent governing body of the Borrower on a fully-diluted basis (and taking into account all such securities that such "person" or "group" has the right to acquire pursuant to any option right); or

(b) during any period of twelve (12) consecutive months, a majority of the members of the board of directors or other equivalent governing body of the Borrower cease to be composed of individuals (i) who were members of that board or equivalent governing body on the first day of such period, (ii) whose election or nomination to that board or equivalent governing body was approved by individuals referred to in clause (i) above constituting at the time of such election or nomination at least a majority of that board or equivalent governing body or (iii) whose election or nomination to that board or other equivalent governing body was approved by individuals referred to in clauses (i) and (ii) above constituting at the time of such election or nomination at least a majority of that board or equivalent governing body.

" Closing Date " means the date hereof.

" Code " means the Internal Revenue Code of 1986.

" Collateral " means all of the " Collateral " referred to in the Collateral Documents and all of the other property that is or is intended under the terms of the Collateral Documents to be subject to Liens in favor of the Administrative Agent for the benefit of the Secured Parties.

" Collateral Assignment of Contract " means that certain Collateral Assignment of Contracts, dated as of the Closing Date, by and among the Borrower, Vertex Europe and the Administrative Agent, pursuant to which, among other things, the Borrower shall have collaterally assigned its rights under the Intercompany Royalty Agreements to the Administrative Agent, in favor of the Secured Parties.

" Collateral Documents " means, collectively, the Security Agreement, each Qualifying Control Agreement, the Collateral Assignment of Contract, each Joinder Agreement, each of the other collateral assignments, security agreements, pledge agreements or other similar agreements delivered to the Administrative Agent pursuant to Section 6.14, and each of the other agreements, instruments or documents that creates or purports to create a Lien in favor of the Administrative Agent for the benefit of the Secured Parties.

" Commodity Exchange Act " means the Commodity Exchange Act (7 U.S.C. § 1 *et seq* .), as amended from time to time, and any successor statute.

" Compliance Certificate " means a certificate substantially in the form of Exhibit C .

" Connection Income Taxes " means Other Connection Taxes that are imposed on or measured by net income (however denominated) or that are franchise Taxes or branch profits Taxes.

" Consolidated " means, when used with reference to financial statements or financial statement items of the Borrower and its Restricted Subsidiaries or any other Person, such statements or items on a consolidated basis in accordance with the consolidation principles of GAAP.

" Consolidated EBITDA " means, for any period, the sum of the following determined on a Consolidated basis, without duplication, for the Borrower and its Restricted Subsidiaries in accordance with GAAP, (a) Consolidated Net Income for the most recently completed Measurement Period plus (b) the following to the extent deducted in calculating such Consolidated Net Income (without duplication): (i) Consolidated Interest Charges, (ii) the provision for federal, state, local and foreign income taxes payable, (iii) depreciation and amortization expense, (iv) non-cash stock-based compensation expense (net of any cash payments related to stock-based compensation), (v) non-cash charges and losses (excluding any such non-cash charges or losses to the extent (A) there were cash charges with respect to such charges and losses in past accounting periods or (B) there is a reasonable expectation that there will be cash charges with respect to such charges and losses in future accounting periods), (vi) R&D Collaboration Payments, (vii) Lease Restructuring Expenses in an aggregate amount not to exceed $5,000,000 during the term of this Agreement, (viii) without duplication, (A) one-time non-recurring transaction fees, costs and expenses, integration, reorganization and restructuring costs and facility consolidation and closing costs incurred in connection with reorganizations and restructurings, provided that such fees, costs and expenses are incurred within twelve (12) months of the occurrence of such applicable triggering event, (B) one-time non-recurring severance costs and expenses, payments to employees on account of their equity ownership and one-time compensation charges incurred in connection with reorganizations and restructurings, provided that such costs, expenses and charges are incurred within twelve (12) months of the occurrence of such applicable triggering event, (C) one-time non-recurring expenses related to the transactions contemplated by this Agreement and any other one-time non-recurring expenses or charges related to any equity offering, Investment, Acquisition, Disposition or recapitalization permitted hereunder or the incurrence, amendment or modification of Indebtedness permitted to be incurred under this Agreement (including a refinancing thereof) (in each case, whether or not successful), and (D) such other amounts as the Administrative Agent shall approve in its reasonable discretion, provided however that the aggregate amount added back pursuant to this clause (viii) shall not exceed 12.5% of Consolidated EBITDA for any Measurement Period (prior to giving effect to such adjustments) (ix) to the extent deducted in the calculation of Consolidated Net Income, any earnouts, milestone payments, royalty payments, working capital adjustments and other contingent payment obligations incurred under any Permitted Acquisition or other Investment permitted hereunder, and (x) without duplication and to the extent not included in the determination of Consolidated Net Income for such Period, (A) proceeds of business interruption insurance in an amount representing the earnings for the applicable period that such proceeds are intended to replace (whether or not received so long as such Person in good faith expects to receive the same within four fiscal quarters of the occurrence of the event for which any such claim is made (it being understood that to the extent not actually received within such fiscal quarters, such proceeds shall

be deducted in calculating Consolidated EBITDA for such fiscal quarters) and (B) the amount of any fee, cost, expense or reserve to the extent actually reimbursed or reimbursable by third parties pursuant to indemnification or reimbursement provisions or similar agreements or insurance (so long as the Borrower in good faith expects to receive reimbursement for such fee, cost, expense or reserve within the next four fiscal quarters of the occurrence of the event for which any such reimbursement is sought (it being understood that to the extent not actually received within such fiscal quarters, such amounts shall be deducted in calculating Consolidated EBITDA for such fiscal quarters); provided , however , that (1) the aggregate amount added back pursuant to this clause (x) shall not exceed $25,000,000 during the term of this Agreement and (2) with respect to any claim for business interruption or reimbursement made against any insurer, such insurer has been notified to the potential claim and does not dispute coverage less (c) without duplication and to the extent reflected as a gain or otherwise included in the calculation of Consolidated Net Income for such period, (i) non-cash gains (excluding any such non-cash gains to the extent (A) there were cash gains with respect to such gains in past accounting periods or (B) there is a reasonable expectation that there will be cash gains with respect to such gains in future accounting periods, but including nonrecurring or unusual gains) and (ii) amounts received in respect of upfront, earnout or milestone payments or other similar contingent amounts in connection with any Disposition).

Notwithstanding the foregoing to the contrary (1) in determining Consolidated EBITDA for any Measurement Period, (I) the net impact of (w) variable interest entities that the Borrower is required to consolidate pursuant to FASB ASC 810, (x) gains or losses associated with the revaluation of earnouts, milestones or other similar contingent obligations incurred in connection with any Investment not prohibited by the Loan Documents (including upfront, earnout or milestone payments), (y) the discontinued operation of the Hepatitis C Drug Franchise and (z) net unrealized losses/gains from embedded derivatives that require the application of Accounting Standard Codification Topic 815 and related pronouncements (*i.e.* , related revenues minus related expenses and or reversals of accruals, shall, in each case of clauses (w) – (z), be excluded), and (II) interest, depreciation and amortization related to the Specified Leased Properties, shall be treated as operating expenses, and (2) Consolidated EBITDA shall be deemed to be (I) for the fiscal quarter ended December 31, 2015, $62,000,000, (II) for the fiscal quarter ended March 31, 2016, $49,000,000, and (III) for the fiscal quarter ended June 30, 2016, $95,000,000.

" Consolidated Funded Indebtedness " means, as of any date of determination, for the Borrower and its Restricted Subsidiaries on a Consolidated basis, the sum of (a) the outstanding principal amount of all obligations, whether current or long-term, for borrowed money (including Obligations hereunder) and all obligations evidenced by bonds, debentures, notes, loan agreements or other similar instruments; (b) all purchase money Indebtedness; (c) unreimbursed obligations under letters of credit (including standby and commercial), bankers' acceptances, bank guaranties, surety bonds and similar instruments; (d) all obligations in respect of the deferred purchase price of property or services (other than trade accounts payable in the ordinary course of business, but including all earnouts, milestone payments, royalty payments, working capital adjustments and other contingent payment obligations (including all R&D Collaboration Payments) that (x) are, or are required to be, classified as liabilities on the financial statements of the Borrower and its Restricted Subsidiaries in accordance with GAAP and (y) are, or will be, due and payable on or prior to the date that is 91 days after the Maturity Date); (e) all Attributable Indebtedness; (f) all

mandatory obligations to purchase, redeem, retire, defease or otherwise make any payment prior to the Maturity Date in respect of any Equity Interests or any warrant, right or option to acquire such Equity Interest, valued, in the case of a redeemable preferred interest, at the greater of its voluntary or involuntary liquidation preference plus accrued and unpaid dividends; (g) without duplication, all Guarantees with respect to outstanding Indebtedness of the types specified in clauses (a) through (f) above of Persons other than the Borrower or any Restricted Subsidiary; and (h) all Indebtedness of the types referred to in clauses (a) through (g) above of any partnership or joint venture (other than a joint venture that is itself a corporation or limited liability company) in which the Borrower or a Restricted Subsidiary is a general partner or joint venturer, unless such Indebtedness is expressly made non-recourse to the Borrower or such Restricted Subsidiary.

" Consolidated Interest Charges " means, for any Measurement Period, the sum of (a) all interest, premium payments, debt discount, fees, charges and related expenses in connection with borrowed money (including capitalized interest) or in connection with the deferred purchase price of assets, in each case to the extent treated as interest in accordance with GAAP, and (b) the portion of rent expense under Capitalized Leases that is treated as interest in accordance with GAAP, in each case, of or by the Borrower and its Restricted Subsidiaries on a Consolidated basis for the most recently completed Measurement Period.

" Consolidated Leverage Ratio " means, as of any date of determination, the ratio of (a) Consolidated Funded Indebtedness as of such date to (b) Consolidated EBITDA for the most recently completed Measurement Period.

" Consolidated Net Income " means, at any date of determination, the net income (or loss) of the Borrower and its Restricted Subsidiaries on a Consolidated basis for the most recently completed Measurement Period; provided that Consolidated Net Income shall exclude (a) extraordinary non-cash gains and extraordinary non-cash losses for such Measurement Period, (b) the net income of any Restricted Subsidiary that is not a Subsidiary Guarantor during such Measurement Period to the extent that the declaration or payment of dividends or similar distributions by such Restricted Subsidiary of such income is not permitted by operation of the terms of its Organization Documents or any agreement, instrument or Law applicable to such Restricted Subsidiary during such Measurement Period, except that the Borrower's equity in any net loss of any such Restricted Subsidiary for such Measurement Period shall be included in determining Consolidated Net Income, and (c) any income (or loss) for such Measurement Period of any Person if such Person is not a Restricted Subsidiary, except that the Borrower's equity in the net income of any such Person for such Measurement Period shall be included in Consolidated Net Income up to the aggregate amount of cash actually distributed by such Person during such Measurement Period to the Borrower or a Restricted Subsidiary as a dividend or other distribution (and in the case of a dividend or other distribution to a Restricted Subsidiary, such Restricted Subsidiary is not precluded from further distributing such amount to the Borrower as described in clause (b) of this proviso).

" Contractual Obligation " means, as to any Person, any provision of any security issued by such Person or of any agreement, instrument or other undertaking to which such Person is a party or by which it or any of its property is bound.

" Control " means the possession, directly or indirectly, of the power to direct or cause the direction of the management or policies of a Person, whether through the ability to exercise voting power, by contract or otherwise. " Controlling " and " Controlled " have meanings correlative thereto.

" Convertible Bond Hedge Transactions " means one or more call options referencing the Borrower's Equity Interests purchased by the Borrower in connection with the issuance of Convertible Bond Indebtedness with a strike or exercise price (howsoever defined) initially equal to the conversion or exchange price (howsoever defined) of the related Convertible Bond Indebtedness (subject to rounding).

" Convertible Bond Indebtedness " means Indebtedness having a feature which entitles the holder thereof to convert all or a portion of such Indebtedness into Equity Interests of the Borrower (and cash in lieu of fractional Equity Interests) and/or cash (in an amount determined by reference to the price of Equity Interests of the Borrower).

" Cost of Acquisition " means, with respect to any Acquisition, as at the date of entering into any agreement therefor, the sum of the following (without duplication): (a) the value of the Equity Interests of the Borrower or any Subsidiary to be transferred in connection with such Acquisition, (b) the amount of any cash and Fair Market Value of other property (excluding property described in clause (a) and the unpaid principal amount of any debt instrument) given as consideration in connection with such Acquisition, (c) the amount (determined by using the face amount or the amount payable at maturity, whichever is greater) of any Indebtedness incurred, assumed or acquired by the Borrower or any Subsidiary in connection with such Acquisition, and (d) all additional purchase price amounts in the form of earnouts, milestone payments, royalty payments, working capital adjustments and other contingent obligations that would be recorded on the financial statements of the Borrower and its Subsidiaries in accordance with GAAP in connection with such Acquisition. For purposes of determining the Cost of Acquisition for any transaction, the Equity Interests of the Borrower shall be valued in accordance with GAAP.

" Credit Extension " means each of the following: (a) a Borrowing and (b) an L/C Credit Extension.

" Cystic Fibrosis Drug Franchise Assets " means (a) all products in development, developed, acquired, manufactured, sold and/or distributed by the Borrower or any of its Subsidiaries related to the treatment of patients with cystic fibrosis, including, ivacaftor (tradename KALYDECO), lumacaftor in combination with ivacaftor (tradename ORKAMBI) and VX-661 in combination with ivacaftor, and (b) all proceeds, Intellectual Property, Permits and other assets of the Borrower or any of its Subsidiaries related thereto.

" Debtor Relief Laws " means the Bankruptcy Code of the United States, and all other liquidation, conservatorship, bankruptcy, assignment for the benefit of creditors, moratorium, rearrangement, receivership, insolvency, reorganization, or similar debtor relief Laws of the United States or other applicable jurisdictions from time to time in effect.

" Default " means any event or condition that constitutes an Event of Default or that, with the giving of any notice, the passage of time, or both, would be an Event of Default.

" Default Rate " means (a) with respect to any Obligation for which a rate is specified, a rate per annum equal to two percent (2%) in excess of the rate otherwise applicable thereto and (b) with respect to any Obligation for which a rate is not specified or available, a rate per annum equal to the Base Rate plus the Applicable Rate for Revolving Loans that are Base Rate Loans plus two percent (2%), in each case, to the fullest extent permitted by applicable Law.

" Defaulting Lender " means, subject to Section 2.15(b), any Lender that (a) has failed to (i) fund all or any portion of its Loans within two (2) Business Days of the date such Loans were required to be funded hereunder unless such Lender notifies the Administrative Agent and the Borrower in writing that such failure is the result of such Lender's good faith determination that one or more conditions precedent to funding (each of which conditions precedent, together with any applicable default, shall be specifically identified in such writing) has not been satisfied, or (ii) pay to the Administrative Agent, any L/C Issuer, the Swingline Lender or any other Lender any other amount required to be paid by it hereunder (including in respect of its participation in Letters of Credit or Swingline Loans) within two (2) Business Days of the date when due, (b) has notified the Borrower, the Administrative Agent, any L/C Issuer or the Swingline Lender in writing that it does not intend to comply with its funding obligations hereunder, or has made a public statement to that effect (unless such writing or public statement relates to such Lender's obligation to fund a Loan hereunder and states that such position is based on such Lender's good faith determination that a condition precedent to funding (which condition precedent, together with any applicable default, shall be specifically identified in such writing or public statement) cannot be satisfied), (c) has failed, within three (3) Business Days after written request by the Administrative Agent or the Borrower, to confirm in writing to the Administrative Agent and the Borrower that it will comply with its prospective funding obligations hereunder (provided that such Lender shall cease to be a Defaulting Lender pursuant to this clause (c) upon receipt of such written confirmation by the Administrative Agent and the Borrower), or (d) has, or has a direct or indirect parent company that has, (i) become the subject of a proceeding under any Debtor Relief Law, (ii) had appointed for it a receiver, custodian, conservator, trustee, administrator, assignee for the benefit of creditors or similar Person charged with reorganization or liquidation of its business or assets, including the Federal Deposit Insurance Corporation or any other state or federal regulatory authority acting in such a capacity or (iii) become the subject of a Bail-In Action; provided that a Lender shall not be a Defaulting Lender solely by virtue of the ownership or acquisition of any Equity Interest in that Lender or any direct or indirect parent company thereof by a Governmental Authority so long as such ownership interest does not result in or provide such Lender with immunity from the jurisdiction of courts within the United States or from the enforcement of judgments or writs of attachment on its assets or permit such Lender (or such Governmental Authority) to reject, repudiate, disavow or disaffirm any contracts or agreements made with such Lender. Any determination by the Administrative Agent that a Lender is a Defaulting Lender under any one or more of clauses (a) through (d) above, and the effective date of such status, shall be conclusive and binding absent manifest error, and such Lender shall be deemed to be a Defaulting Lender (subject to Section 2.15(b)) as of the date established therefor by the Administrative Agent in a written notice of such determination, which shall be delivered by the Administrative Agent to the Borrower, the L/C Issuers, the Swingline Lender and each other Lender promptly following such determination.

" Designated Jurisdiction " means any country or territory to the extent that such country or territory is the subject of comprehensive Sanctions.

" Disposition " or " Dispose " means the sale, transfer, license, lease or other disposition (including any Sale and Leaseback Transaction) of any property by any Loan Party or any Restricted Subsidiary, including any sale, assignment, transfer or other disposal, with or without recourse, of any notes or accounts receivable or any rights and claims associated therewith, but excluding any Involuntary Disposition.

" Disqualified Institution " means, on any date, (a) any Person set forth on Schedule 11.06, (b) competitors of the Borrower or any of its Subsidiaries which have been designated by the Borrower as a "Disqualified Institution" by written notice to the Administrative Agent and the Lenders, (c) any Affiliate of any such Person identified in clauses (a) and (b) to the extent such Affiliate is either (i) clearly identifiable on the basis of its name or (ii) designated by the Borrower as a "Disqualified Institution" by written notice to the Administrative Agent and the Lenders; provided that (1) no Person shall be a Disqualified Institution hereunder pursuant to clauses (b) or (c)(ii) until a period of two (2) Business Days has elapsed after the date on which such written designation with respect to such Person shall have been posted to the Platform and (2) "Disqualified Institutions" shall exclude (x) any bona fide fixed income investors, banks (or similar financial institutions) and debt funds and (y) any Person that the Borrower has designated as no longer being a "Disqualified Institution" by written notice delivered to the Administrative Agent and the Lenders from time to time.

" Disqualified Stock " shall mean, with respect to any Person, any Equity Interests of such Person that, by its terms (or by the terms of any security or other Equity Interest into which it is convertible or for which it is exchangeable) or upon the happening of any event or condition or pursuant to any agreement, (a) matures or is mandatorily redeemable (other than solely for Qualified Stock), pursuant to a sinking fund obligation or otherwise (except as a result of a Change of Control or asset sale so long as any rights of the holders thereof upon the occurrence of a Change of Control or asset sale event shall be subject to the prior occurrence of the Facility Termination Date), (b) is redeemable at the option of the holder thereof (other than solely for Qualified Stock) (except as a result of a Change of Control or asset sale so long as any rights of the holders thereof upon the occurrence of a Change of Control or asset sale event shall be subject to the prior occurrence of the Facility Termination Date), in whole or in part, (c) provides for the scheduled mandatory payments of dividends in cash or (d) is or may be convertible into or exchangeable for Indebtedness or any other Equity Interest that would constitute Disqualified Stock, in each case, prior to the date that is ninety-one (91) days after the Maturity Date; provided , that Equity Interests issued pursuant to a plan for the benefit of employees of Borrower or its Subsidiaries or by any such plan to such employees shall not constitute Disqualified Stock solely because it may be required to be repurchased by Borrower or its Subsidiaries in order to satisfy applicable statutory or regulatory obligations.

" Dollar " and " $ " mean lawful money of the United States.

" Dollar Equivalent " means, at any time, (a) with respect to any amount denominated in Dollars, such amount, and (b) with respect to any amount denominated in any Alternative Currency, the equivalent amount thereof in Dollars as determined by the Administrative Agent or the applicable

L/C Issuer, as the case may be, at such time on the basis of the Spot Rate (determined in respect of the most recent Revaluation Date) for the purchase of Dollars with such Alternative Currency.

" Domestic Subsidiary " means any Subsidiary that is organized under the laws of any political subdivision of the United States.

" DQ List " has the meaning specified in Section 11.06(h)(iv).

" EEA Financial Institution " means (a) any credit institution or investment firm established in any EEA Member Country which is subject to the supervision of an EEA Resolution Authority, (b) any entity established in an EEA Member Country which is a parent of an institution described in clause (a) of this definition, or (c) any financial institution established in an EEA Member Country which is a Subsidiary of an institution described in clauses (a) or (b) of this definition and is subject to consolidated supervision with its parent.

" EEA Member Country " means any of the member states of the European Union, Iceland, Liechtenstein, and Norway.

" EEA Resolution Authority " means any public administrative authority or any Person entrusted with public administrative authority of any EEA Member Country (including any delegee) having responsibility for the resolution of any EEA Financial Institution.

" Eligible Assignee " means any Person that meets the requirements to be an assignee under Section 11.06 (subject to such consents, if any, as may be required under Section 11.06(b)(iii)). For the avoidance of doubt, any Disqualified Institution is subject to Section 11.06(h).

" Eligible Currency " means any lawful currency other than Dollars that is readily available, freely transferable and convertible into Dollars in the international interbank market available to the Lenders in such market and as to which a Dollar Equivalent may be readily calculated. If, after the designation by the Lenders of any currency as an Alternative Currency, any change in currency controls or exchange regulations or any change in the national or international financial, political or economic conditions are imposed in the country in which such currency is issued, results in, in the reasonable opinion of the Administrative Agent or the L/C Issuers (in the case of any Letter of Credit to be denominated in an Alternative Currency), (a) such currency no longer being readily available, freely transferable and convertible into Dollars, (b) a Dollar Equivalent no longer being readily calculable with respect to such currency, (c) providing such currency is no longer practicable for the Lenders in their reasonable business judgment or (d) such currency no longer a currency in which the L/C Issuers are willing to make such Credit Extensions in their reasonable business judgment (each of (a), (b), (c), and (d) a " Disqualifying Event "), then the Administrative Agent shall promptly notify the Lenders and the Borrower, and such country's currency shall no longer be an Alternative Currency until such time as the Disqualifying Event(s) no longer exist.

" Environmental Laws " means any and all federal, state, local, and foreign statutes, laws, regulations, ordinances, rules, judgments, orders, decrees, Environmental Permits, concessions, grants, franchises, licenses, agreements or enforceable governmental restrictions relating to

pollution and the protection of the environment or the release of any Hazardous Materials into the environment or into public waste management systems.

" Environmental Liability " means any liability, contingent or otherwise (including any liability for damages, costs of environmental remediation, fines, penalties or indemnities), of the Borrower, any other Loan Party or any of their respective Subsidiaries directly or indirectly resulting from or based upon (a) violation of any Environmental Law, (b) the generation, use, handling, transportation, storage, treatment or disposal of any Hazardous Materials, (c) exposure to any Hazardous Materials, (d) the release or threatened release of any Hazardous Materials into the environment or (e) any contract, agreement or other consensual arrangement pursuant to which liability is assumed or imposed with respect to any of the foregoing.

" Environmental Permit " means any permit, approval, identification number, license or other authorization required under any Environmental Law.

" Equity Interests " means, with respect to any Person, all of the shares of capital stock of (or other ownership or profit interests in) such Person, all of the warrants, options or other rights for the purchase or acquisition from such Person of shares of capital stock of (or other ownership or profit interests in) such Person, all of the securities convertible into or exchangeable for shares of capital stock of (or other ownership or profit interests in) such Person or warrants, rights or options for the purchase or acquisition from such Person of such shares (or such other interests), and all of the other ownership or profit interests in such Person (including partnership, member or trust interests therein), whether voting or nonvoting, and whether or not such shares, warrants, options, rights or other interests are outstanding on any date of determination, provided , however , that Convertible Bond Indebtedness which is permitted under Section 7.02 and convertible into or exchangeable or exercisable for any Equity Interests and Capped Call Transactions, Convertible Bond Hedge Transactions and Warrant Transactions entered into as a part of, or in connection with, an issuance of such Convertible Bond Indebtedness shall not be deemed an Equity Interest hereunder prior to the actual conversion or exercise thereof in full (or, in the case of a partial conversion, the applicable portion thereof) into shares of capital stock of (or other ownership or profit interests in) such Person.

" ERISA " means the Employee Retirement Income Security Act of 1974.

" ERISA Affiliate " means any trade or business (whether or not incorporated) under common control with the Borrower within the meaning of Section 414(b) or (c) of the Code (and Sections 414(m) and (o) of the Code for purposes of provisions relating to Section 412 of the Code).

" ERISA Event " means (a) a Reportable Event with respect to a Pension Plan; (b) the withdrawal of the Borrower or any ERISA Affiliate from a Pension Plan subject to Section 4063 of ERISA during a plan year in which such entity was a "substantial employer" as defined in Section 4001(a)(2) of ERISA or a cessation of operations that is treated as such a withdrawal under Section 4062(e) of ERISA; (c) a complete or partial withdrawal by the Borrower or any ERISA Affiliate from a Multiemployer Plan or notification that a Multiemployer Plan is in reorganization; (d) the filing of a notice of intent to terminate, the treatment of a Pension Plan amendment as a termination under Section 4041 or 4041A of ERISA; (e) the institution by the PBGC of proceedings to terminate a Pension Plan; (f) any event or condition which constitutes grounds under Section 4042 of ERISA

for the termination of, or the appointment of a trustee to administer, any Pension Plan; (g) the determination that any Pension Plan is considered an at-risk plan or a plan in endangered or critical status within the meaning of Sections 430, 431 and 432 of the Code or Sections 303, 304 and 305 of ERISA; (h) the imposition of any liability under Title IV of ERISA, other than for PBGC premiums due but not delinquent under Section 4007 of ERISA, upon the Borrower or any ERISA Affiliate or (i) a failure by the Borrower or any ERISA Affiliate to meet all applicable requirements under the Pension Funding Rules in respect of a Pension Plan, whether or not waived, or the failure by the Borrower or any ERISA Affiliate to make any required contribution to a Multiemployer Plan.

" EU Bail-In Legislation Schedule " means the EU Bail-In Legislation Schedule published by the Loan Market Association (or any successor person), as in effect from time to time.

" Euro " and " € " mean the single currency of the Participating Member States.

" Eurodollar Rate " means:

(a) for any Interest Period with respect to a Eurodollar Rate Loan, the rate per annum equal to the London Interbank Offered Rate (" LIBOR "), or a comparable or successor rate which rate is approved by the Administrative Agent, as published on the applicable Bloomberg screen page (or such other commercially available source providing such quotations as may be designated by the Administrative Agent in its reasonable discretion from time to time) (in such case, the " LIBOR Rate ") at or about 11:00 a.m., London time, two (2) Business Days prior to the commencement of such Interest Period, for Dollar deposits (for delivery on the first day of such Interest Period) with a term equivalent to such Interest Period; and

(b) for any interest calculation with respect to a Base Rate Loan on any date, the rate per annum equal to the LIBOR Rate, at or about 11:00 a.m., London time, two (2) Business Days prior to such date for Dollar deposits with a term of one (1) month commencing that day;

provided that: (i) to the extent a comparable or successor rate is approved by the Administrative Agent in its reasonable discretion in connection herewith, the approved rate shall be applied in a manner consistent with market practice; provided , further that to the extent such market practice is not administratively feasible for the Administrative Agent, such approved rate shall be applied in a manner as otherwise reasonably determined by the Administrative Agent and (ii) if the Eurodollar Rate shall be less than zero, such rate shall be deemed zero for purposes of this Agreement.

" Eurodollar Rate Loan " means a Revolving Loan that bears interest at a rate based on clause (a) of the definition of "Eurodollar Rate."

" Event of Default " has the meaning specified in Section 8.01.

" Excluded Property " has the meaning set forth in the Security Agreement.

" Excluded Subsidiary " shall mean (a) each Foreign Subsidiary, (b) each CFC, (c) each Immaterial Domestic Subsidiary, (d) each Subsidiary that is not a Wholly Owned Subsidiary (for so long as such Subsidiary remains a non-Wholly Owned Subsidiary), (e) each Subsidiary that is prohibited from Guaranteeing or granting Liens to secure the applicable Obligations by any applicable Law or, by any agreement or other undertaking to which such Subsidiary is a party (with any Person, other than any Affiliate) or by which its property or assets is bound existing on the Closing Date, to the extent disclosed on Schedule 7.09 (or, with respect to any Subsidiary acquired by the Borrower or a Restricted Subsidiary after the Closing Date (and so long as such agreement or other undertaking is not with any Affiliate, was not incurred in contemplation of such Acquisition and is disclosed to the Administrative Agent), on the date such Subsidiary is so acquired) or that would require consent, approval, license or authorization of a Governmental Authority to Guarantee or grant Liens to secure the Obligations (unless (x) such consent, approval, license or authorization has been received or (y) such prohibition or restriction is terminated or rendered unenforceable or otherwise deemed ineffective by any other applicable Law), (f) each Unrestricted Subsidiary, (g) each Massachusetts Security Corporation and (h) any other Subsidiary with respect to which, in the reasonable judgment of the Administrative Agent in consultation with the Borrower (which shall, if requested by the Borrower, be confirmed in writing to the Borrower), the cost or other consequences (including adverse tax consequences) of providing a Guarantee shall be excessive in view of the benefits to be obtained by the Lenders therefrom.

" Excluded Swap Obligation " means, with respect to any Loan Party, any Swap Obligation if, and to the extent that, all or a portion of the Guaranty of such Loan Party of, or the grant by such Loan Party of a Lien to secure, such Swap Obligation (or any Guarantee thereof) is or becomes illegal under the Commodity Exchange Act or any rule, regulation or order of the Commodity Futures Trading Commission (or the application or official interpretation thereof) by virtue of such Loan Party's failure for any reason to constitute an "eligible contract participant" as defined in the Commodity Exchange Act (determined after giving effect to Section 10.11 and any other "keepwell, support or other agreement for the benefit of such Loan Party and any and all guarantees of such Loan Party's Swap Obligations by other Loan Parties) at the time the Guaranty of such Loan Party, or grant by such Loan Party of a Lien, becomes effective with respect to such Swap Obligation. If a Swap Obligation arises under a Master Agreement governing more than one Swap Contract, such exclusion shall apply only to the portion of such Swap Obligation that is attributable to Swap Contracts for which such Guaranty or Lien is or becomes excluded in accordance with the first sentence of this definition.

" Excluded Taxes " means any of the following Taxes imposed on or with respect to any Recipient or required to be withheld or deducted from a payment to a Recipient, (a) Taxes imposed on or measured by net income (however denominated), franchise Taxes, and branch profits Taxes, in each case, (i) imposed as a result of such Recipient being organized under the laws of, or having its principal office or, in the case of any Lender, its Lending Office located in, the jurisdiction imposing such Tax (or any political subdivision thereof) or (ii) that are Other Connection Taxes, (b) in the case of a Lender, U.S. federal withholding Taxes imposed on amounts payable to or for the account of such Lender with respect to an applicable interest in a Loan or Revolving Commitment pursuant to a law in effect on the date on which (i) such Lender acquires such interest in the Loan or Revolving Commitment (other than pursuant to an assignment request by the Borrower under

Section 11.13) or (ii) such Lender changes its Lending Office, except in each case to the extent that, pursuant to Section 3.01(a)(ii), (a)(iii) or (c), amounts with respect to such Taxes were payable either to such Lender's assignor immediately before such Lender became a party hereto or to such Lender immediately before it changed its Lending Office, (c) Taxes attributable to such Recipient's failure to comply with Section 3.01(e) and (d) any U.S. federal withholding Taxes imposed pursuant to FATCA.

" Existing Credit Agreement " means that certain Credit Agreement, dated as of July 9, 2014, among the Borrower, Macquarie US Trading LLC, as administrative agent, and a syndicate of lenders, as amended.

" Existing Letters of Credit " means those certain letters of credit set forth on Schedule 1.01(d).

" Facility Termination Date " means the date as of which all of the following shall have occurred: (a) the Aggregate Revolving Commitments have terminated, (b) all Obligations have been paid in full (other than contingent indemnification and contingent expense reimbursement obligations), and (c) all Letters of Credit have terminated or expired (other than Letters of Credit that have been Cash Collateralized or as to which other arrangements with respect thereto satisfactory to the Administrative Agent and the applicable L/C Issuer shall have been made).

" Fair Market Value " shall mean, with respect to any asset or property, the price, as determined in good faith by the Borrower, that could be negotiated in an arms'-length transaction between a willing seller and a willing buyer, neither of whom is under undue pressure or compulsion to complete the transaction.

" FASB ASC " means the Accounting Standards Codification of the Financial Accounting Standards Board.

" FATCA " means Sections 1471 through 1474 of the Code, as of the date of this Agreement (or any amended or successor version that is substantively comparable and not materially more onerous to comply with), any current or future regulations or official interpretations thereof and any agreements entered into pursuant to Section 1471(b)(1) of the Code.

" Federal Funds Rate " means, for any day, the rate per annum equal to the weighted average of the rates on overnight federal funds transactions with members of the Federal Reserve System, as published by the Federal Reserve Bank of New York on the Business Day next succeeding such day; provided that (a) if such day is not a Business Day, the Federal Funds Rate for such day shall be such rate on such transactions on the next preceding Business Day as so published on the next succeeding Business Day, and (b) if no such rate is so published on such next succeeding Business Day, the Federal Funds Rate for such day shall be the average rate (rounded upward, if necessary, to a whole multiple of 1/100 of 1%) charged to Bank of America on such day on such transactions as determined by the Administrative Agent.

" Fee Letter " means, collectively, (a) the fee letter, dated as of August 23, 2016, between the Borrower, the Administrative Agent and MLPFS and (b) the fee letter, dated September 9, 2016,

between the Borrower, SunTrust Bank and SunTrust Robinson Humphrey, Inc., in each case, in connection with this Agreement and the other Loan Documents.

" Foreign Government Scheme or Arrangement " has the meaning specified in Section 5.12(e).

" Foreign Lender " means (a) if the Borrower is a U.S. Person, a Lender that is not a U.S. Person, and (b) if the Borrower is not a U.S. Person, a Lender that is resident or organized under the laws of a jurisdiction other than that in which the Borrower is resident for tax purposes. For purposes of this definition, the United States, each State thereof and the District of Columbia shall be deemed to constitute a single jurisdiction.

" Foreign Plan " has the meaning specified in Section 5.12(e).

" Foreign Subsidiary " means any Subsidiary that is not a Domestic Subsidiary.

" FRB " means the Board of Governors of the Federal Reserve System of the United States.

" Fronting Exposure " means, at any time there is a Defaulting Lender, (a) with respect to the L/C Issuers, such Defaulting Lender's Applicable Percentage of the outstanding L/C Obligations other than L/C Obligations as to which such Defaulting Lender's participation obligation has been reallocated to other Revolving Lenders or Cash Collateralized in accordance with the terms hereof, and (b) with respect to the Swingline Lender, such Defaulting Lender's Applicable Percentage of Swingline Loans other than Swingline Loans as to which such Defaulting Lender's participation obligation has been reallocated to other Revolving Lenders or Cash Collateralized in accordance with the terms hereof.

" Fund " means any Person (other than a natural Person) that is (or will be) engaged in making, purchasing, holding or otherwise investing in commercial loans and similar extensions of credit in the ordinary course of its activities.

" Funding Indemnity Letter " means a funding indemnity letter, substantially in the form of Exhibit L .

" GAAP " means generally accepted accounting principles in the United States set forth from time to time in the opinions and pronouncements of the Accounting Principles Board and the American Institute of Certified Public Accountants and statements and pronouncements of the Financial Accounting Standards Board (or agencies with similar functions of comparable stature and authority within the accounting profession) including, without limitation, the FASB Accounting Standards Codification, that are applicable to the circumstances as of the date of determination, consistently applied and subject to Section 1.03.

" Governmental Authority " means the government of the United States or any other nation, or of any political subdivision thereof, whether state or local, and any agency, authority, instrumentality, regulatory body, court, central bank or other entity exercising executive, legislative, judicial, taxing, regulatory or administrative powers or functions of or pertaining to government

(including, the Financial Conduct Authority, the Prudential Regulation Authority and any supra-national bodies such as the European Union or the European Central Bank).

" Guarantee " means, as to any Person, (a) any obligation, contingent or otherwise, of such Person guaranteeing or having the economic effect of guaranteeing any Indebtedness of the kind described in clauses (a) through (g) of the definition thereof or other obligation payable or performable by another Person (the " primary obligor ") in any manner, whether directly or indirectly, and including any obligation of such Person, direct or indirect, (i) to purchase or pay (or advance or supply funds for the purchase or payment of) such Indebtedness or other obligation, (ii) to purchase or lease property, securities or services for the purpose of assuring the obligee in respect of such Indebtedness or other obligation of the payment or performance of such Indebtedness or other obligation, (iii) to maintain working capital, equity capital or any other financial statement condition or liquidity or level of income or cash flow of the primary obligor so as to enable the primary obligor to pay such Indebtedness or other obligation, or (iv) entered into for the purpose of assuring in any other manner the obligee in respect of such Indebtedness or other obligation of the payment or performance thereof or to protect such obligee against loss in respect thereof (in whole or in part), or (b) any Lien on any assets of such Person securing any Indebtedness of the kind described in clauses (a) through (g) of the definition thereof or other obligation of any other Person, whether or not such Indebtedness or other obligation is assumed or expressly undertaken by such Person (or any right, contingent or otherwise, of any holder of such Indebtedness to obtain any such Lien). The amount of any Guarantee shall be deemed to be an amount equal to the stated or determinable amount of the related primary obligation, or portion thereof, in respect of which such Guarantee is made or, if not stated or determinable, the maximum reasonably anticipated liability in respect thereof as determined by the guaranteeing Person in good faith. The term " Guarantee " as a verb has a corresponding meaning.

" Guaranteed Obligations " has the meaning set forth in Section 10.01.

" Guarantors " means, collectively, (a) the Subsidiary Guarantors, in each case, unless and until such Person ceases to be a Subsidiary Guarantor in accordance with the terms hereof, and (b) with respect to Additional Secured Obligations owing by any Loan Party or any of its Subsidiaries and any Swap Obligation of a Specified Loan Party (determined before giving effect to Sections 10.01 and 10.11) under the Guaranty, the Borrower.

" Guaranty " means, collectively, the Guarantee made by the Guarantors under Article X in favor of the Secured Parties, together with each other guaranty delivered pursuant to Section 6.13.

" Hazardous Materials " means all explosive or radioactive substances or wastes and all hazardous or toxic substances, wastes or other pollutants, including petroleum or petroleum distillates, natural gas, natural gas liquids, asbestos or asbestos-containing materials, polychlorinated biphenyls, radon gas, toxic mold, infectious or medical wastes and all other substances, wastes, chemicals, pollutants, contaminants or compounds of any nature in any form regulated pursuant to any Environmental Law.

" Hedge Bank " means any Person in its capacity as a party to a Swap Contract that, (a) at the time it enters into a Swap Contract, is a Lender or an Affiliate of a Lender, or (b) at the time it

(or its Affiliate) becomes a Lender, is a party to a Swap Contract, in each case, in its capacity as a party to such Swap Contract (even if such Person ceases to be a Lender or such Person's Affiliate ceased to be a Lender); provided , that for any of the foregoing to be included as a "Secured Hedge Agreement" on any date of determination by the Administrative Agent, the applicable Hedge Bank (other than the Administrative Agent or an Affiliate of the Administrative Agent) must have delivered a Secured Party Designation Notice to the Administrative Agent prior to such date of determination.

" Hepatitis C Drug Franchise " means (1) Incivek (telaprevir), for use in treating patients with hepatitis C, and (2) all proceeds, other assets and business operations related thereto.

" Honor Date " has the meaning set forth in Section 2.03(c).

" IFRS " means international accounting standards within the meaning of IAS Regulation 1606/2002 to the extent applicable to the relevant financial statements delivered under or referred to herein.

" Immaterial Subsidiary " means (i) each Domestic Subsidiary that is not a Material Domestic Subsidiary and (ii) each Foreign Subsidiary that is not a Material Foreign Subsidiary.

" Increasing Revolving Lender " has the meaning specified in Section 2.16(a) .

" Incremental Revolving Facility " has the meaning specified in Section 2.16(a) .

" Indebtedness " means, as to any Person at a particular time, without duplication, all of the following, whether or not included as indebtedness or liabilities in accordance with GAAP:

(a) all obligations of such Person for borrowed money and all obligations of such Person evidenced by bonds, debentures, notes, loan agreements or other similar instruments;

(b) the maximum amount of all direct or contingent obligations of such Person arising under letters of credit (including standby and commercial), bankers' acceptances, bank guaranties, surety bonds and similar instruments;

(c) net obligations of such Person under any Swap Contract;

(d) all obligations (including, without limitation, earnouts, milestone payments, royalty payments, working capital adjustments, all R&D Collaboration Payments and other contingent obligations) of such Person to pay the deferred purchase price of property or services (other than (i) trade accounts payable in the ordinary course of business, including recurring royalty payments reflected in the cost of goods sold and (ii) earnouts, milestone payments, royalty payments, working capital adjustments, R&D Collaboration Payments and other contingent obligations that are not required to be, and are not, classified as liabilities on the financial statements of the Borrower and its Restricted Subsidiaries in accordance with GAAP);

(e) indebtedness (excluding prepaid interest thereon) secured by a Lien on property owned or being purchased by such Person (including indebtedness arising under conditional sales or other title retention agreements), whether or not such indebtedness shall have been assumed by such Person or is limited in recourse; provided that the amount of such indebtedness that is non-recourse to the Loan Parties or their Restricted Subsidiaries shall be the lesser of (A) the Fair Market Value of such property at such date of determination as determined in good faith by such Person, and (B) the aggregate unpaid amount of such indebtedness;

(f) all Attributable Indebtedness of such Person;

(g) all obligations of such Person to purchase, redeem, retire, defease or otherwise make any payment in respect of any Equity Interest in such Person or any other Person or any warrant, right or option to acquire such Equity Interest, valued, in the case of a redeemable preferred interest, at the greater of its voluntary or involuntary liquidation preference plus accrued and unpaid dividends; and

(h) all Guarantees of such Person in respect of any of the foregoing.

For all purposes hereof, the Indebtedness of any Person shall include the Indebtedness of any partnership or joint venture (other than a joint venture that is itself a corporation or limited liability company) in which such Person is a general partner or a joint venturer, unless such Indebtedness is expressly made non-recourse to such Person. The amount of any net obligation under any Swap Contract on any date shall be deemed to be the Swap Termination Value thereof as of such date.

" Indemnified Taxes " means (a) Taxes, other than Excluded Taxes, imposed on or with respect to any payment made by or on account of any obligation of any Loan Party under any Loan Document and (b) to the extent not otherwise described in clause (a), Other Taxes.

" Indemnitees " has the meaning specified in Section 11.04(b).

" Information " has the meaning specified in Section 11.07.

" Intellectual Property " has the meaning set forth in the Security Agreement.

" Intercompany Debt " has the meaning specified in Section 7.02.

" Intercompany Royalty Agreement " means (i) Buy-In License Agreement (VX-770 and VX-809), effective October 1, 2010, by and between the Borrower and Vertex Europe (as successor in interest to Vertex Pharmaceuticals (Cayman) Limited), and (ii) Buy-In License Agreement (VX-661), effective September 1, 2012, by and between the Borrower and Vertex Europe (as successor in interest to Vertex Pharmaceuticals (Cayman) Limited) (including, for the avoidance of any doubt, any renewal, successor or replacement agreement of any of the foregoing).

" Intercompany Subordination Agreement " means, collectively, each subordination agreement by and among the Administrative Agent, the Loan Parties and their Restricted

Subsidiaries, each in form and substance reasonably satisfactory to the Administrative Agent and pursuant to which each of the Loan Parties and their Restricted Subsidiaries agree to subordinate any intercompany Indebtedness owed by any Loan Party to any such Person that is not a Loan Party to the prior payment of all Secured Obligations under the Loan Documents.

" Interest Payment Date " means, (a) as to any Eurodollar Rate Loan, the last day of each Interest Period applicable to such Loan and the Maturity Date; provided, however, that if any Interest Period for a Eurodollar Rate Loan exceeds three (3) months, the respective dates that fall every three (3) months after the beginning of such Interest Period shall also be Interest Payment Dates; and (b) as to any Base Rate Loan or Swingline Loan, the last Business Day of each March, June, September and December and the Maturity Date.

" Interest Period " means, as to each Eurodollar Rate Loan, the period commencing on the date such Eurodollar Rate Loan is disbursed or converted to or continued as a Eurodollar Rate Loan and ending on the date one (1), two (2), three (3) or six (6) months thereafter (in each case, subject to availability), as selected by the Borrower in its Loan Notice, or such other period that is twelve (12) months or less requested by the Borrower (in each case, subject to availability) and consented to by all of the Appropriate Lenders; provided that :

(a) any Interest Period that would otherwise end on a day that is not a Business Day shall be extended to the next succeeding Business Day unless such Business Day falls in another calendar month, in which case such Interest Period shall end on the next preceding Business Day;

(b) any Interest Period that begins on the last Business Day of a calendar month (or on a day for which there is no numerically corresponding day in the calendar month at the end of such Interest Period) shall end on the last Business Day of the calendar month at the end of such Interest Period; and

(c) no Interest Period shall extend beyond the Maturity Date.

" Investment " means (a) as to any Person, any direct or indirect acquisition or investment by such Person, whether by means of (i) the purchase or other acquisition of Equity Interests of another Person, (ii) a loan, advance or capital contribution to, Guarantee or assumption of debt of, or purchase or other acquisition of any other debt or interest in, another Person (including any partnership or joint venture interest in such other Person and any arrangement pursuant to which the investor guaranties Indebtedness of such other Person), or (iii) the purchase or other acquisition (in one transaction or a series of transactions) of assets of another Person which constitute all or substantially all of the assets of such Person or of a division, line of business or other business unit of such Person or (b) any R&D Collaboration Payment. For purposes of covenant compliance, the amount of any Investment shall be the amount actually invested (without adjustment for subsequent increases or decreases in the value of such Investment).

" Investment Policy " means the investment policy of the Borrower and its Subsidiaries approved and duly adopted by the board of directors (or other governing body, including any

authorized committee of the board of directors) of the Borrower, as in effect on the Closing Date (or as otherwise approved by such board of directors or governing body from time to time).

" Involuntary Disposition " means any loss of, damage to or destruction of, or any condemnation or other taking for public use of, any property of any Loan Party or any Subsidiary.

" IP Rights " has the meaning specified in Section 5.22.

" IRS " means the United States Internal Revenue Service.

" ISP " means, with respect to any Letter of Credit, the "International Standby Practices 1998" published by the Institute of International Banking Law & Practice, Inc. (or such later version thereof as may be in effect at the time of issuance).

" Issuer Documents " means with respect to any Letter of Credit, the Letter of Credit Application, and any other document, agreement and instrument entered into by an L/C Issuer and the Borrower (or any Restricted Subsidiary) or in favor of such L/C Issuer and relating to such Letter of Credit.

" Joinder Agreement " means a joinder agreement substantially in the form of Exhibit D executed and delivered in accordance with the provisions of Section 6.13.

" Judgment Currency " has the meaning specified in Section 11.21.

" Landlord Waiver " means a landlord waiver substantially in the form of Exhibit M .

" Laws " means, collectively, all international, foreign, federal, state and local statutes, treaties, rules, guidelines, regulations, ordinances, codes and administrative or judicial precedents or authorities, including the interpretation or administration thereof by any Governmental Authority charged with the enforcement, interpretation or administration thereof, and all applicable administrative orders, directed duties, requests, licenses, authorizations and permits of, and agreements with, any Governmental Authority, in each case whether or not having the force of law.

" L/C Advance " means, with respect to each Revolving Lender, such Lender's funding of its participation in any L/C Borrowing in accordance with its Applicable Revolving Percentage. All L/C Advances shall be denominated in Dollars.

" L/C Borrowing " means an extension of credit resulting from a drawing under any Letter of Credit which has not been reimbursed on the date when made or refinanced as a Revolving Borrowing. All L/C Borrowings shall be denominated in Dollars.

" L/C Credit Extension " means, with respect to any Letter of Credit, the issuance thereof or extension of the expiry date thereof, or the increase of the amount thereof.

" L/C Issuer " means with respect to a particular Letter of Credit, (a) Bank of America, through itself or through one of its designated Affiliates or branch offices, in its capacity as issuer of such Letter of Credit, or any successor issuer thereof, (b) such other Lender selected by the Borrower

(that is reasonably acceptable to the Administrative Agent) pursuant to Section 2.03(l) from time to time to issue such Letter of Credit (provided that no Lender shall be required to become an L/C Issuer pursuant to this subclause (b) without such Lender's consent), or any successor issuer thereof or (c) any Lender selected by the Borrower (that is reasonably acceptable to the Administrative Agent) to replace a Lender who is a Defaulting Lender at the time of such Lender's appointment as an L/C Issuer (provided that no Lender shall be required to become an L/C Issuer pursuant to this subclause (c) without such Lender's consent), or any successor issuer thereof.

" L/C Obligations " means, as at any date of determination, the Dollar Equivalent of the aggregate amount (a) available to be drawn under all outstanding Letters of Credit plus (b) of all Unreimbursed Amounts (including all L/C Borrowings). For purposes of computing the amount available to be drawn under any Letter of Credit, the amount of such Letter of Credit shall be determined in accordance with Section 1.06. For all purposes of this Agreement, if on any date of determination a Letter of Credit has expired by its terms but any amount may still be drawn thereunder by reason of the operation of Rule 3.14 of the ISP, such Letter of Credit shall be deemed to be "outstanding" in the amount so remaining available to be drawn.

" Lease Restructuring Expenses " means, collectively, the amount by which the aggregate rental expense exceeds the sublease rental income from the leased real properties of the Borrower located at (a) 675 W. Kendall St., Cambridge, MA and (b) other locations where similar sublease real property arrangements are entered into by the Borrower or any of its Restricted Subsidiaries from time to time.

" Lender " means each of the Persons identified as a "Lender" on the signature pages hereto, each other Person that becomes a "Lender" in accordance with this Agreement and, their successors and assigns and, unless the context requires otherwise, includes the Swingline Lender.

" Lending Office " means, as to the Administrative Agent, any L/C Issuer or any Lender, the office or offices of such Person described as such in such Person's Administrative Questionnaire, or such other office or offices as such Person may from time to time notify the Borrower and the Administrative Agent; which office may include any Affiliate of such Person or any domestic or foreign branch of such Person or such Affiliate.

" Letter of Credit " means any letter of credit issued hereunder and shall include the Existing Letters of Credit. A Letter of Credit may be a commercial letter of credit or a standby letter of credit. Letters of Credit may be issued in Dollars or in an Alternative Currency.

" Letter of Credit Application " means an application and agreement for the issuance or amendment of a Letter of Credit in the form from time to time in use by the applicable L/C Issuer.

" Letter of Credit Expiration Date " means the day that is seven (7) days prior to the Maturity Date (or, if such day is not a Business Day, the next preceding Business Day).

" Letter of Credit Fee " has the meaning specified in Section 2.03(h).

" Letter of Credit Report " means a certificate substantially in the form of Exhibit P or any other form approved by the Administrative Agent.

" Letter of Credit Sublimit " means an amount equal to the lesser of (a) $50,000,000 and (b) the Aggregate Revolving Commitments. The Letter of Credit Sublimit is part of, and not in addition to, the Revolving Facility.

" LIBOR " has the meaning specified in the definition of Eurodollar Rate.

" Lien " means any mortgage, pledge, hypothecation, collateral assignment, collateral deposit arrangement, encumbrance, lien (statutory or otherwise), charge, or similar preference, priority or other security interest or preferential arrangement in the nature of a security interest of any kind or nature whatsoever (including any conditional sale or other title retention agreement, any easement, right of way or other encumbrance on title to real property and any financing lease having substantially the same economic effect as any of the foregoing but excluding precautionary liens and filings made in respect of operating leases and assets subject thereto).

" Loan " means an extension of credit by a Lender to the Borrower under Article II in the form of a Revolving Loan or a Swingline Loan.

" Loan Documents " means, collectively, (a) this Agreement, (b) the Revolving Notes, (c) the Guaranty, (d) the Collateral Documents, (e) the Fee Letter, (f) each Issuer Document, (g) each Joinder Agreement, (h) any agreement creating or perfecting rights in Cash Collateral pursuant to the provisions of Section 2.14, (i) each Compliance Certificate, (j) the Intercompany Subordination Agreement, (k) any other certificates, agreements, documents and instruments now or hereafter executed, acknowledged and/or delivered by or on behalf of any Loan Party pursuant to the foregoing designated as a Loan Document (but specifically excluding any Secured Hedge Agreement or any Secured Cash Management Agreement); provided , however, that for purposes of Section 11.01 , "Loan Documents" shall mean this Agreement, the Guaranty, and the Collateral Documents.

" Loan Notice " means a notice of (a) a Borrowing, (b) a conversion of Loans from one Type to the other, or (c) a continuation of Eurodollar Rate Loans, pursuant to Section 2.02(a), which shall be substantially in the form of Exhibit E or such other form as may be approved by the Administrative Agent (including any form on an electronic platform or electronic transmission system as shall be approved by the Administrative Agent), appropriately completed and signed by a Responsible Officer of the Borrower.

" Loan Parties " means, collectively, the Borrower and each Subsidiary Guarantor.

" London Banking Day " means any day on which dealings in Dollar deposits are conducted by and between banks in the London interbank Eurodollar market.

" Master Agreement " has the meaning set forth in the definition of "Swap Contract."

" Massachusetts Security Corporation " means a Person that qualifies as a Massachusetts "security corporation" under Mass. Gen. L. c. 63, §38B, but only to the extent, and during the time period, it so qualifies.

" Material Adverse Effect " means (a) a material adverse change in, or a material adverse effect upon, the operations, business, properties or financial condition of the Borrower and its Restricted Subsidiaries taken as a whole; (b) a material impairment of the enforceability of, or rights and remedies of the Administrative Agent or any Lender under, the Loan Documents; or (c) a material adverse effect upon ability of the Loan Parties to perform their obligations under the Loan Documents, taken as a whole.

" Material Domestic Subsidiary " means any Domestic Subsidiary of the Borrower that, together with its Subsidiaries, (a) generates more than $10,000,000 of revenue on a Pro Forma Basis for the four (4) fiscal quarter period most recently ended or (b) has total assets (including Equity Interests in other Subsidiaries and excluding investments that are eliminated in consolidation) equal to or greater than $10,000,000 as of the end of the most recent four (4) fiscal quarters; provided , however , that if at any time there are Domestic Subsidiaries which are not classified as "Material Domestic Subsidiaries" but which collectively (i) generate more than $100,000,000 of revenue on a Pro Forma Basis or (ii) have total assets (including Equity Interests in other Subsidiaries and excluding investments that are eliminated in consolidation) equal to or greater than $100,000,000, in each case, as of the four (4) fiscal quarter period most recently ended, then the Borrower shall promptly designate one or more of such Domestic Subsidiaries as Material Domestic Subsidiaries and cause any such Domestic Subsidiaries to comply with the provisions of Section 6.13 such that, after such Domestic Subsidiaries become Subsidiary Guarantors hereunder, the Domestic Subsidiaries that are not Guarantors shall (A) generate less than $100,000,000 of revenue for the four (4) fiscal quarter period most recently ended and (B) have total assets of less than $100,000,000, as of the four (4) fiscal quarter period most recently ended.

" Material Foreign Subsidiary " means any Foreign Subsidiary of the Borrower that, together with its Subsidiaries, (a) generates more than $10,000,000 of revenue on a Pro Forma Basis for the four (4) fiscal quarter period most recently ended or (b) has total assets (including equity interests in other Subsidiaries and excluding investments that are eliminated in consolidation) equal to or greater than $10,000,000 as of the end of the most recent four (4) fiscal quarters.

" Material Indebtedness " means any Indebtedness in an aggregate principal amount in excess of the Threshold Amount.

" Material Intellectual Property " means, as of any particular date of determination, (a) Intellectual Property that are Cystic Fibrosis Drug Franchise Assets and (b) other Intellectual Property of the Loan Parties and their Subsidiaries where the failure to maintain such Intellectual Property would reasonably be expected to have Material Adverse Effect; provided , however , that any Intellectual Property that would otherwise be considered Material Intellectual Property, which are developed or acquired by the Borrower or its Subsidiaries after the Closing Date, shall be considered to be Material Intellectual Property as of the date of determination described above.

" Maturity Date " means October 13, 2021; provided , however , that, in each case, if such date is not a Business Day, the Maturity Date shall be the next preceding Business Day.

" Measurement Period " means, at any date of determination, the most recently completed four (4) fiscal quarters of the Borrower (or, for purposes of determining Pro Forma Compliance, the most recently completed four (4) fiscal quarters of the Borrower for which financial statements have been delivered pursuant to Section 6.01).

" Medicaid " means that government-sponsored entitlement program under Title XIX, P.L. 89-97 of the Social Security Act, which provides federal grants to states for medical assistance based on specific eligibility criteria, as set forth on Section 1396, et seq. of Title 42 of the United States Code.

" Medicare " means that government-sponsored insurance program under Title XVIII, P.L. 89-97, of the Social Security Act, which provides for a health insurance system for eligible elderly and disabled individuals, as set forth at Section 1395, et seq. of Title 42 of the United States Code.

" Minimum Collateral Amount " means, at any time, (a) with respect to Cash Collateral consisting of cash or deposit account balances provided to reduce or eliminate Fronting Exposure during any period when a Lender constitutes a Defaulting Lender, an amount equal to 100% of the Fronting Exposure of the L/C Issuers with respect to Letters of Credit issued and outstanding at such time and (b) with respect to Cash Collateral consisting of cash or deposit account balances provided in accordance with the provisions of Section 2.14(a)(i), (a)(ii) or (a)(iii), an amount equal to 103% of the Outstanding Amount of all L/C Obligations.

" MLPFS " means Merrill Lynch, Pierce, Fenner & Smith Incorporated.

" Moody's " means Moody's Investors Service, Inc. and any successor thereto.

" Multiemployer Plan " means any employee benefit plan of the type described in Section 4001(a)(3) of ERISA, to which the Borrower or any ERISA Affiliate makes or is obligated to make contributions, or during the preceding five (5) plan years, has made or been obligated to make contributions.

" Multiple Employer Plan " means a Plan which has two or more contributing sponsors (including the Borrower or any ERISA Affiliate) at least two of whom are not under common control, as such a plan is described in Section 4064 of ERISA.

" Non-Consenting Lender " means any Lender that does not approve any consent, waiver or amendment that (a) requires the approval of all Lenders or all affected Lenders, or all Lenders or all affected Lenders, in accordance with the terms of Section 11.01 and (b) has been approved by the Required Lenders.

" Non-Defaulting Lender " means, at any time, each Lender that is not a Defaulting Lender at such time.

" Non-Extension Notice Date " has the meaning specified in Section 2.03(b)(iv).

" Notice of Additional L/C Issuer " means a certificate substantially in the form of Exhibit Q or any other form approved by the Administrative Agent.

" Notice of Loan Prepayment " means a notice of prepayment with respect to a Loan, which shall be substantially in the form of Exhibit O or such other form as may be reasonably approved by the Administrative Agent (including any form on an electronic platform or electronic transmission system as shall be approved by the Administrative Agent), appropriately completed and signed by a Responsible Officer.

" Obligations " means (a) all advances to, and debts, liabilities, obligations, covenants and duties of, any Loan Party arising under any Loan Document or otherwise with respect to any Loan or Letter of Credit and (b) all costs and expenses incurred in connection with enforcement and collection of the foregoing, including the fees, charges and disbursements of counsel, in each case whether direct or indirect (including those acquired by assumption), absolute or contingent, due or to become due, now existing or hereafter arising and including interest, expenses and fees that accrue after the commencement by or against any Loan Party or any Affiliate thereof pursuant to any proceeding under any Debtor Relief Laws naming such Person as the debtor in such proceeding, regardless of whether such interest, expenses and fees are allowed claims in such proceeding; provided that Obligations of a Loan Party shall exclude any Excluded Swap Obligations with respect to such Loan Party.

" OFAC " means the Office of Foreign Assets Control of the United States Department of the Treasury.

" Organization Documents " means, (a) with respect to any corporation, the certificate or articles of incorporation and the bylaws (or equivalent or comparable constitutive documents with respect to any non-U.S. jurisdiction); (b) with respect to any limited liability company, the certificate or articles of formation or organization and operating agreement or limited liability company agreement (or equivalent or comparable documents with respect to any non-U.S. jurisdiction); (c) with respect to any partnership, joint venture, trust or other form of business entity, the partnership, joint venture or other applicable agreement of formation or organization (or equivalent or comparable documents with respect to any non-U.S. jurisdiction) and (d) with respect to all entities, any agreement, instrument, filing or notice with respect thereto filed in connection with its formation or organization with the applicable Governmental Authority in the jurisdiction of its formation or organization (or equivalent or comparable documents with respect to any non-U.S. jurisdiction).

" Other Connection Taxes " means, with respect to any Recipient, Taxes imposed as a result of a present or former connection between such Recipient and the jurisdiction imposing such Tax (other than connections arising from such Recipient having executed, delivered, become a party to, performed its obligations under, received payments under, received or perfected a security interest under, engaged in any other transaction pursuant to or enforced any Loan Document, or sold or assigned an interest in any Loan or Loan Document).

" Other Taxes " means all present or future stamp, court or documentary, intangible, recording, filing or similar Taxes that arise from any payment made under, from the execution, delivery, performance, enforcement or registration of, from the receipt or perfection of a security interest

under, or otherwise with respect to, any Loan Document, except any such Taxes that are Other Connection Taxes imposed with respect to an assignment (other than an assignment made pursuant to Section 3.06).

" Outstanding Amount " means (a) Revolving Loans and Swingline Loans on any date, the aggregate outstanding principal amount thereof after giving effect to any borrowings and prepayments or repayments of Revolving Loans and Swingline Loans, as the case may be, occurring on such date; and (b) with respect to any L/C Obligations on any date, the Dollar Equivalent amount of the aggregate outstanding amount of such L/C Obligations on such date after giving effect to any L/C Credit Extension occurring on such date and any other changes in the aggregate amount of the L/C Obligations as of such date, including as a result of any reimbursements by the Borrower of Unreimbursed Amounts.

" Overnight Rate " means, for any day, (a) with respect to any amount denominated in Dollars, the greater of (i) the Federal Funds Rate and (ii) an overnight rate determined by the Administrative Agent or the applicable L/C Issuer, as the case may be, in accordance with banking industry rules on interbank compensation, and (b) with respect to any amount denominated in an Alternative Currency, an overnight rate determined by the Administrative Agent or the applicable L/C Issuer, as the case may be, in accordance with banking industry rules on interbank compensation.

" Participant " has the meaning specified in Section 11.06(d).

" Participating Member State " means any member state of the European Union that adopts or has adopted the Euro as its lawful currency in accordance with legislation of the European Union relating to Economic and Monetary Union.

" Participant Register " has the meaning specified in Section 11.06(d).

" PBGC " means the Pension Benefit Guaranty Corporation.

" Pension Funding Rules " means the rules of the Code and ERISA regarding minimum required contributions (including any installment payment thereof) to Pension Plans and set forth in Sections 412, 430, 431, 432 and 436 of the Code and Sections 302, 303, 304 and 305 of ERISA.

" Pension Plan " means any employee pension benefit plan (including a Multiple Employer Plan or a Multiemployer Plan) that is maintained or is contributed to by the Borrower and any ERISA Affiliate and is either covered by Title IV of ERISA or is subject to Pension Funding Rules.

" Perfection Certificate " means a Perfection and Information Certificate, dated as of the Closing Date, executed by the Borrower and the other Loan Parties, in form and substance reasonably satisfactory to the Administrative Agent.

" Permitted Acquisition " means an Acquisition by a Loan Party or any Restricted Subsidiary (the Person or division, line of business or other business unit of the Person to be acquired in such Acquisition shall be referred to herein as the " Target "), in each case that is a type of business (or assets used in a type of business) permitted to be engaged in by the Borrower and its Restricted

Subsidiaries pursuant to the terms of this Agreement (or another business ancillary, complementary or reasonably related thereto), in each case so long as:

(a) no Event of Default shall then exist or would exist after giving effect thereto;

(b) after giving effect to the Acquisition on a Pro Forma Basis, the Loan Parties are in Pro Forma Compliance;

(c) the Administrative Agent, on behalf of the Secured Parties, shall have received (or shall receive in connection with the closing of such Acquisition) a first priority perfected security interest in all property (including, without limitation, Equity Interests) acquired with respect to the Target to the extent required by the terms of Section 6.14 and the Target, if a Person, shall have executed a Joinder Agreement to the extent required by the terms of Section 6.13; and

(d) in the case of any Acquisition for which the Cost of Acquisition paid by or on behalf of the Borrower and its Restricted Subsidiaries exceeds $50,000,000, the Administrative Agent shall have received, on or prior to the consummation of such Acquisition, a Permitted Acquisition Certificate, executed by a Responsible Officer of the Borrower certifying that such Permitted Acquisition complies with the requirements set forth in clauses (a) through (c) above.

" Permitted Acquisition Certificate " means a certificate substantially in the form of Exhibit F or any other form approved by the Administrative Agent in its reasonable discretion.

" Permitted Liens " has the meaning set forth in Section 7.01.

" Permitted Material Acquisition " means any Permitted Acquisition for which the Cost of Acquisition is equal to or greater than $100,000,000.

" Person " means any natural person, corporation, limited liability company, trust, joint venture, association, company, partnership, Governmental Authority or other entity.

" Plan " means any employee benefit plan within the meaning of Section 3(3) of ERISA (including a Pension Plan), maintained for employees of the Borrower or any ERISA Affiliate or any such Plan to which the Borrower or any ERISA Affiliate is required to contribute on behalf of any of its employees.

" Platform " has the meaning specified in Section 6.02.

" Pledged Equity " has the meaning specified in the Security Agreement.

" Pro Forma Basis " and " Pro Forma Effect " means, for any transaction specified herein, including any Disposition (including of all or substantially all of a division or a line of business), Acquisition, or Investment, or incurrence or assumption of Indebtedness, whether actual or proposed, for purposes of determining compliance with the terms of this Agreement and the other Loan Documents (including, the financial covenants set forth in Section 7.11), each such transaction

or proposed transaction shall be given pro forma effect as if such events (including all Credit Extensions made in connection therewith) occurred on the first day of the most recent Measurement Period ended on or before the occurrence of such event, and, for the avoidance of any doubt, shall include the following pro forma adjustments:

(a) in the case of an actual or proposed Disposition or the designation of any Restricted Subsidiary as an Unrestricted Subsidiary, all income statement items (whether positive or negative) attributable to the assets or the Person subject to such Disposition or such designation shall be excluded from the results of the Borrower and its Restricted Subsidiaries for such Measurement Period to the extent occurring prior to the date of such transaction;

(b) in the case of an actual or proposed Acquisition or any Subsidiary Redesignation, income statement items (whether positive or negative) attributable to the property, line of business or the Person subject to such Acquisition or such Subsidiary Redesignation shall be included in the results of the Borrower and its Restricted Subsidiaries for such Measurement Period;

(c) interest accrued during the relevant Measurement Period on, and the principal of, any Indebtedness repaid or to be repaid or refinanced in such transaction shall be excluded from the results of the Borrower and its Restricted Subsidiaries for such Measurement Period; and

(d) any Indebtedness or Investment actually or proposed to be incurred or assumed in such transaction shall be deemed to have been incurred as of the first day of the applicable Measurement Period, and interest on any Indebtedness shall be deemed to have accrued from such day on such Indebtedness at the applicable rates provided therefor (and in the case of interest that does or would accrue at a formula or floating rate, at the rate in effect at the time of determination) and shall be included in the results of the Borrower and its Restricted Subsidiaries for such Measurement Period.

" Pro Forma Compliance " means, with respect to any transaction, such transaction complies with the financial covenants set forth in Section 7.11 after giving Pro Forma Effect, based upon the results of operations for the most recently completed Measurement Period, to (a) such transaction and (b) all other transactions (including any Credit Extensions) which are contemplated or required to be given Pro Forma Effect hereunder that have occurred on or after the first day of the relevant Measurement Period.

" Public Lender " has the meaning specified in Section 6.02.

" Qualified ECP Guarantor " means, at any time, each Loan Party with total assets exceeding $10,000,000 or that qualifies at such time as an "eligible contract participant" under the Commodity Exchange Act and can cause another Person to qualify as an "eligible contract participant" at such time under Section 1a(18)(A)(v)(II) of the Commodity Exchange Act.

" Qualified Stock " shall mean any Equity Interest that is not Disqualified Stock.

" Qualifying Control Agreement " means an agreement, among a Loan Party, a depository institution or securities intermediary and the Administrative Agent, which agreement is in form and substance reasonably acceptable to the Administrative Agent and which provides the Administrative Agent with "control" (as such term is used in Article 9 of the UCC) over the deposit account(s) or securities account(s) described therein.

" Real Property " means any means any owned or leased real property of a Loan Party or its Subsidiaries.

" R&D Collaboration Payments " means one-time non-recurring up-front payments and milestone payments payable by the Borrower and its Restricted Subsidiaries under research and development licensing agreements, collaboration agreements or development agreements of the Borrower and its Subsidiaries relating to product candidates of the Borrower and its Subsidiaries.

" Recipient " means the Administrative Agent, any Lender, any L/C Issuer or any other recipient of any payment to be made by or on account of any obligation of any Loan Party hereunder.

" Register " has the meaning specified in Section 11.06(c).

" Related Parties " means, with respect to any Person, such Person's Affiliates and the partners, directors, officers, employees, agents, trustees, administrators, managers, advisors and representatives of such Person and of such Person's Affiliates.

" Reportable Event " means any of the events set forth in Section 4043(c) of ERISA, other than events for which the thirty (30) day notice period has been waived.

" Request for Credit Extension " means (a) with respect to a Borrowing, conversion or continuation of Revolving Loans, a Loan Notice, (b) with respect to an L/C Credit Extension, a Letter of Credit Application, and (c) with respect to a Swingline Loan, a Swingline Loan Notice.

" Required Lenders " means, at any time, Revolving Lenders having Total Revolving Credit Exposures representing more than 50% of the Total Revolving Credit Exposures of all Revolving Lenders. The Total Revolving Credit Exposure of any Defaulting Lender shall be disregarded in determining Required Lenders at any time; provided that, the amount of any participation in any Swingline Loan and Unreimbursed Amounts that such Defaulting Lender has failed to fund that have not been reallocated to and funded by another Lender shall be deemed to be held by the Revolving Lender that is the Swingline Lender or L/C Issuer, as the case may be, in making such determination.

" Resignation Effective Date " has the meaning set forth in Section 9.06.

" Responsible Officer " means the chief executive officer, president, chief financial officer, treasurer, executive vice president, assistant treasurer, controller or assistant controller of a Loan Party, solely for purposes of the delivery of incumbency certificates pursuant to Section 4.01, the secretary or any assistant secretary of a Loan Party and, solely for purposes of notices given pursuant to Article II, any other officer or employee of the applicable Loan Party so designated by any of

the foregoing officers in a notice to the Administrative Agent or any other officer or employee of the applicable Loan Party designated in or pursuant to an agreement between the applicable Loan Party and the Administrative Agent. Any document delivered hereunder that is signed by a Responsible Officer of a Loan Party shall be conclusively presumed to have been authorized by all necessary corporate, partnership and/or other action on the part of such Loan Party and such Responsible Officer shall be conclusively presumed to have acted on behalf of such Loan Party and any document delivered hereunder that is signed by a Responsible Officer of the Borrower shall be conclusively presumed to have been authorized by all necessary corporate, partnership and/or other action on the part of each Subsidiary Guarantor and such Responsible Officer shall be conclusively presumed to have acted on behalf of such Subsidiary Guarantor. To the extent requested by the Administrative Agent, each Responsible Officer will provide an incumbency certificate and to the extent requested by the Administrative Agent, appropriate authorization documentation, in form and substance reasonably satisfactory to the Administrative Agent (it being understood and agreed that the incumbency certificates and authorization documentation provided on the Closing Date shall satisfy this requirement with respect to the Responsible Officers listed therein).

" Restricted Payment " means (a) any dividend or other distribution, direct or indirect, on account of any shares (or equivalent) of any class of Equity Interests of the Borrower or any of its Restricted Subsidiaries, now or hereafter outstanding (other than a dividend or distribution payable solely in shares of Qualified Stock), (b) any redemption, retirement, sinking fund or similar payment, purchase or other acquisition for value, direct or indirect, of any shares (or equivalent) of any class of Equity Interests of the Borrower or any of its Restricted Subsidiaries, now or hereafter outstanding, (c) any payment made to retire, or to obtain the surrender of, any outstanding warrants, options or other rights to acquire shares of any class of Equity Interests of any Loan Party or any of its Restricted Subsidiaries, now or hereafter outstanding and (d) any payments (other than payments of interest on a non-accelerated basis) in respect, or on account, of Capped Call Transactions, Convertible Bond Hedge Transactions, Warrant Transactions or otherwise in connection with the settlement of Convertible Bond Indebtedness upon the conversion of such Indebtedness to Equity Interests.

" Restricted Subsidiary " means, at any time, any Subsidiary of the Borrower that is not an Unrestricted Subsidiary.

" Revaluation Date " means with respect to any Letter of Credit, each of the following: (a) each date of issuance, amendment and/or extension of a Letter of Credit denominated in an Alternative Currency, (b) each date of any payment by the applicable L/C Issuer under any Letter of Credit denominated in an Alternative Currency, (c) in the case of all Existing Letters of Credit denominated in Alternative Currencies, the Closing Date, and (d) such additional dates as the Administrative Agent or any L/C Issuer shall reasonably determine or the Required Lenders shall require.

" Revolving Borrowing " means a borrowing consisting of simultaneous Revolving Loans of the same Type and, in the case of Eurodollar Rate Loans, having the same Interest Period made by each of the Revolving Lenders pursuant to Section 2.01.

" Revolving Commitment " means, as to each Revolving Lender, its obligation to (a) make Revolving Loans to the Borrower pursuant to Section 2.01, (b) purchase participations in L/C

Obligations, and (c) purchase participations in Swingline Loans, in an aggregate principal amount at any one time outstanding not to exceed the amount set forth opposite such Lender's name on Schedule 1.01(b) under the caption "Revolving Commitment" or opposite such caption in the Assignment and Assumption pursuant to which such Lender becomes a party hereto, as applicable, as such amount may be adjusted from time to time in accordance with this Agreement. The Revolving Commitment of all of the Revolving Lenders on the Closing Date shall be $500,000,000.

" Revolving Exposure " means, as to any Lender at any time, the aggregate principal amount at such time of its outstanding Revolving Loans and such Lender's participation in L/C Obligations and Swingline Loans at such time.

" Revolving Facility " means, at any time, the aggregate amount of the Revolving Lenders' Revolving Commitments at such time.

" Revolving Facility Increase Effective Date " has the meaning specified in Section 2.16(a)(iv).

" Revolving Lender " means, at any time, (a) so long as any Revolving Commitment is in effect, any Lender that has a Revolving Commitment at such time or (b) if the Revolving Commitments have terminated or expired, any Lender that has a Revolving Loan or a participation in L/C Obligations or Swingline Loans at such time.

" Revolving Loan " has the meaning specified in Section 2.01.

" Revolving Note " means a promissory note made by the Borrower in favor of a Revolving Lender evidencing Revolving Loans or Swingline Loans, as the case may be, made by such Revolving Lender, substantially in the form of Exhibit G .

" S&P " means Standard & Poor's Financial Services LLC, a Subsidiary of The McGraw-Hill Companies, Inc., and any successor thereto.

" Sale and Leaseback Transaction " means, with respect to any Loan Party or any Subsidiary, any arrangement, directly or indirectly, with any Person whereby such Loan Party or such Subsidiary shall sell or transfer any property used or useful in its business, whether now owned or hereafter acquired, and thereafter rent or lease such property or other property that it intends to use for substantially the same purpose or purposes as the property being sold or transferred.

" Same Day Funds " means (a) with respect to disbursements and payments in Dollars, immediately available funds, and (b) with respect to disbursements and payments in an Alternative Currency, same day or other funds as may be determined by the Administrative Agent or the applicable L/C Issuer, as the case may be, to be customary in the place of disbursement or payment for the settlement of international banking transactions in the relevant Alternative Currency.

" Sanction(s) " means any economic sanctions administered or enforced by the United States Government (including, without limitation, OFAC), the United Nations Security Council, the European Union, or Her Majesty's Treasury (" HMT ").

" Sanctioned Persons " has the meaning specified in Section 5.17(a) .

" SEC " means the Securities and Exchange Commission, or any Governmental Authority succeeding to any of its principal functions.

" Secured Cash Management Agreement " means any Cash Management Agreement between any Loan Party or any of its Subsidiaries and any Cash Management Bank.

" Secured Hedge Agreement " means any interest rate, currency, foreign exchange, or commodity Swap Contract not prohibited under Article VII between any Loan Party or any of its Subsidiaries and any Hedge Bank.

" Secured Obligations " means all Obligations and all Additional Secured Obligations.

" Secured Parties " means, collectively, the Administrative Agent, the Lenders, the L/C Issuers, each Hedge Bank, each Cash Management Bank, the Indemnitees and each co-agent or sub-agent appointed by the Administrative Agent from time to time pursuant to Section 9.05.

" Secured Party Designation Notice " means a notice from any Lender or an Affiliate of a Lender substantially in the form of Exhibit H .

" Securities Act " means the Securities Act of 1933, including all amendments thereto and regulations promulgated thereunder.

" Security Agreement " means the security and pledge agreement, dated as of the Closing Date, executed in favor of the Administrative Agent by each of the Loan Parties.

" Social Security Act " means the Social Security Act of 1965.

" Solvency Certificate " means a solvency certificate in substantially in the form of Exhibit I .

" Solvent " and " Solvency " mean, with respect to any Person on any date of determination, that on such date (a) the fair value of the property of such Person is greater than the total amount of liabilities, including contingent liabilities, of such Person, (b) the present fair saleable value of the assets of such Person is not less than the amount that will be required to pay the probable liability of such Person on its debts as they become absolute and matured, (c) such Person does not intend to, and does not believe that it will, incur debts or liabilities beyond such Person's ability to pay such debts and liabilities as they mature, (d) such Person is not engaged in business or a transaction, and is not about to engage in business or a transaction, for which such Person's property would constitute an unreasonably small capital, and (e) such Person is able to pay its debts and liabilities, contingent obligations and other commitments as they mature in the ordinary course of business. The amount of contingent liabilities at any time shall be computed as the amount that, in the light of all the facts and circumstances existing at such time, represents the amount that can reasonably be expected to become an actual or matured liability.

" Specified Leased Location " has the meaning set forth in the definition of Specified Leased Properties.

" Specified Leased Properties " means, collectively, (a) as of the Closing Date, the leased Real Property located at (i) 50 Northern Avenue, Boston, Massachusetts, (ii) 11 Fan Pier Boulevard, Boston, Massachusetts (the leased locations set forth in clauses (i) and (ii), collectively, the " Specified Leased Locations ") and (iii) 3215 Merryfield Row, San Diego, California, (b) that certain continuous manufacturing rig located at 40 Lake Drive, East Windsor, NJ 08520 and (c) other locations where leased real property arrangements similar to the Specified Leased Locations (and not otherwise reflecting debt arrangements) are entered into by the Borrower or any of its Restricted Subsidiaries from time to time following the Closing Date. For the avoidance of any doubt, all such leases of Specified Leased Properties shall be treated as operating leases for all purposes of this Agreement.

" Specified Loan Party " means any Loan Party that is not then an "eligible contract participant" under the Commodity Exchange Act (determined prior to giving effect to Section 10.11).

" Spot Rate " for a currency means the rate determined by the Administrative Agent or the applicable L/C Issuer, as applicable, to be the rate quoted by the Person acting in such capacity as the spot rate for the purchase by such Person of such currency with another currency through its principal foreign exchange trading office at approximately 11:00 a.m. on the date two (2) Business Days prior to the date as of which the foreign exchange computation is made; provided that the Administrative Agent or such L/C Issuer may obtain such spot rate from another financial institution designated by the Administrative Agent or such L/C Issuer if the Person acting in such capacity does not have as of the date of determination a spot buying rate for any such currency; and provided further that such L/C Issuer may use such spot rate quoted on the date as of which the foreign exchange computation is made in the case of any Letter of Credit denominated in an Alternative Currency.

" Stated Ratio " has the meaning specified in Section 7.11(a).

" Sterling " and " £ " mean the lawful currency of the United Kingdom.

" Subsidiary " of a Person means a corporation, partnership, joint venture, limited liability company or other business entity of which a majority of the shares of Voting Stock is at the time beneficially owned, or the management of which is otherwise controlled, directly, or indirectly through one or more intermediaries, or both, by such Person. Unless otherwise specified, all references herein to a "Subsidiary" or to "Subsidiaries" shall refer to a Subsidiary or Subsidiaries of the Loan Parties. For the avoidance of any doubt, no variable interest entities that the Borrower is required to consolidate solely pursuant to FASB ASC 810 shall be deemed to be "Subsidiaries" for purposes of the Loan Documents.

" Subsidiary Guarantors " means, collectively, the Subsidiaries of the Borrower set forth on Schedule 5.19(b) and each other Subsidiary of the Borrower that shall execute and delivery a Joinder Agreement or otherwise become party to this Agreement from time to time pursuant to the requirements of Section 6.13. Notwithstanding anything to the contrary contained herein, no Excluded Subsidiary shall be required to become a "Subsidiary Guarantor" hereunder. As of the Closing Date, the Subsidiary Guarantors are: (i) Vertex Pharmaceuticals (San Diego) LLC, a

Delaware limited liability company, (ii) Vertex Holdings, Inc., a Delaware corporation, (iii) Vertex Pharmaceuticals (Distribution) Incorporated, a Delaware corporation, (iv) Vertex Pharmaceuticals (Delaware) LLC, a Delaware limited liability company, and (v) Vertex Pharmaceuticals (Puerto Rico) LLC, a Delaware limited liability company.

" Successor Borrower " has the meaning specified in Section 7.04(e).

" Swap Contract " means (a) any and all rate swap transactions, basis swaps, credit derivative transactions, forward rate transactions, commodity swaps, commodity options, forward commodity contracts, equity or equity index swaps or options, bond or bond price or bond index swaps or options or forward bond or forward bond price or forward bond index transactions, interest rate options, forward foreign exchange transactions, cap transactions, floor transactions, collar transactions, currency swap transactions, cross-currency rate swap transactions, currency options, spot contracts, or any other similar transactions or any combination of any of the foregoing (including any options to enter into any of the foregoing), whether or not any such transaction is governed by or subject to any master agreement, and (b) any and all transactions of any kind, and the related confirmations, which are subject to the terms and conditions of, or governed by, any form of master agreement published by the International Swaps and Derivatives Association, Inc., any International Foreign Exchange Master Agreement, or any other master agreement (any such master agreement, together with any related schedules, a " Master Agreement "), including any such obligations or liabilities under any Master Agreement. Notwithstanding the foregoing, Capped Call Transactions, Convertible Bond Hedge Transactions and Warrant Transactions shall not constitute Swap Contracts.

" Subsidiary Redesignation " has the meaning set forth in the definition of "Unrestricted Subsidiary".

" Swap Obligations " means with respect to any Guarantor any obligation to pay or perform under any agreement, contract or transaction that constitutes a "swap" within the meaning of Section 1a(47) of the Commodity Exchange Act.

" Swap Termination Value " means, in respect of any one or more Swap Contracts, after taking into account the effect of any legally enforceable netting agreement relating to such Swap Contracts, (a) for any date on or after the date such Swap Contracts have been closed out and termination value(s) determined in accordance therewith, such termination value(s), and (b) for any date prior to the date referenced in clause (a), the amount(s) determined as the mark-to-market value(s) for such Swap Contracts, as determined based upon one or more mid-market or other readily available quotations provided by any recognized dealer in such Swap Contracts (which may include a Lender or any Affiliate of a Lender).

" Swingline Borrowing " means a borrowing of a Swingline Loan pursuant to Section 2.04.

" Swingline Lender " means Bank of America, in its capacity as provider of Swingline Loans, or any successor swingline lender hereunder.

" Swingline Loan " has the meaning specified in Section 2.04(a).

" Swingline Loan Notice " means a notice of a Swingline Borrowing pursuant to Section 2.04(b), which shall be substantially in the form of Exhibit J or such other form as approved by the Administrative Agent (including any form on an electronic platform or electronic transmission system as shall be approved by the Administrative Agent), appropriately completed and signed by a Responsible Officer of the Borrower.

" Swingline Sublimit " means an amount equal to the lesser of (a) $20,000,000 and (b) the Revolving Facility. The Swingline Sublimit is part of, and not in addition to, the Revolving Facility.

" Swiss Francs " and " CHF " mean the lawful currency of Switzerland.

" Synthetic Lease Obligation " means the monetary obligation of a Person under (a) a so-called synthetic, off-balance sheet or tax retention lease, or (b) an agreement for the use or possession of property (including Sale and Leaseback Transactions), in each case, creating obligations that do not appear on the balance sheet of such Person but which, upon the application of any Debtor Relief Laws to such Person, would be characterized as the indebtedness of such Person (without regard to accounting treatment).

" Target " has the meaning set forth in the definition of " Permitted Acquisition ."

" Taxes " means all present or future taxes, levies, imposts, duties, deductions, withholdings (including backup withholding), assessments, fees or other charges imposed by any Governmental Authority, including any interest, additions to tax or penalties applicable thereto.

" Threshold Amount " means $50,000,000.

" Total Revolving Credit Exposure " means, as to any Revolving Lender at any time, the unused Revolving Commitments and Revolving Exposure of such Revolving Lender at such time.

" Total Revolving Outstandings " means the aggregate Outstanding Amount of all Revolving Loans, Swingline Loans and L/C Obligations.

" Type " means, with respect to a Loan, its character as a Base Rate Loan or a Eurodollar Rate Loan.

" UCC " means the Uniform Commercial Code as in effect in the State of New York; provided that, if perfection or the effect of perfection or non-perfection or the priority of any security interest in any Collateral is governed by the Uniform Commercial Code as in effect in a jurisdiction other than the State of New York, " UCC " means the Uniform Commercial Code as in effect from time to time in such other jurisdiction for purposes of the provisions hereof relating to such perfection, effect of perfection or non-perfection or priority.

" UCP " means, with respect to any Letter of Credit, the Uniform Customs and Practice for Documentary Credits, International Chamber of Commerce (" ICC ") Publication No. 600 (or such later version thereof as may be in effect at the time of issuance).

" United States " and " U.S. " mean the United States of America.

" Unreimbursed Amount " has the meaning specified in Section 2.03(c)(i).

" Unrestricted Subsidiary " shall mean any non-Wholly Owned Subsidiary of the Borrower, whether now owned or acquired or created after the Closing Date, that is designated on or after the Closing Date by the Borrower as an Unrestricted Subsidiary hereunder by written notice to the Administrative Agent; provided , that the Borrower shall only be permitted to so designate a new Unrestricted Subsidiary on or after the Closing Date so long as (a) no Default or Event of Default has occurred and is continuing or would result therefrom, (b) immediately after giving effect to such designation, the Borrower shall be in Pro Forma Compliance, provided that the Consolidated Leverage Ratio shall not exceed, on a Pro Forma Basis, 2.50 to 1.00, (c) (i) all Investments in such Unrestricted Subsidiary at the time of designation (as contemplated by the immediately following sentence) are permitted in accordance with the relevant requirements of Section 7.03 and (ii) the aggregate amount of all Investments (including Guarantees of Indebtedness of any such Unrestricted Subsidiary) in Unrestricted Subsidiaries (with each such Unrestricted Subsidiary being valued at its Fair Market Value at the time such Unrestricted Subsidiary was so designated) shall not exceed in the aggregate $250,000,000 during the term of this Agreement (it being understood and agreed that such aggregate limitation for purposes of determining compliance with this clause (c) shall be calculated without giving effect to any return representing a return of capital with respect to such Unrestricted Subsidiary, whether or not repaid in cash prior to such time of determination (including as a result of Subsidiary Redesignation)), (d) such Subsidiary being designated as an "Unrestricted Subsidiary" shall also, concurrently with such designation and thereafter, constitute an "unrestricted Subsidiary" under any Material Indebtedness issued or incurred on or after the Closing Date, (e) such Subsidiary was not previously designated as an Unrestricted Subsidiary and thereafter re-designated as a Restricted Subsidiary, (f) such Subsidiary shall not (i) own, or possess the right to use any Intellectual Property, or (ii) own any of the material economic rights derived from any Intellectual Property, in each case with respect to clause (i) or (ii), covering the Cystic Fibrosis Drug Franchise Assets and (g) if such designation is on the Closing Date, the designation shall not occur until the conditions set forth in Section 4.02 are satisfied (or waived in accordance with Section 11.01) and the funding of the initial Loans has occurred. The designation of any Restricted Subsidiary as an Unrestricted Subsidiary shall constitute an Investment by the Borrower (or its Restricted Subsidiaries) therein at the date of designation in an amount equal to the Fair Market Value of the Borrower's (or its Restricted Subsidiaries') Investments therein, which shall be required to be permitted on such date in accordance with Section 7.03 (and not as an Investment permitted thereby in a Restricted Subsidiary). The Borrower may designate any Unrestricted Subsidiary to be a Restricted Subsidiary for purposes of this Agreement (each, a " Subsidiary Redesignation "); provided , that (i) no Default or Event of Default has occurred and is continuing or would result therefrom (after giving effect to the provisions of the immediately succeeding sentence), (ii) immediately after giving effect to such redesignation, the Borrower shall be in Pro Forma Compliance, provided that the Consolidated Leverage Ratio shall not exceed, on a Pro Forma Basis, 2.50 to 1.00, (iii) the Borrower shall have delivered to the Administrative Agent an officer's certificate executed by a Responsible Officer of the Borrower, certifying to such officer's knowledge, compliance with the foregoing requirements and (iv) the Borrower shall cause any such Restricted Subsidiary to comply with the provisions of Section 6.13 and Section 6.14, to the extent applicable. The designation of any Unrestricted Subsidiary as a Restricted Subsidiary on or after the Closing

Date shall constitute the incurrence at the time of designation of any Investment, Indebtedness or Liens of such Subsidiary existing at such time.

" U.S. Person " means any Person that is a "United States Person" as defined in Section 7701(a)(30) of the Code.

" U.S. Tax Compliance Certificate " has the meaning specified in Section 3.01(e)(ii)(B)(3).

" Vertex Europe " means, Vertex Pharmaceuticals (Europe) Limited, a limited liability company organized under the laws of England and Wales.

" Voting Stock " means, with respect to any Person, Equity Interests issued by such Person the holders of which are ordinarily, in the absence of contingencies, entitled to vote for the election of directors (or persons performing similar functions) of such Person, even though the right to so vote has been suspended by the happening of such contingency.

" Warrant Transactions " means one or more call options referencing the Borrower's common stock written by Borrower substantially contemporaneously with the purchase by the Borrower of Convertible Bond Hedge Transactions and having an initial strike or exercise price (howsoever defined) greater than the strike or exercise price (howsoever defined) of such Convertible Bond Hedge Transactions.

" Wholly Owned Subsidiary " of any Person shall mean a Subsidiary of such person, all of the Equity Interests of which (other than directors' qualifying shares or nominee or other similar shares required pursuant to applicable Law) are owned by such Person or another Wholly Owned Subsidiary of such Person. Unless the context otherwise requires, "Wholly Owned Subsidiary" shall mean a Subsidiary of the Borrower that is a Wholly Owned Subsidiary of the Borrower.

" Write-Down and Conversion Powers " means, with respect to any EEA Resolution Authority, the write-down and conversion powers of such EEA Resolution Authority from time to time under the Bail-In Legislation for the applicable EEA Member Country, which write-down and conversion powers are described in the EU Bail-In Legislation Schedule.

1.02 Other Interpretive Provisions .

With reference to this Agreement and each other Loan Document, unless otherwise specified herein or in such other Loan Document:

(a) The definitions of terms herein shall apply equally to the singular and plural forms of the terms defined. Whenever the context may require, any pronoun shall include the corresponding masculine, feminine and neuter forms. The words "include," "includes" and "including" shall be deemed to be followed by the phrase "without limitation." The word "will" shall be construed to have the same meaning and effect as the word "shall." Unless the context requires otherwise, (i) any definition of or reference to any agreement, instrument or other document (including the Loan Documents and any Organization Document) shall be construed as referring to such agreement, instrument or other document

as from time to time amended, amended and restated, modified, extended, restated, replaced or supplemented from time to time (subject to any restrictions on such amendments, supplements or modifications set forth herein or in any other Loan Document), (ii) any reference herein to any Person shall be construed to include such Person's successors and assigns, (iii) the words "hereto," "herein," "hereof" and "hereunder," and words of similar import when used in any Loan Document, shall be construed to refer to such Loan Document in its entirety and not to any particular provision thereof, (iv) all references in a Loan Document to Articles, Sections, Preliminary Statements, Exhibits and Schedules shall be construed to refer to Articles and Sections of, and Preliminary Statements, Exhibits and Schedules to, the Loan Document in which such references appear, (v) any reference to any law shall include all statutory and regulatory rules, regulations, orders and provisions consolidating, amending, replacing or interpreting such law and any reference to any law or regulation shall, unless otherwise specified, refer to such law or regulation as amended, modified, extended, restated, replaced or supplemented from time to time, and (vi) the words "asset" and "property" shall be construed to have the same meaning and effect and to refer to any and all tangible and intangible assets and properties, including cash, securities, accounts and contract rights.

(b) In the computation of periods of time from a specified date to a later specified date, the word "from" means "from and including;" the words "to" and "until" each mean "to but excluding;" and the word "through" means "to and including."

(c) Section headings herein and in the other Loan Documents are included for convenience of reference only and shall not affect the interpretation of this Agreement or any other Loan Document.

1.03 Accounting Terms .

(a) Generally . All accounting terms not specifically or completely defined herein shall be construed in conformity with, and all financial data (including financial ratios and other financial calculations) required to be submitted pursuant to this Agreement shall be prepared in conformity with, GAAP applied on a consistent basis, as in effect from time to time, applied in a manner consistent with that used in preparing the Audited Financial Statements, except as otherwise specifically prescribed herein. Notwithstanding the foregoing, for purposes of determining compliance with any covenant (including the computation of any financial covenant) contained herein, Indebtedness of the Borrower and its Restricted Subsidiaries shall be deemed to be carried at 100% of the outstanding principal amount thereof, and the effects of FASB ASC 825 and FASB ASC 470-20 on financial liabilities shall be disregarded.

(b) Changes in GAAP . If at any time any change in GAAP (including the adoption of IFRS) would affect the computation of any financial ratio or requirement set forth in any Loan Document, and either the Borrower or the Required Lenders shall so request, the Administrative Agent, the Lenders and the Borrower shall negotiate in good faith to amend such ratio or requirement to preserve the original intent thereof in light of such change in GAAP (subject to the approval of the Required Lenders); provided that, until

so amended, (i) such ratio or requirement shall continue to be computed in accordance with GAAP prior to such change therein and (ii) the Borrower shall provide to the Administrative Agent and the Lenders financial statements and other documents required under this Agreement or as reasonably requested hereunder setting forth a reconciliation between calculations of such ratio or requirement made before and after giving effect to such change in GAAP. Notwithstanding the foregoing if at any time any change in GAAP would require operating leases or real estate leases to be capitalized, the GAAP treatment of operating and real estate leases on the Closing Date shall continue to apply for purposes of this Agreement and the other Loan Documents, including for purposes of the definitions of "Consolidated EBITDA" and "Consolidated Funded Indebtedness" and the calculation of the financial covenants under this Agreement.

(c) Consolidation of Variable Interest Entities . All references herein to Consolidated financial statements of the Borrower and its Subsidiaries or to the determination of any amount for the Borrower and its Subsidiaries on a Consolidated basis or any similar reference shall, in each case, be deemed to exclude each variable interest entity that the Borrower is required to otherwise consolidate pursuant to FASB ASC 810.

(d) Pro Forma Treatment . Each Disposition of all or substantially all of a line of business, and each Acquisition, by the Borrower and its Subsidiaries that is consummated during any Measurement Period shall, for purposes of determining compliance with the financial covenants set forth in Section 7.11 and for purposes of determining the Applicable Rate, be given Pro Forma Effect as of the first day of such Measurement Period.

1.04 Rounding .

Any financial ratios required to be maintained by the Borrower pursuant to this Agreement shall be calculated by dividing the appropriate component by the other component, carrying the result to one place more than the number of places by which such ratio is expressed herein and rounding the result up or down to the nearest number (with a rounding-up if there is no nearest number).

1.05 Times of Day .

Unless otherwise specified, all references herein to times of day shall be references to Eastern time (daylight or standard, as applicable).

1.06 Letter of Credit Amounts .

Unless otherwise specified herein, the amount of a Letter of Credit at any time shall be deemed to be the Dollar Equivalent of the stated amount of such Letter of Credit in effect at such time; provided , however , that with respect to any Letter of Credit that, by its terms or the terms of any Issuer Document related thereto, provides for one or more automatic increases in the stated amount thereof, the amount of such Letter of Credit shall be deemed to be the Dollar Equivalent of the maximum stated amount of such Letter of Credit after giving effect to all such increases, whether or not such maximum stated amount is in effect at such time.

1.07 UCC Terms .

Terms defined in the UCC in effect on the Closing Date and not otherwise defined herein shall, unless the context otherwise indicates, have the meanings provided by those definitions. Subject to the foregoing, the term "UCC" refers, as of any date of determination, to the UCC then in effect.

1.08 Rates; Currency Equivalents .

(a) The Administrative Agent or the applicable L/C Issuer, as applicable, shall determine the Spot Rates as of each Revaluation Date to be used for calculating Dollar Equivalent amounts of Credit Extensions and Outstanding Amounts denominated in Alternative Currencies. Such Spot Rates shall become effective as of such Revaluation Date and shall be the Spot Rates employed in converting any amounts between the applicable currencies until the next Revaluation Date to occur. Except for purposes of financial statements delivered by Loan Parties hereunder or calculating financial covenants hereunder or except as otherwise provided herein, the applicable amount of any currency (other than Dollars) for purposes of the Loan Documents shall be such Dollar Equivalent amount as so determined by the Administrative Agent or the applicable L/C Issuer, as applicable.

(b) Wherever in this Agreement in connection with the issuance, amendment or extension of a Letter of Credit, an amount, such as a required minimum or multiple amount, is expressed in Dollars, but such Letter of Credit is denominated in an Alternative Currency, such amount shall be the relevant Alternative Currency Equivalent of such Dollar amount (rounded to the nearest unit of such Alternative Currency, with 0.5 of a unit being rounded upward), as determined by the Administrative Agent or the applicable L/C Issuer, as the case may be.

(c) The Administrative Agent does not warrant, nor accept responsibility, nor shall the Administrative Agent have any liability with respect to the administration, submission or any other matter related to the rates in the definition of "Eurodollar Rate" or with respect to any comparable or successor rate thereto.

(d) Any amount specified in this Agreement (other than in Articles II, IX and X) or any of the other Loan Documents to be in Dollars shall also include the equivalent of such amount in any currency other than Dollars, such equivalent amount thereof in the applicable currency to be determined by the Administrative Agent at such time on the basis of the Spot Rate (as defined below) for the purchase of such currency with Dollars. For purposes of this Section 1.08, the "Spot Rate" for a currency means the rate determined by the Administrative Agent to be the rate quoted by the Person acting in such capacity as the spot rate for the purchase by such Person of such currency with another currency through its principal foreign exchange trading office at approximately 11:00 a.m. on the date two (2) Business Days prior to the date of such determination; provided that the Administrative Agent may obtain such Spot Rate from another financial institution designated by the Administrative Agent if the Person acting in such capacity does not have as of the date of determination a spot buying rate for any such currency.

1.09 Additional Alternative Currencies .

(a) The Borrower may from time to time request that Letters of Credit be issued in a currency other than those specifically listed in the definition of "Alternative Currency"; provided that such requested currency is an Eligible Currency. Such request shall be subject to the approval of the Administrative Agent and the L/C Issuers.

(b) Any such request shall be made to the Administrative Agent not later than 11:00 a.m., twenty (20) Business Days prior to the date of the desired Credit Extension (or such other time or date as may be agreed by the Administrative Agent and the L/C Issuers, in their sole discretion). In the case of any such request, the Administrative Agent shall promptly notify the L/C Issuers thereof. The L/C Issuers shall notify the Administrative Agent, not later than 11:00 a.m., ten (10) Business Days after receipt of such request whether it consents, in its sole discretion, to the issuance of Letters of Credit in such requested currency.

(c) Any failure by all L/C Issuers to respond to such request within the time period specified in the preceding sentence shall be deemed to be a refusal by the L/C Issuers to permit Letters of Credit to be issued in such requested currency. If the Administrative Agent and the L/C Issuers consent to the issuance of Letters of Credit in such requested currency, the Administrative Agent shall so notify the Borrower and such currency shall thereupon be deemed for all purposes to be an Alternative Currency, for purposes of any Letter of Credit issuances. If the Administrative Agent shall fail to obtain consent to any request for an additional currency under this Section 1.09, the Administrative Agent shall promptly so notify the Borrower.

1.10 Change of Currency .

(a) Each obligation of the Borrower to make a payment denominated in the national currency unit of any member state of the European Union that adopts the Euro as its lawful currency after the date hereof shall be redenominated into Euro at the time of such adoption.

(b) Each provision of this Agreement shall be subject to such reasonable changes of construction as the Administrative Agent may from time to time specify to be appropriate to reflect the adoption of the Euro by any member state of the European Union and any relevant market conventions or practices relating to the Euro.

(c) Each provision of this Agreement also shall be subject to such reasonable changes of construction as the Administrative Agent may from time to time specify to be appropriate to reflect a change in currency of any other country and any relevant market conventions or practices relating to the change in currency.

ARTICLE II

COMMITMENTS AND CREDIT EXTENSIONS

2.01 **Revolving Loans .** Subject to the terms and conditions set forth herein, each Revolving Lender severally agrees to make loans (each such loan, a " Revolving Loan ") to the Borrower, in Dollars from time to time, on any Business Day during the Availability Period, in an aggregate amount not to exceed at any time outstanding the amount of such Lender's Revolving Commitment; provided , however , that after giving effect to any Revolving Borrowing, (i) the Total Revolving Outstandings shall not exceed the Aggregate Revolving Commitments, and (ii) the Revolving Exposure of any Lender shall not exceed such Revolving Lender's Revolving Commitment. Within the limits of each Revolving Lender's Revolving Commitment, and subject to the other terms and conditions hereof, the Borrower may borrow Revolving Loans, prepay under Section 2.05, and reborrow under this Section 2.01. Revolving Loans may be Base Rate Loans or Eurodollar Rate Loans, as further provided herein; provided , however , any Revolving Borrowings made on the Closing Date shall be made as Base Rate Loans unless the Borrower delivers a Funding Indemnity Letter not less than three (3) Business Days prior to the date of such Revolving Borrowing.

2.02 **Borrowings, Conversions and Continuations of Loans .**

(a) Notice of Borrowing . Each Borrowing, each conversion of Loans from one Type to the other, and each continuation of Eurodollar Rate Loans shall be made upon the Borrower's irrevocable notice to the Administrative Agent, which may be given by: (A) telephone or (B) a Loan Notice; provided that any telephonic notice must be confirmed immediately by delivery to the Administrative Agent of a Loan Notice. Each such Loan Notice must be received by the Administrative Agent not later than 11:00 a.m. (i) three (3) Business Days prior to the requested date of any Borrowing of, conversion to or continuation of Eurodollar Rate Loans or of any conversion of Eurodollar Rate Loans to Base Rate Loans, and (ii) on the requested date of any Borrowing of Base Rate Loans; provided , however , that if the Borrower wishes to request Eurodollar Rate Loans having an Interest Period other than one (1), two (2), three (3) or six (6) months in duration as provided in the definition of "Interest Period", the applicable notice must be received by the Administrative Agent not later than 11:00 a.m. four (4) Business Days prior to the requested date of such Borrowing, conversion or continuation, whereupon the Administrative Agent shall give prompt notice to the Appropriate Lenders of such request and determine whether the requested Interest Period is acceptable to all of them. Not later than 11:00 a.m., three (3) Business Days before the requested date of such Borrowing, conversion or continuation, the Administrative Agent shall notify the Borrower (which notice may be by telephone) whether or not the requested Interest Period has been consented to by all the Lenders. Each Borrowing of, conversion to or continuation of Eurodollar Rate Loans shall be in a principal amount of $5,000,000 or a whole multiple of $1,000,000 in excess thereof. Except as provided in Sections 2.03(c) and 2.04(c), each Borrowing of or conversion to Base Rate Loans shall be in a principal amount of $500,000 or a whole multiple of $100,000 in excess thereof. Each Loan Notice and each telephonic notice shall specify (A) whether the Borrower is requesting a Borrowing,

a conversion of Loans from one Type to the other, or a continuation of Loans, as the case may be, (B) the requested date of the Borrowing, conversion or continuation, as the case may be (which shall be a Business Day), (C) the principal amount of Loans to be borrowed, converted or continued, (D) the Type of Loans to be borrowed or to which existing Loans are to be converted, and (E) if applicable, the duration of the Interest Period with respect thereto. If the Borrower fails to specify a Type of Loan in a Loan Notice or if the Borrower fails to give a timely notice requesting a conversion or continuation, then the applicable Loans shall be made as, or converted to, Base Rate Loans. Any such automatic conversion to Base Rate Loans shall be effective as of the last day of the Interest Period then in effect with respect to the applicable Eurodollar Rate Loans. If the Borrower requests a Borrowing of, conversion to, or continuation of Eurodollar Rate Loans in any such Loan Notice, but fails to specify an Interest Period, it will be deemed to have specified an Interest Period of one (1) month. Notwithstanding anything to the contrary herein, each Swingline Loan shall be made as a Base Rate Loan and may not be converted to a Eurodollar Rate Loan.

(b) Advances . Following receipt of a Loan Notice, the Administrative Agent shall promptly notify each Appropriate Lender of the amount of its Applicable Percentage of the applicable Loans, and if no timely notice of a conversion or continuation is provided by the Borrower, the Administrative Agent shall notify each Appropriate Lender of the details of any automatic conversion to Base Rate Loans described in Section 2.02(a). In the case of a Borrowing, each Appropriate Lender shall make the amount of its Loan available to the Administrative Agent in Same Day Funds at the Administrative Agent's Office not later than 1:00 p.m. on the Business Day specified in the applicable Loan Notice. Upon satisfaction of the applicable conditions set forth in Section 4.02 (and, if such Borrowing is the initial Credit Extension, Section 4.01), the Administrative Agent shall make all funds so received available to the Borrower in like funds as received by the Administrative Agent either by (i) crediting the account of the Borrower on the books of Bank of America with the amount of such funds or (ii) wire transfer of such funds, in each case in accordance with instructions provided to (and reasonably acceptable to) the Administrative Agent by the Borrower; provided , however , that if, on the date a Loan Notice with respect to a Revolving Borrowing is given by the Borrower, there are L/C Borrowings outstanding, then the proceeds of such Revolving Borrowing, first , shall be applied to the payment in full of any such L/C Borrowings, and second, shall be made available to the Borrower as provided above.

(c) Eurodollar Rate Loans . Except as otherwise provided herein, a Eurodollar Rate Loan may be continued or converted only on the last day of an Interest Period for such Eurodollar Rate Loan. During the existence of an Event of Default, no Loans may be requested as, converted to or continued as Eurodollar Rate Loans without the consent of the Required Lenders, and the Required Lenders may demand that any or all of the outstanding Eurodollar Rate Loans be converted immediately to Base Rate Loans.

(d) Notice of Interest Rates . The Administrative Agent shall promptly notify the Borrower and the Lenders of the interest rate applicable to any Interest Period for Eurodollar Rate Loans upon determination of such interest rate. At any time that Base Rate Loans are

outstanding, the Administrative Agent shall notify the Borrower and the Lenders of any change in Bank of America's prime rate used in determining the Base Rate promptly following the public announcement of such change.

(e) Interest Periods. After giving effect to all Revolving Borrowings, all conversions of Revolving Loans from one Type to the other, and all continuations of Revolving Loans as the same Type, there shall not be more than ten (10) Interest Periods in effect in respect of the Revolving Facility.

(f) Cashless Settlement Mechanism. Notwithstanding anything to the contrary in this Agreement, any Lender may exchange, continue or rollover all or the portion of its Loans in connection with any refinancing, extension, loan modification or similar transaction permitted by the terms of this Agreement, pursuant to a cashless settlement mechanism approved by the Borrower, the Administrative Agent and such Lender.

2.03 Letters of Credit.

(a) The Letter of Credit Commitment.

(i) Subject to the terms and conditions set forth herein, (A) the applicable L/C Issuer agrees, in reliance upon the agreements of the Revolving Lenders set forth in this Section, (1) from time to time on any Business Day during the period from the Closing Date until the Letter of Credit Expiration Date, to issue Letters of Credit denominated in Dollars or in one or more Alternative Currencies for the account of the Borrower or any of its Restricted Subsidiaries, and to amend or extend Letters of Credit previously issued by it, in accordance with Section 2.03(b), and (2) to honor drawings under the Letters of Credit; and (B) the Revolving Lenders severally agree to participate in Letters of Credit issued for the account of the Borrower or its Restricted Subsidiaries and any drawings thereunder; provided that after giving effect to any L/C Credit Extension with respect to any Letter of Credit, (x) the Total Revolving Outstandings shall not exceed the Aggregate Revolving Commitments, (y) the Revolving Exposure of any Revolving Lender shall not exceed such Lender's Revolving Commitment, and (z) the Outstanding Amount of the L/C Obligations shall not exceed the Letter of Credit Sublimit. Each request by the Borrower for the issuance or amendment of a Letter of Credit shall be deemed to be a representation by the Borrower that the L/C Credit Extension so requested complies with the conditions set forth in the proviso to the preceding sentence. Within the foregoing limits, and subject to the terms and conditions hereof, the Borrower's ability to obtain Letters of Credit shall be fully revolving, and accordingly the Borrower may, during the foregoing period, obtain Letters of Credit to replace Letters of Credit that have expired or that have been drawn upon and reimbursed. All Existing Letters of Credit shall be deemed to have been issued pursuant hereto and deemed L/C Obligations, and from and after the Closing Date shall be subject to and governed by the terms and conditions hereof.

(ii) No L/C Issuer shall issue any Letter of Credit if:

(A) subject to Section 2.03(b)(iv), the expiry date of the requested Letter of Credit would occur more than twelve (12) months after the date of issuance or last extension, unless the Administrative Agent and such L/C Issuer have approved such expiry date;

(B) the expiry date of such requested Letter of Credit would occur after the Letter of Credit Expiration Date, unless the Administrative Agent and such L/C Issuer have approved such expiry date (it being understood that in the event the expiry date of any requested Letter of Credit would occur after the Letter of Credit Expiration Date, from and after the Letter of Credit Expiration Date, the Borrower shall immediately Cash Collateralize the then Outstanding Amount of all L/C Obligations in respect of such Letters of Credit in accordance with Section 2.14);

(iii) No L/C Issuer shall be under any obligation to issue any Letter of Credit if:

(A) any order, judgment or decree of any Governmental Authority or arbitrator shall by its terms purport to enjoin or restrain such L/C Issuer from issuing the Letter of Credit, or any Law applicable to such L/C Issuer or any request or directive (whether or not having the force of Law) from any Governmental Authority with jurisdiction over such L/C Issuer shall prohibit, or request that such L/C Issuer refrain from, the issuance of letters of credit generally or the Letter of Credit in particular or shall impose upon such L/C Issuer with respect to the Letter of Credit any restriction, reserve or capital requirement (for which such L/C Issuer is not otherwise compensated hereunder) not in effect on the Closing Date, or shall impose upon such L/C Issuer any unreimbursed loss, cost or expense which was not applicable on the Closing Date and which such L/C Issuer in good faith deems material to it;

(B) the issuance of the Letter of Credit would violate one or more policies of such L/C Issuer applicable to letters of credit generally;

(C) except as otherwise agreed by the Administrative Agent and such L/C Issuer, the Letter of Credit is in an initial stated amount less than $50,000;

(D) except as otherwise agreed by the Administrative Agent and such L/C Issuer, the Letter of Credit is to be denominated in a currency other than Dollars or an Alternative Currency;

(E) any Revolving Lender is at that time a Defaulting Lender, unless such L/C Issuer has entered into arrangements, including the delivery of Cash Collateral, satisfactory to such L/C Issuer (in its sole discretion) with the Borrower or such Revolving Lender to eliminate such L/C Issuer's actual

or potential Fronting Exposure (after giving effect to Section 2.15(a)(iv)) with respect to the Defaulting Lender arising from either the Letter of Credit then proposed to be issued or that Letter of Credit and all other L/C Obligations as to which such L/C Issuer has actual or potential Fronting Exposure, as it may elect in its sole discretion;

(F) the Letter of Credit contains any provisions for automatic reinstatement of the stated amount after any drawing thereunder; or

(G) such L/C Issuer does not as of the issuance date of the requested Letter of Credit issue Letters of Credit in the requested currency.

(iv) No L/C Issuer shall amend any Letter of Credit if such L/C Issuer would not be permitted at such time to issue the Letter of Credit in its amended form under the terms hereof.

(v) No L/C Issuer shall be under any obligation to amend any Letter of Credit if (A) such L/C Issuer would have no obligation at such time to issue such Letter of Credit in its amended form under the terms hereof, or (B) the beneficiary of such Letter of Credit does not accept the proposed amendment to the Letter of Credit.

(vi) Each L/C Issuer shall act on behalf of the Revolving Lenders with respect to any Letters of Credit issued by it and the documents associated therewith, and such L/C Issuer shall have all of the benefits and immunities (A) provided to the Administrative Agent in Article IX with respect to any acts taken or omissions suffered by such L/C Issuer in connection with Letters of Credit issued by it or proposed to be issued by it and Issuer Documents pertaining to such Letters of Credit as fully as if the term "Administrative Agent" as used in Article IX included such L/C Issuer with respect to such acts or omissions, and (B) as additionally provided herein with respect to the L/C Issuers.

(b) Procedures for Issuance and Amendment of Letters of Credit; Auto-Extension Letters of Credit .

(i) Each Letter of Credit shall be issued or amended, as the case may be, upon the request of the Borrower delivered to the applicable L/C Issuer (with a copy to the Administrative Agent) in the form of a Letter of Credit Application, appropriately completed and signed by a Responsible Officer of the Borrower and/or such Restricted Subsidiary, as required by such L/C Issuer. Such Letter of Credit Application may be sent by fax transmission, by United States mail, by overnight courier, by electronic transmission using the system provided by the applicable L/C Issuer, by personal delivery or by any other means reasonably acceptable to such L/C Issuer. Such Letter of Credit Application must be received by the applicable L/C Issuer and the Administrative Agent not later than 11:00 a.m. at least five (5) Business Days (or such later date and time as the Administrative Agent and such L/

C Issuer may agree in a particular instance in their sole discretion) prior to the proposed issuance date or date of amendment, as the case may be. In the case of a request for an initial issuance of a Letter of Credit, such Letter of Credit Application shall specify in form and detail satisfactory to the applicable L/C Issuer: (A) the proposed issuance date of the requested Letter of Credit (which shall be a Business Day); (B) the amount and currency thereof and in the absence of specification of currency shall be deemed a request for a Letter of Credit denominated in Dollars; (C) the expiry date thereof; (D) the name and address of the beneficiary thereof; (E) the documents to be presented by such beneficiary in case of any drawing thereunder; (F) the full text of any certificate to be presented by such beneficiary in case of any drawing thereunder; (G) the purpose and nature of the requested Letter of Credit; and (H) such other matters as such L/C Issuer may reasonably require. In the case of a request for an amendment of any outstanding Letter of Credit, such Letter of Credit Application shall specify in form and detail reasonably satisfactory to the applicable L/C Issuer: (1) the Letter of Credit to be amended; (2) the proposed date of amendment thereof (which shall be a Business Day); (3) the nature of the proposed amendment; and (4) such other matters as such L/C Issuer may require. Additionally, the Borrower shall furnish to the applicable L/C Issuer such other documents and information pertaining to such requested Letter of Credit issuance or amendment, including any Issuer Documents, as such L/C Issuer may require.

(ii) Promptly after receipt of any Letter of Credit Application, the applicable L/C Issuer will confirm with the Administrative Agent (by telephone or in writing) that the Administrative Agent has received a copy of such Letter of Credit Application from the Borrower and, if not, such L/C Issuer will provide the Administrative Agent with a copy thereof. Unless the applicable L/C Issuer has received written notice from any Revolving Lender, the Administrative Agent or any Loan Party, at least one (1) Business Day prior to the requested date of issuance or amendment of the applicable Letter of Credit, that one or more applicable conditions contained in Article IV shall not then be satisfied, then, subject to the terms and conditions hereof, such L/C Issuer shall, on the requested date, issue a Letter of Credit for the account of the Borrower (or the applicable Restricted Subsidiary) or enter into the applicable amendment, as the case may be, in each case in accordance with such L/C Issuer's usual and customary business practices. Immediately upon the issuance of each Letter of Credit, each Revolving Lender shall be deemed to, and hereby irrevocably and unconditionally agrees to, purchase from the applicable L/C Issuer a risk participation in such Letter of Credit in an amount equal to the product of such Revolving Lender's Applicable Revolving Percentage times the amount of such Letter of Credit.

(iii) Promptly after its delivery of any Letter of Credit or any amendment to a Letter of Credit to an advising bank with respect thereto or to the beneficiary thereof, the applicable L/C Issuer will also deliver to the Borrower and the Administrative Agent a true and complete copy of such Letter of Credit or amendment.

(iv) If the Borrower so requests in any applicable Letter of Credit Application, the applicable L/C Issuer may, in its sole discretion, agree to issue a standby Letter of Credit that has automatic extension provisions (each, an " Auto-Extension Letter of Credit "); provided that any such Auto-Extension Letter of Credit must permit such L/C Issuer to prevent any such extension at least once in each twelve (12) month period (commencing with the date of issuance of such Letter of Credit) by giving prior notice to the beneficiary thereof not later than a day (the " Non-Extension Notice Date ") in each such twelve (12) month period to be agreed upon at the time such Letter of Credit is issued. Unless otherwise directed by the applicable L/C Issuer, the Borrower shall not be required to make a specific request to such L/C Issuer for any such extension. Once an Auto-Extension Letter of Credit has been issued, the Revolving Lenders shall be deemed to have authorized (but may not require) the applicable L/C Issuer to permit the extension of such Letter of Credit at any time to an expiry date not later than the Letter of Credit Expiration Date; provided that , a Letter of Credit may, upon the request of the Borrower, be renewed for a period beyond the Letter of Credit Expiration Date subject to the provisions of Section 2.03(a)(ii)(B) ; provided , however , that such L/C Issuer shall not permit any such extension if (A) such L/C Issuer has determined that it would not be permitted, or would have no obligation at such time to issue such Letter of Credit in its revised form (as extended) under the terms hereof (by reason of the provisions of clause (ii) or (iii) of Section 2.03(a) or otherwise), or (B) it has received notice (which may be by telephone or in writing) on or before the day that is seven (7) Business Days before the Non-Extension Notice Date (1) from the Administrative Agent that the Required Lenders have elected not to permit such extension or (2) from the Administrative Agent, any Revolving Lender or the Borrower that one or more of the applicable conditions specified in Section 4.02 is not then satisfied, and in each such case directing such L/C Issuer not to permit such extension.

(c) Drawings and Reimbursements; Funding of Participations .

(i) Upon receipt from the beneficiary of any Letter of Credit of any notice of a drawing under such Letter of Credit, the applicable L/C Issuer shall notify the Borrower and the Administrative Agent thereof. The Borrower shall reimburse the applicable L/C Issuer for all drawings under any Letter of Credit in Dollars, unless, in the case of a Letter of Credit denominated in an Alternative Currency, (A) such L/C Issuer (at its option) shall have specified in such notice that it will require reimbursement in such Alternative Currency, or (B) in the absence of any such requirement for reimbursement in such Alternative Currency, the Borrower shall have notified such L/C Issuer promptly following receipt of the notice of drawing that the Borrower will reimburse such L/C Issuer in such Alternative Currency. In the case of any such reimbursement in Dollars of a drawing under a Letter of Credit denominated in an Alternative Currency, the applicable L/C Issuer shall notify the Borrower of the Dollar Equivalent of the amount of the drawing promptly following the determination thereof. If the Borrower shall have received notice from the applicable L/C Issuer on or prior to 11:00 a.m. on the date of payment by the

applicable L/C Issuer under a Letter of Credit to be reimbursed in Dollars, not later than 4:00 p.m. on such date of payment by the applicable L/C Issuer, or, if the Borrower shall have received notice later than 11:00 a.m. on the date of payment by the applicable L/C Issuer under a Letter of Credit to be reimbursed in Dollars, not later than 11:00 a.m. on the immediately following Business Day, or the Applicable Time on the date of any payment by such L/C Issuer under a Letter of Credit to be reimbursed in an Alternative Currency (each such date, an " Honor Date "), the Borrower shall reimburse such L/C Issuer through the Administrative Agent in an amount equal to the amount of such drawing and in the applicable currency. In the event that (A) a drawing denominated in an Alternative Currency is to be reimbursed in Dollars and (B) the Dollar amount paid by the Borrower, whether on or after the Honor Date, shall not be adequate on the date of that payment to purchase in accordance with normal banking procedures a sum denominated in the Alternative Currency equal to the drawing, the Borrower agrees, as a separate and independent obligation, to indemnify any L/C Issuer for the loss resulting from its inability on that date to purchase the Alternative Currency in the full amount of the drawing. If the Borrower fails to so reimburse the applicable L/C Issuer by such time, the Administrative Agent shall promptly notify each Revolving Lender of the Honor Date, the amount of the unreimbursed drawing (expressed in Dollars in an amount equal to the Dollar Equivalent thereof in the case of a Letter of Credit denominated in an Alternative Currency) (the " Unreimbursed Amount "), and the amount of such Revolving Lender's Applicable Revolving Percentage thereof. In such event, the Borrower shall be deemed to have requested a Revolving Borrowing of Base Rate Loans to be disbursed on the Honor Date in an amount equal to the Unreimbursed Amount, without regard to the minimum and multiples specified in Section 2.02 for the principal amount of Base Rate Loans, but subject to the amount of the unutilized portion of the Revolving Commitments and the conditions set forth in Section 4.02 (other than the delivery of a Loan Notice). Any notice given by any L/C Issuer or the Administrative Agent pursuant to this Section 2.03(c)(i) may be given by telephone if immediately confirmed in writing; provided that the lack of such an immediate confirmation shall not affect the conclusiveness or binding effect of such notice.

(ii) Each Revolving Lender shall upon any notice pursuant to Section 2.03(c)(i) make funds available (and the Administrative Agent may apply Cash Collateral provided for this purpose) for the account of the applicable L/C Issuer, in Dollars, at the Administrative Agent's Office in an amount equal to its Applicable Revolving Percentage of the Unreimbursed Amount not later than 1:00 p.m. on the Business Day specified in such notice by the Administrative Agent, whereupon, subject to the provisions of Section 2.03(c)(iii), each Revolving Lender that so makes funds available shall be deemed to have made a Base Rate Loan to the Borrower in such amount. The Administrative Agent shall remit the funds so received to the applicable L/C Issuer in Dollars.

(iii) With respect to any Unreimbursed Amount that is not fully refinanced by a Revolving Borrowing of Base Rate Loans because the conditions set forth in Section 4.02 cannot be satisfied or for any other reason, the Borrower shall be deemed to have incurred from the applicable L/C Issuer an L/C Borrowing in the amount of the Unreimbursed Amount that is not so refinanced, which L/C Borrowing shall be due and payable on demand (together with interest) and shall bear interest at the Default Rate. In such event, each Revolving Lender's payment to the Administrative Agent for the account of the applicable L/C Issuer pursuant to Section 2.03(c)(ii) shall be deemed payment in respect of its participation in such L/C Borrowing and shall constitute an L/C Advance from such Lender in satisfaction of its participation obligation under this Section.

(iv) Until each Revolving Lender funds its Revolving Loan or L/C Advance pursuant to this Section 2.03(c) to reimburse the L/C Issuer for any amount drawn under any Letter of Credit, interest in respect of such Lender's Applicable Revolving Percentage of such amount shall be solely for the account of the applicable L/C Issuer.

(v) Each Revolving Lender's obligation to make Revolving Loans or L/C Advances to reimburse the L/C Issuers for amounts drawn under Letters of Credit, as contemplated by this Section 2.03(c), shall be absolute and unconditional and shall not be affected by any circumstance, including (A) any setoff, counterclaim, recoupment, defense or other right which such Lender may have against any L/C Issuer, the Borrower, any Subsidiary or any other Person for any reason whatsoever; (B) the occurrence or continuance of a Default; or (C) any other occurrence, event or condition, whether or not similar to any of the foregoing; provided , however , that each Revolving Lender's obligation to make Revolving Loans pursuant to this Section 2.03(c) is subject to the conditions set forth in Section 4.02 (other than delivery by the Borrower of a Loan Notice). No such making of an L/C Advance shall relieve or otherwise impair the obligation of the Borrower to reimburse any L/C Issuer for the amount of any payment made by such L/C Issuer under any Letter of Credit, together with interest as provided herein.

(vi) If any Revolving Lender fails to make available to the Administrative Agent for the account of the applicable L/C Issuer any amount required to be paid by such Lender pursuant to the foregoing provisions of this Section 2.03(c) by the time specified in Section 2.03(c)(ii), then, without limiting the other provisions of this Agreement, such L/C Issuer shall be entitled to recover from such Lender (acting through the Administrative Agent), on demand, such amount with interest thereon for the period from the date such payment is required to the date on which such payment is immediately available to such L/C Issuer at a rate per annum equal to the applicable Overnight Rate from time to time in effect, plus any administrative, processing or similar fees customarily charged by such L/C Issuer in connection with the foregoing. If such Lender pays such amount (with interest and fees as aforesaid), the amount so paid shall constitute such Lender's Revolving Loan

included in the relevant Revolving Borrowing or L/C Advance in respect of the relevant L/C Borrowing, as the case may be. A certificate of any L/C Issuer submitted to any Revolving Lender (through the Administrative Agent) with respect to any amounts owing under this Section 2.03(c)(vi) shall be conclusive absent manifest error.

(d) Repayment of Participations .

(i) At any time after an L/C Issuer has made a payment under any Letter of Credit and has received from any Revolving Lender such Lender's L/C Advance in respect of such payment in accordance with Section 2.03(c), if the Administrative Agent receives for the account of such L/C Issuer any payment in respect of the related Unreimbursed Amount or interest thereon (whether directly from the Borrower or otherwise, including proceeds of Cash Collateral applied thereto by the Administrative Agent), the Administrative Agent will distribute to such Lender its Applicable Revolving Percentage thereof in Dollars and in the same funds as those received by the Administrative Agent.

(ii) If any payment received by the Administrative Agent for the account of an L/C Issuer pursuant to Section 2.03(c)(i) is required to be returned under any of the circumstances described in Section 11.05 (including pursuant to any settlement entered into by such L/C Issuer in its discretion), each Revolving Lender shall pay to the Administrative Agent for the account of the applicable L/C Issuer its Applicable Revolving Percentage thereof on demand of the Administrative Agent, plus interest thereon from the date of such demand to the date such amount is returned by such Lender, at a rate per annum equal to the applicable Overnight Rate from time to time in effect. The obligations of the Lenders under this clause shall survive the payment in full of the Obligations and the termination of this Agreement.

(e) Obligations Absolute . The obligation of the Borrower to reimburse each L/C Issuer for each drawing under each Letter of Credit and to repay each L/C Borrowing shall be absolute, unconditional and irrevocable, and shall be paid strictly in accordance with the terms of this Agreement under all circumstances, including the following:

(i) any lack of validity or enforceability of such Letter of Credit, this Agreement, or any other Loan Document;

(ii) the existence of any claim, counterclaim, setoff, defense or other right that the Borrower or any Subsidiary may have at any time against any beneficiary or any transferee of such Letter of Credit (or any Person for whom any such beneficiary or any such transferee may be acting), any L/C Issuer or any other Person, whether in connection with this Agreement or by such Letter of Credit, the transactions contemplated hereby or any agreement or instrument relating thereto, or any unrelated transaction;

(iii) any draft, demand, endorsement, certificate or other document presented under or in connection with such Letter of Credit proving to be forged, fraudulent, invalid or insufficient in any respect or any statement therein being untrue or inaccurate in any respect; or any loss or delay in the transmission or otherwise of any document required in order to make a drawing under such Letter of Credit;

(iv) waiver by any L/C Issuer of any requirement that exists for such L/C Issuer's protection and not the protection of the Borrower or any waiver by such L/C Issuer which does not in fact materially prejudice the Borrower;

(v) honor of a demand for payment presented electronically even if such Letter of Credit requires that demand be in the form of a draft;

(vi) any payment made by any L/C Issuer in respect of an otherwise complying item presented after the date specified as the expiration date of, or the date by which documents must be received under, such Letter of Credit if presentation after such date is authorized by the UCC, the ISP or the UCP, as applicable;

(vii) any payment by any L/C Issuer under such Letter of Credit against presentation of a draft or certificate that does not strictly comply with the terms of such Letter of Credit; or any payment made by such L/C Issuer under such Letter of Credit to any Person purporting to be a trustee in bankruptcy, debtor-in-possession, assignee for the benefit of creditors, liquidator, receiver or other representative of or successor to any beneficiary or any transferee of such Letter of Credit, including any arising in connection with any proceeding under any Debtor Relief Law;

(viii) any other circumstance or happening whatsoever, whether or not similar to any of the foregoing, including any other circumstance that might otherwise constitute a defense available to, or a discharge of, the Borrower or any of its Subsidiaries; or

(ix) any adverse change in the relevant exchange rates or in the availability of the relevant Alternative Currency to the Borrower or any Subsidiary or in the relevant currency markets generally;

provided that the foregoing shall not excuse any L/C Issuer from liability to the Borrower to the extent provided in the second proviso to Section 2.03(f).

The Borrower shall promptly examine a copy of each Letter of Credit and each amendment thereto that is delivered to it and, in the event of any claim of noncompliance with the Borrower's instructions or other irregularity, the Borrower will immediately notify the applicable L/C Issuer. The Borrower shall be conclusively deemed to have waived any such claim against the applicable L/C Issuer and its correspondents unless such notice is given as aforesaid.

(f) Role of L/C Issuer. Each Lender and the Borrower agree that, in paying any drawing under a Letter of Credit, the applicable L/C Issuer shall not have any responsibility

to obtain any document (other than any sight or time draft, certificates and documents expressly required by the Letter of Credit) or to ascertain or inquire as to the validity or accuracy of any such document or the authority of the Person executing or delivering any such document. None of the L/C Issuers, the Administrative Agent, any of their respective Related Parties nor any correspondent, participant or assignee of any L/C Issuer shall be liable to any Lender for (i) any action taken or omitted in connection herewith at the request or with the approval of the Lenders or the Required Lenders, as applicable; (ii) any action taken or omitted in the absence of gross negligence, willful misconduct or bad faith; or (iii) the due execution, effectiveness, validity or enforceability of any document or instrument related to any Letter of Credit or Issuer Document. The Borrower hereby assumes all risks of the acts or omissions of any beneficiary or transferee with respect to its use of any Letter of Credit; provided , however , that this assumption is not intended to, and shall not, preclude the Borrower's pursuing such rights and remedies as it may have against the beneficiary or transferee at law or under any other agreement. None of the L/C Issuers, the Administrative Agent, any of their respective Related Parties nor any correspondent, participant or assignee of any L/C Issuer shall be liable or responsible for any of the matters described in Section 2.03(e); provided , however , that anything in such clauses to the contrary notwithstanding, the Borrower may have a claim against any L/C Issuer, and such L/C Issuer may be liable to the Borrower, to the extent, but only to the extent, of any direct, as opposed to consequential or exemplary, damages suffered by the Borrower which the Borrower proves, as determined by a final nonappealable judgment of a court of competent jurisdiction, were caused by such L/C Issuer's gross negligence, willful misconduct or bad faith or such L/C Issuer's willful failure to pay under any Letter of Credit after the presentation to it by the beneficiary of a sight or time draft and certificate(s) strictly complying with the terms and conditions of a Letter of Credit. In furtherance and not in limitation of the foregoing, any L/C Issuer may accept documents that appear on their face to be in order, without responsibility for further investigation, regardless of any notice or information to the contrary, and no L/C Issuer shall be responsible for the validity or sufficiency of any instrument transferring, endorsing or assigning or purporting to transfer, endorse or assign a Letter of Credit or the rights or benefits thereunder or proceeds thereof, in whole or in part, which may prove to be invalid or ineffective for any reason. Any L/C Issuer may send a Letter of Credit or conduct any communication to or from the beneficiary via the Society for Worldwide Interbank Financial Telecommunication (" SWIFT ") message or overnight courier, or any other commercially reasonable means of communicating with a beneficiary.

(g) Applicability of ISP and UCP; Limitation of Liability . Unless otherwise expressly agreed by the applicable L/C Issuer and the Borrower when a Letter of Credit is issued (including any such agreement applicable to an Existing Letter of Credit), (i) the rules of the ISP shall apply to each standby Letter of Credit, and (ii) the rules of the UCP shall apply to each commercial Letter of Credit. Notwithstanding the foregoing, no L/C Issuer shall be responsible to the Borrower for, and no L/C Issuer's rights and remedies against the Borrower shall be impaired by, any action or inaction of such L/C Issuer required or permitted under any law, order, or practice that is required or permitted to be applied to any Letter of Credit or this Agreement, including the Law or any order of a jurisdiction where such L/C Issuer or the beneficiary is located, the practice stated in the ISP or UCP, as

applicable, or in the decisions, opinions, practice statements, or official commentary of the ICC Banking Commission, the Bankers Association for Finance and Trade - International Financial Services Association (BAFT-IFSA), or the Institute of International Banking Law & Practice, whether or not any Letter of Credit chooses such law or practice.

(h) Letter of Credit Fees . The Borrower shall pay to the Administrative Agent for the account of each Revolving Lender in accordance, subject to Section 2.15, with its Applicable Revolving Percentage a Letter of Credit fee (the " Letter of Credit Fee ") for each Letter of Credit equal to the Applicable Rate times the daily amount available to be drawn under such Letter of Credit. Letter of Credit Fees shall be (1) due and payable on the first Business Day following each fiscal quarter end, commencing with the first such date to occur after the issuance of such Letter of Credit on the Letter of Credit Expiration Date and thereafter on demand and (2) computed on a quarterly basis in arrears.

(i) Fronting Fee and Documentary and Processing Charges Payable to L/C Issuers . The Borrower shall pay directly to the applicable L/C Issuer for its own account a fronting fee (i) with respect to each commercial Letter of Credit, at a rate per annum equal to 0.125% (or such other rate separately agreed between the Borrower and the L/C Issuers), computed on the Dollar Equivalent of the amount of such Letter of Credit, and payable upon the issuance thereof, (ii) with respect to any amendment of a commercial Letter of Credit increasing the amount of such Letter of Credit, at a rate separately agreed between the Borrower and such L/C Issuer, computed on the Dollar Equivalent of the amount of such increase, and payable upon the effectiveness of such amendment, and (iii) with respect to each standby Letter of Credit, at a rate per annum equal to 0.125% (or such other rate separately agreed between the Borrower and the L/C Issuers), computed on the Dollar Equivalent of the daily amount available to be drawn under such Letter of Credit on a quarterly basis in arrears. Such fronting fee shall be due and payable on or prior to the date that is ten (10) Business Days following each fiscal quarter end, commencing with the first such date to occur after the issuance of such Letter of Credit, on the Letter of Credit Expiration Date and thereafter on demand. For purposes of computing the daily amount available to be drawn under any Letter of Credit, the amount of such Letter of Credit shall be determined in accordance with Section 1.06. In addition, the Borrower shall pay directly to the applicable L/C Issuer for its own account, in Dollars, the customary issuance, presentation, amendment and other processing fees, and other standard costs and charges, of such L/C Issuer relating to letters of credit as from time to time in effect. Such customary fees and standard costs and charges are due and payable on demand and are nonrefundable.

(j) Conflict with Issuer Documents . In the event of any conflict between the terms hereof and the terms of any Issuer Document, the terms hereof shall control.

(k) L/C Issuer Reports to the Administrative Agent . Unless otherwise agreed by the Administrative Agent, each L/C Issuer shall, in addition to its notification obligations set forth elsewhere in this Section, provide the Administrative Agent a Letter of Credit Report, as set forth below:

(i) reasonably prior to the time that such L/C Issuer issues, amends, renews, increases or extends a Letter of Credit, the date of such issuance, amendment, renewal, increase or extension and the stated amount of the applicable Letters of Credit after giving effect to such issuance, amendment, renewal or extension (and whether the amounts thereof shall have changed);

(ii) on each Business Day on which such L/C Issuer makes a payment pursuant to a Letter of Credit, the date and amount of such payment;

(iii) on any Business Day on which the Borrower fails to reimburse a payment made pursuant to a Letter of Credit required to be reimbursed to such L/C Issuer on such day, the date of such failure and the amount of such payment;

(iv) on any other Business Day, such other information as the Administrative Agent shall reasonably request as to the Letters of Credit issued by such L/C Issuer; and

(v) for so long as any Letter of Credit issued by an L/C Issuer is outstanding, such L/C Issuer shall deliver to the Administrative Agent (A) on the last Business Day of each calendar month, (B) at all other times a Letter of Credit Report is required to be delivered pursuant to this Agreement, and (C) on each date that (1) an L/C Credit Extension occurs or (2) there is any expiration, cancellation and/or disbursement, in each case, with respect to any such Letter of Credit, a Letter of Credit Report appropriately completed with the information for every outstanding Letter of Credit issued by such L/C Issuer.

(l) Additional L/C Issuers . Any Lender hereunder (that is reasonably acceptable to the Administrative Agent) may become an L/C Issuer upon receipt by the Administrative Agent of a fully executed Notice of Additional L/C Issuer which shall be signed by the Borrower, the Administrative Agent and each L/C Issuer.

(m) Letters of Credit Issued for Restricted Subsidiaries . Notwithstanding that a Letter of Credit issued or outstanding hereunder is in support of any obligations of, or is for the account of, a Restricted Subsidiary of the Borrower, the Borrower shall be obligated to reimburse each L/C Issuer hereunder for any and all drawings under each Letter of Credit issued by such L/C Issuer. The Borrower hereby acknowledges that the issuance of Letters of Credit for the account of Restricted Subsidiaries of the Borrower inures to the benefit of the Borrower, and that the Borrower's business derives substantial benefits from the businesses of such Restricted Subsidiaries.

2.04 Swingline Loans .

(a) The Swingline . Subject to the terms and conditions set forth herein, the Swingline Lender, in reliance upon the agreements of the other Lenders set forth in this Section, may in its sole discretion make loans to the Borrower (each such loan, a " Swingline Loan "). Each such Swingline Loan may be made, subject to the terms and conditions set

forth herein, to the Borrower, in Dollars, from time to time on any Business Day. During the Availability Period in an aggregate amount not to exceed at any time outstanding the amount of the Swingline Sublimit, notwithstanding the fact that such Swingline Loans, when aggregated with the Applicable Revolving Percentage of the Outstanding Amount of Revolving Loans and L/C Obligations of the Lender acting as Swingline Lender, may exceed the amount of such Lender's Revolving Commitment; provided , however , that (i) after giving effect to any Swingline Loan, (A) the Total Revolving Outstandings shall not exceed the Aggregate Revolving Commitments at such time, and (B) the Revolving Exposure of any Revolving Lender at such time shall not exceed such Lender's Revolving Commitment, (ii) the Borrower shall not use the proceeds of any Swingline Loan to refinance any outstanding Swingline Loan, and (iii) the Swingline Lender shall not be under any obligation to make any Swingline Loan if it shall determine (which determination shall be conclusive and binding absent manifest error) that it has, or by such Credit Extension may have, Fronting Exposure. Within the foregoing limits, and subject to the other terms and conditions hereof, the Borrower may borrow under this Section, prepay under Section 2.05, and reborrow under this Section. Each Swingline Loan shall bear interest only at a rate based on the Base Rate plus the Applicable Rate. Immediately upon the making of a Swingline Loan, each Revolving Lender shall be deemed to, and hereby irrevocably and unconditionally agrees to, purchase from the Swingline Lender a risk participation in such Swingline Loan in an amount equal to the product of such Revolving Lender's Applicable Revolving Percentage times the amount of such Swingline Loan.

(b) Borrowing Procedures .

Subject to the terms and conditions hereof, each Swingline Borrowing shall be made upon the Borrower's irrevocable notice to the Swingline Lender and the Administrative Agent, which may be given by: (A) telephone or (B) a Swingline Loan Notice; provided that any telephonic notice must be confirmed immediately by delivery to the Swingline Lender and the Administrative Agent of a Swingline Loan Notice. Each such Swingline Loan Notice must be received by the Swingline Lender and the Administrative Agent not later than 1:00 p.m. on the requested borrowing date, and shall specify (i) the amount to be borrowed, which shall be a minimum of $100,000, and (ii) the requested date of the Borrowing (which shall be a Business Day). Promptly after receipt by the Swingline Lender of any Swingline Loan Notice, the Swingline Lender will confirm with the Administrative Agent (by telephone or in writing) that the Administrative Agent has also received such Swingline Loan Notice and, if not, the Swingline Lender will notify the Administrative Agent (by telephone or in writing) of the contents thereof. Unless the Swingline Lender has received notice (by telephone or in writing) from the Administrative Agent (including at the request of any Revolving Lender) prior to 2:00 p.m. on the date of the proposed Swingline Borrowing (A) directing the Swingline Lender not to make such Swingline Loan as a result of the limitations set forth in the first proviso to the third sentence of Section 2.04(a), or (B) that one or more of the applicable conditions specified in Article IV is not then satisfied, then, subject to the terms and conditions hereof, the Swingline Lender may, make the

amount of its Swingline Loan available to the Borrower at its office by crediting the account of the Borrower on the books of the Swingline Lender in Same Day Funds.

(c) Refinancing of Swingline Loans .

(i) The Swingline Lender at any time in its sole discretion may request, on behalf of the Borrower (which hereby irrevocably authorizes the Swingline Lender to so request on its behalf), that each Revolving Lender make a Base Rate Loan in an amount equal to such Lender's Applicable Revolving Percentage of the amount of Swingline Loans then outstanding. Such request shall be made in writing (which written request shall be deemed to be a Loan Notice for purposes hereof) and in accordance with the requirements of Section 2.02, without regard to the minimum and multiples specified therein for the principal amount of Base Rate Loans, but subject to the unutilized portion of the Revolving Facility and the conditions set forth in Section 4.02. The Swingline Lender shall furnish the Borrower with a copy of the applicable Loan Notice promptly after delivering such notice to the Administrative Agent. Each Revolving Lender shall make an amount equal to its Applicable Revolving Percentage of the amount specified in such Loan Notice available to the Administrative Agent in Same Day Funds (and the Administrative Agent may apply Cash Collateral available with respect to the applicable Swingline Loan) for the account of the Swingline Lender at the Administrative Agent's Office not later than 1:00 p.m. on the day specified in such Loan Notice, whereupon, subject to Section 2.04(c)(ii), each Revolving Lender that so makes funds available shall be deemed to have made a Base Rate Loan to the Borrower in such amount. The Administrative Agent shall remit the funds so received to the Swingline Lender.

(ii) If for any reason any Swingline Loan cannot be refinanced by such a Revolving Borrowing in accordance with Section 2.04(c)(i), the request for Base Rate Loans submitted by the Swingline Lender as set forth herein shall be deemed to be a request by the Swingline Lender that each of the Revolving Lenders fund its risk participation in the relevant Swingline Loan and each Revolving Lender's payment to the Administrative Agent for the account of the Swingline Lender pursuant to Section 2.04(c)(i) shall be deemed payment in respect of such participation.

(iii) If any Revolving Lender fails to make available to the Administrative Agent for the account of the Swingline Lender any amount required to be paid by such Lender pursuant to the foregoing provisions of this Section 2.04(c) by the time specified in Section 2.04(c)(i), the Swingline Lender shall be entitled to recover from such Lender (acting through the Administrative Agent), on demand, such amount with interest thereon for the period from the date such payment is required to the date on which such payment is immediately available to the Swingline Lender at a rate per annum equal to the greater of the Federal Funds Rate and a rate determined by the Swingline Lender in accordance with banking industry rules on interbank compensation, plus any administrative, processing or similar fees customarily

charged by the Swingline Lender in connection with the foregoing. If such Lender pays such amount (with interest and fees as aforesaid), the amount so paid shall constitute such Lender's Revolving Loan included in the relevant Revolving Borrowing or funded participation in the relevant Swingline Loan, as the case may be. A certificate of the Swingline Lender submitted to any Lender (through the Administrative Agent) with respect to any amounts owing under this clause (iii) shall be conclusive absent manifest error.

(iv) Each Revolving Lender's obligation to make Revolving Loans or to purchase and fund risk participations in Swingline Loans pursuant to this Section 2.04(c) shall be absolute and unconditional and shall not be affected by any circumstance, including (A) any setoff, counterclaim, recoupment, defense or other right which such Lender may have against the Swingline Lender, the Borrower or any other Person for any reason whatsoever, (B) the occurrence or continuance of a Default or (C) any other occurrence, event or condition, whether or not similar to any of the foregoing; provided however , that each Revolving Lender's obligation to make Revolving Loans pursuant to this Section 2.04(c) is subject to the conditions set forth in Section 4.02 (other than delivery by the Borrower of a Loan Notice). No such funding of risk participations shall relieve or otherwise impair the obligation of the Borrower to repay Swingline Loans, together with interest as provided herein.

(d) Repayment of Participations .

(i) At any time after any Revolving Lender has purchased and funded a risk participation in a Swingline Loan, if the Swingline Lender receives any payment on account of such Swingline Loan, the Swingline Lender will distribute to such Revolving Lender its Applicable Revolving Percentage thereof in the same funds as those received by the Swingline Lender.

(ii) If any payment received by the Swingline Lender in respect of principal or interest on any Swingline Loan is required to be returned by the Swingline Lender under any of the circumstances described in Section 11.05 (including pursuant to any settlement entered into by the Swingline Lender in its discretion), each Revolving Lender shall pay to the Swingline Lender its Applicable Revolving Percentage thereof on demand of the Administrative Agent, plus interest thereon from the date of such demand to the date such amount is returned, at a rate per annum equal to the Federal Funds Rate. The Administrative Agent will make such demand upon the request of the Swingline Lender. The obligations of the Lenders under this clause shall survive the payment in full of the Obligations and the termination of this Agreement.

(e) Interest for Account of Swingline Lender . The Swingline Lender shall be responsible for invoicing the Borrower for interest on the Swingline Loans. Until each Revolving Lender funds its Base Rate Loan or risk participation pursuant to this Section to refinance such Revolving Lender's Applicable Revolving Percentage of any Swingline

Loan, interest in respect of such Applicable Revolving Percentage shall be solely for the account of the Swingline Lender.

(f) Payments Directly to Swingline Lender. The Borrower shall make all payments of principal and interest in respect of the Swingline Loans directly to the Swingline Lender.

2.05 Prepayments.

(a) Optional.

(i) The Borrower may, upon notice to the Administrative Agent pursuant to delivery to the Administrative Agent of a Notice of Loan Prepayment, at any time or from time to time voluntarily prepay Revolving Loans in whole or in part without premium or penalty subject to Section 3.05; provided that, unless otherwise agreed by the Administrative Agent, (A) such notice must be received by the Administrative Agent not later than 11:00 a.m. (1) three (3) Business Days prior to any date of prepayment of Eurodollar Rate Loans and (2) on the date of prepayment of Base Rate Loans; (B) any prepayment of Eurodollar Rate Loans shall be in a principal amount of $5,000,000 or a whole multiple of $1,000,000 in excess thereof; and (C) any prepayment of Base Rate Loans shall be in a principal amount of $500,000 or a whole multiple of $100,000 in excess thereof or, in each case, if less, the entire principal amount thereof then outstanding. Each such notice shall specify the date and amount of such prepayment and the Type(s) of Loans to be prepaid and, if Eurodollar Rate Loans are to be prepaid, the Interest Period(s) of such Loans. The Administrative Agent will promptly notify each Lender of its receipt of each such notice, and of the amount of such Lender's ratable portion of such prepayment (based on such Lender's Applicable Percentage). If such notice is given by the Borrower, the Borrower shall make such prepayment and the payment amount specified in such notice shall be due and payable on the date specified therein. Any prepayment of principal shall be accompanied by all accrued interest on the amount prepaid, together with any additional amounts required pursuant to Section 3.05. Subject to Section 2.15, such prepayments shall be paid to the Lenders in accordance with their respective Applicable Percentages.

(ii) The Borrower may, upon notice to the Swingline Lender pursuant to delivery to the Swingline Lender of a Notice of Loan Prepayment (with a copy to the Administrative Agent), at any time or from time to time, voluntarily prepay Swingline Loans in whole or in part without premium or penalty; provided that, unless otherwise agreed by the Swingline Lender, (A) such notice must be received by the Swingline Lender and the Administrative Agent not later than 1:00 p.m. on the date of the prepayment, and (B) any such prepayment shall be in a minimum principal amount of $100,000 or a whole multiple of $100,000 in excess hereof (or, if less, the entire principal thereof then outstanding). Each such notice shall specify the date and amount of such prepayment. If such notice is given by the Borrower, the Borrower shall make such prepayment and the payment amount specified in such

notice shall be due and payable on the date specified therein. Any prepayment of principal shall be accompanied by all accrued interest on the amount prepaid, together with any additional amounts required pursuant to Section 3.05.

(b) Mandatory .

(i) If for any reason the Total Revolving Outstandings at any time exceed the Aggregate Revolving Commitment then in effect for the Revolving Facility at such time, the Borrower shall promptly (and in any event, within one (1) Business Day) prepay Revolving Loans, Swingline Loans and L/C Borrowings (together with all accrued but unpaid interest thereon) and/or Cash Collateralize the L/C Obligations in an aggregate amount equal to such excess; provided , however , that the Borrower shall not be required to Cash Collateralize the L/C Obligations pursuant to this Section 2.05(b)(i) unless, after the prepayment of the Revolving Loans and Swingline Loans, the Total Revolving Outstandings exceed the Aggregate Revolving Commitment then in effect for the Revolving Facility at such time; provided that if any such excess shall result solely from a change in the applicable exchange rates relating to Alternative Currencies, then such prepayment and/or Cash Collateralization shall only be required to be made by the Borrower upon three (3) Business Days' notice from the Administrative Agent.

(ii) Except as otherwise provided in Section 2.15, prepayments of the Revolving Facility made pursuant to this Section 2.05(b), first , shall be applied ratably to the L/C Borrowings and the Swingline Loans, second , shall be applied to the outstanding Revolving Loans, and, third , shall be used to Cash Collateralize the remaining L/C Obligations. Upon the drawing of any Letter of Credit that has been Cash Collateralized, the funds held as Cash Collateral shall be applied (without any further action by or notice to or from the Borrower or any other Loan Party or any Defaulting Lender that has provided Cash Collateral) to reimburse the applicable L/C Issuer or the Revolving Lenders, as applicable.

(iii) If the Administrative Agent notifies the Company at any time that the Outstanding Amount of all L/C Obligations denominated in Alternative Currencies at such time exceeds an amount equal to 105% of the Letter of Credit Sublimit then in effect, then, within three (3) Business Days after receipt of such notice, the Borrowers shall prepay Loans and/or Cash Collateralize Letters of Credit in an aggregate amount sufficient to reduce such Outstanding Amount as of such date of payment to an amount not to exceed 100% of the Letter of Credit Sublimit then in effect.

Within the parameters of the applications set forth above in Section 2.05(b), prepayments pursuant to Section 2.05(b) shall be applied first to Base Rate Loans and then to Eurodollar Rate Loans in direct order of Interest Period maturities. All prepayments under Section 2.05(b) shall be subject to Section 3.05, but otherwise without premium or penalty, and shall be accompanied by interest on the principal amount prepaid through the date of prepayment.

2.06 Termination or Reduction of Commitments .

(a) Optional . The Borrower may, upon notice to the Administrative Agent, terminate the Revolving Facility, the Letter of Credit Sublimit or the Swingline Sublimit, or from time to time permanently reduce the Revolving Facility, the Letter of Credit Sublimit or the Swingline Sublimit; provided that (i) any such notice shall be received by the Administrative Agent not later than 11:00 a.m. three (3) Business Days prior to the date of termination or reduction, (ii) any such partial reduction shall be in an aggregate amount of $5,000,000 or any whole multiple of $500,000 in excess thereof and (iii) the Borrower shall not terminate or reduce (A) the Revolving Facility if, after giving effect thereto and to any concurrent prepayments hereunder, the Total Revolving Outstandings would exceed the Aggregate Revolving Commitments, (B) the Letter of Credit Sublimit if, after giving effect thereto, the Outstanding Amount of L/C Obligations not fully Cash Collateralized hereunder would exceed the Letter of Credit Sublimit, or (C) the Swingline Sublimit if, after giving effect thereto and to any concurrent prepayments hereunder, the Outstanding Amount of Swingline Loans would exceed the Swingline Sublimit; and provided , further, that any notice of permanent reduction or termination may state that such notice is conditional upon the effectiveness of any facility or instrument refinancing all or a portion of the outstanding Revolving Commitments or upon the consummation of any other debt or equity transaction or event that will generate financing in connection therewith, in which case such notice may be revoked by the Borrower (by notice to the Administrative Agent on or prior to the specified date) if such condition is not satisfied.

(b) Mandatory . If after giving effect to any reduction or termination of Revolving Commitments under this Section 2.06, the Letter of Credit Sublimit or the Swingline Sublimit exceeds the Aggregate Revolving Commitments at such time, the Letter of Credit Sublimit or the Swingline Sublimit, as the case may be, shall be automatically reduced by the amount of such excess.

(c) Application of Commitment Reductions; Payment of Fees . The Administrative Agent will promptly notify the Lenders of any termination or reduction of the Letter of Credit Sublimit, Swingline Sublimit or the Revolving Commitment under this Section 2.06. Upon any reduction of the Revolving Commitments, the Revolving Commitment of each Revolving Lender shall be reduced by such Lender's Applicable Revolving Percentage of such reduction amount. All fees in respect of the Revolving Facility accrued until the effective date of any termination of the Revolving Facility shall be paid on the effective date of such termination.

2.07 Repayment of Loans .

(a) Revolving Loans . The Borrower shall repay to the Revolving Lenders on the Maturity Date the aggregate principal amount of all Revolving Loans outstanding on such date.

(b) Swingline Loans . The Borrower shall repay each Swingline Loan on the earlier to occur of (i) the date ten (10) Business Days after such Loan is made (it being

understood that the Borrower may use the proceeds of a Borrowing of Revolving Loans for such repayment, subject to the applicable conditions to such Borrowing hereunder) and (ii) the Maturity Date.

2.08 Interest and Default Rate .

(a) Interest . Subject to the provisions of Section 2.08(b), (i) each Eurodollar Rate Loan under the Revolving Facility shall bear interest on the outstanding principal amount thereof for each Interest Period from the applicable borrowing date at a rate per annum equal to the Eurodollar Rate for such Interest Period plus the Applicable Rate; (ii) each Base Rate Loan under the Revolving Facility shall bear interest on the outstanding principal amount thereof from the applicable borrowing date at a rate per annum equal to the Base Rate plus the Applicable Rate; and (iii) each Swingline Loan shall bear interest on the outstanding principal amount thereof from the applicable borrowing date at a rate per annum equal to the Base Rate plus the Applicable Rate. To the extent that any calculation of interest or any fee required to be paid under this Agreement shall be based on (or result in) a calculation that is less than zero, such calculation shall be deemed zero for purposes of this Agreement.

(b) Default Rate .

(i) Upon the occurrence of any Event of Default under Section 8.01(a), whether at stated maturity, by acceleration or otherwise, all outstanding Obligations (including Letter of Credit Fees) shall accrue at a fluctuating interest rate per annum at all times equal to the Default Rate to the fullest extent permitted by applicable Laws.

(ii) Upon the occurrence of any Event of Default under Section 8.01(f) or Section 8.01(g), all outstanding Obligations (including Letter of Credit Fees) shall accrue at a fluctuating interest rate per annum at all times equal to the Default Rate to the fullest extent permitted by applicable Laws.

(iii) Accrued and unpaid interest on past due amounts (including interest on past due interest) shall be due and payable upon demand.

(c) Interest Payments . Interest on each Loan shall be due and payable in arrears on each Interest Payment Date applicable thereto and at such other times as may be specified herein. Interest hereunder shall be due and payable in accordance with the terms hereof before and after judgment, and before and after the commencement of any proceeding under any Debtor Relief Law.

2.09 Fees .

In addition to certain fees described in subsections (h) and (i) of Section 2.03:

(a) Commitment Fee . The Borrower shall pay to the Administrative Agent for the account of each Revolving Lender in accordance with its Applicable Revolving Percentage, a commitment fee in Dollars equal to the Applicable Rate times the actual daily amount by which the Revolving Facility exceeds the sum of (i) the Outstanding Amount of Revolving Loans and (ii) the Outstanding Amount of L/C Obligations, subject to adjustment as provided in Section 2.15. For the avoidance of doubt, the Outstanding Amount of Swingline Loans shall not be counted towards or considered usage of the Revolving Facility for purposes of determining the commitment fee. The commitment fee shall be calculated quarterly in arrears and shall accrue at all times during the Availability Period, including at any time during which one or more of the conditions in Article IV is not met, and shall be due and payable quarterly in arrears on the last Business Day of each March, June, September and December, commencing with the first such date to occur after the Closing Date, and on the last day of the Availability Period for the Revolving Facility. For purposes of calculating the commitment fee, if there is any change in the Applicable Rate during any quarter, the actual daily amount shall be computed and multiplied by the Applicable Rate separately for each period during such quarter that such Applicable Rate was in effect.

(b) Other Fees .

(i) The Borrower shall pay to the Persons entitled thereto, for their own account, in Dollars, fees in the amounts and at the times specified in the Fee Letter. Such fees shall be fully earned when paid and shall not be refundable for any reason whatsoever.

(ii) The Borrower shall pay to the Lenders and the Arrangers, such fees as shall have been separately agreed upon in writing and disclosed to the Administrative Agent in the amounts and at the times so specified. Such fees shall be fully earned when paid and shall not be refundable for any reason whatsoever.

2.10 Computation of Interest and Fees; Retroactive Adjustments of Applicable Rate .

(a) Computation of Interest and Fees . All computations of interest for Base Rate Loans (including Base Rate Loans determined by reference to the Eurodollar Rate) shall be made on the basis of a year of 365 or 366 days, as the case may be, and actual days elapsed. All other computations of fees and interest shall be made on the basis of a 360-day year and actual days elapsed (which results in more fees or interest, as applicable, being paid than if computed on the basis of a 365 day year). Interest shall accrue on each Loan for the day on which the Loan is made, and shall not accrue on a Loan, or any portion thereof, for the day on which the Loan or such portion is paid, provided that any Loan that is repaid on the same day on which it is made shall, subject to Section 2.12(a), bear interest for one (1) day. Each determination by the Administrative Agent of an interest rate or fee hereunder shall be conclusive and binding for all purposes, absent manifest error.

(b) Financial Statement Adjustments or Restatements . If, as a result of any restatement of or other adjustment to the financial statements of the Borrower and its Subsidiaries or for any other reason, the Borrower, or the Lenders determine that (i) the

Consolidated Leverage Ratio as calculated by the Borrower as of any applicable date was inaccurate and (ii) a proper calculation of the Consolidated Leverage Ratio would have resulted in higher pricing for such period, the Borrower shall retroactively be obligated to pay to the Administrative Agent for the account of the applicable Lenders or the applicable L/C Issuers, as the case may be, promptly on demand by the Administrative Agent (or, after the occurrence of an actual or deemed entry of an order for relief with respect to the Borrower under the Bankruptcy Code of the United States, automatically and without further action by the Administrative Agent, any Lender or any L/C Issuer), an amount equal to the excess of the amount of interest and fees that should have been paid for such period over the amount of interest and fees actually paid for such period. This paragraph shall not limit the rights of the Administrative Agent, any Lender or any L/C Issuer, as the case may be, under any provision of this Agreement to payment of any Obligations hereunder at the Default Rate or under Article VIII. The Borrower's obligations under this paragraph shall survive the termination of the Aggregate Revolving Commitments and the repayment of all other Obligations hereunder. Any additional interest or fees under this Section 2.10(b) shall not be due and payable until a demand is made for such payment by the Administrative Agent and accordingly, any nonpayment of such interest or fees as a result of any such inaccuracy shall not constitute a Default (whether retroactively or otherwise), and none of such additional amounts shall be deemed overdue or accrue interest at the Default Rate.

2.11 Evidence of Debt .

(a) Maintenance of Accounts . The Credit Extensions made by each Lender shall be evidenced by one or more accounts or records maintained by such Lender and by the Administrative Agent in the ordinary course of business. The accounts or records maintained by the Administrative Agent and each Lender shall be conclusive absent manifest error of the amount of the Credit Extensions made by the Lenders to the Borrower and the interest and payments thereon. Any failure to so record or any error in doing so shall not, however, limit or otherwise affect the obligation of the Borrower hereunder to pay any amount owing with respect to the Obligations. In the event of any conflict between the accounts and records maintained by any Lender and the accounts and records of the Administrative Agent in respect of such matters, the accounts and records of the Administrative Agent shall control in the absence of manifest error. Upon the request of any Lender made through the Administrative Agent, the Borrower shall execute and deliver to such Lender (through the Administrative Agent) a Revolving Note, which shall evidence such Lender's Loans in addition to such accounts or records. Each Lender may attach schedules to its Revolving Note and endorse thereon the date, Type (if applicable), amount and maturity of its Loans and payments with respect thereto.

(b) Maintenance of Records . In addition to the accounts and records referred to in Section 2.11(a), each Lender and the Administrative Agent shall maintain in accordance with its usual practice accounts or records evidencing the purchases and sales by such Lender of participations in Letters of Credit and Swingline Loans. In the event of any conflict between the accounts and records maintained by the Administrative Agent and the accounts

and records of any Lender in respect of such matters, the accounts and records of the Administrative Agent shall control in the absence of manifest error.

2.12 Payments Generally; Administrative Agent's Clawback .

(a) General . All payments to be made by the Borrower shall be made free and clear of and without condition or deduction for any counterclaim, defense, recoupment or setoff. Except as otherwise expressly provided herein, all payments by the Borrower hereunder shall be made to the Administrative Agent, for the account of the respective Lenders to which such payment is owed, at the Administrative Agent's Office in Dollars and in Same Day Funds not later than 2:00 p.m. on the date specified herein. The Administrative Agent will promptly distribute to each Lender its Applicable Percentage (or other applicable share as provided herein) of such payment in like funds as received by wire transfer to such Lender's Lending Office. All payments received by the Administrative Agent (i) after 2:00 p.m., in the case of payments in Dollars, or (ii) after the Applicable Time specified by the Administrative Agent, in the case of payments in an Alternative Currency, shall in each case be deemed received on the next succeeding Business Day and any applicable interest or fee shall continue to accrue. Subject to Section 2.07(a) and as otherwise specifically provided for in this Agreement, if any payment to be made by the Borrower shall come due on a day other than a Business Day, payment shall be made on the next following Business Day, and such extension of time shall be reflected in computing interest or fees, as the case may be.

(b)

(i) Funding by Lenders; Presumption by Administrative Agent . Unless the Administrative Agent shall have received notice from a Lender prior to the proposed date of any Borrowing of Eurodollar Rate Loans (or, in the case of any Borrowing of Base Rate Loans, prior to 12:00 noon on the date of such Borrowing) that such Lender will not make available to the Administrative Agent such Lender's share of such Borrowing, the Administrative Agent may assume that such Lender has made such share available on such date in accordance with Section 2.02 (or, in the case of a Borrowing of Base Rate Loans, that such Lender has made such share available in accordance with and at the time required by Section 2.02) and may, in reliance upon such assumption, make available to the Borrower a corresponding amount. In such event, if a Lender has not in fact made its share of the applicable Borrowing available to the Administrative Agent, then the applicable Lender and the Borrower severally agree to pay to the Administrative Agent forthwith on demand such corresponding amount in Same Day Funds with interest thereon, for each day from and including the date such amount is made available to the Borrower to but excluding the date of payment to the Administrative Agent, at (A) in the case of a payment to be made by such Lender, the Overnight Rate, plus any administrative, processing or similar fees customarily charged by the Administrative Agent in connection with the foregoing, and (B) in the case of a payment to be made by the Borrower, the interest rate applicable to Base Rate Loans. If the Borrower and such

Lender shall pay such interest to the Administrative Agent for the same or an overlapping period, the Administrative Agent shall promptly remit to the Borrower the amount of such interest paid by the Borrower for such period. If such Lender pays its share of the applicable Borrowing to the Administrative Agent, then the amount so paid shall constitute such Lender's Loan included in such Borrowing. Any payment by the Borrower shall be without prejudice to any claim the Borrower may have against a Lender that shall have failed to make such payment to the Administrative Agent.

(ii) Payments by Borrower; Presumptions by Administrative Agent . Unless the Administrative Agent shall have received notice from the Borrower prior to the date on which any payment is due to the Administrative Agent for the account of the Lenders or the L/C Issuers hereunder that the Borrower will not make such payment, the Administrative Agent may assume that the Borrower has made such payment on such date in accordance herewith and may, in reliance upon such assumption, distribute to the Appropriate Lenders or the applicable L/C Issuers, as the case may be, the amount due. In such event, if the Borrower has not in fact made such payment, then each of the Appropriate Lenders or the applicable L/C Issuers, as the case may be, severally agrees to repay to the Administrative Agent forthwith on demand the amount so distributed to such Lender or such L/C Issuer, in Same Day Funds with interest thereon, for each day from and including the date such amount is distributed to it to but excluding the date of payment to the Administrative Agent, at the Overnight Rate.

A notice of the Administrative Agent to any Lender or the Borrower with respect to any amount owing under this subsection (b) shall be conclusive, absent manifest error.

(c) Failure to Satisfy Conditions Precedent . If any Lender makes available to the Administrative Agent funds for any Loan to be made by such Lender as provided in the foregoing provisions of this Article II, and such funds are not made available to the Borrower by the Administrative Agent because the conditions to the applicable Credit Extension set forth in Article IV are not satisfied or waived in accordance with the terms hereof, the Administrative Agent shall return such funds (in like funds as received from such Lender) to such Lender, without interest.

(d) Obligations of Lenders Several . The obligations of the Lenders hereunder to make Revolving Loans, to fund participations in Letters of Credit and Swingline Loans and to make payments pursuant to Section 11.04(c) are several and not joint. The failure of any Lender to make any Loan, to fund any such participation or to make any payment under Section 11.04(c) on any date required hereunder shall not relieve any other Lender of its corresponding obligation to do so on such date, and no Lender shall be responsible for the failure of any other Lender to so make its Loan, to purchase its participation or to make its payment under Section 11.04(c).

(e) Funding Source . Nothing herein shall be deemed to obligate any Lender to obtain the funds for any Loan in any particular place or manner or to constitute a

representation by any Lender that it has obtained or will obtain the funds for any Loan in any particular place or manner.

(f) Pro Rata Treatment . Except to the extent otherwise provided herein: (i) each Borrowing (other than Swingline Borrowings) shall be made from the Appropriate Lenders, each payment of fees under Section 2.09 and Sections 2.03(h) and (i) shall be made for account of the Appropriate Lenders, and each termination or reduction of the amount of the Revolving Commitments shall be applied to the respective Revolving Commitments of the Lenders, pro rata according to the amounts of their respective Revolving Commitments; (ii) each Borrowing shall be allocated pro rata among the Lenders according to the amounts of their respective Revolving Commitments (in the case of the making of Revolving Loans) or their respective Loans that are to be included in such Borrowing (in the case of conversions and continuations of Loans); (iii) each payment or prepayment of principal of Loans by the Borrower shall be made for account of the Appropriate Lenders pro rata in accordance with the respective unpaid principal amounts of the Loans held by them; and (iv) each payment of interest on Loans by the Borrower shall be made for account of the Appropriate Lenders pro rata in accordance with the amounts of interest on such Loans then due and payable to the respective Appropriate Lenders.

2.13 Sharing of Payments by Lenders .

If any Lender shall, by exercising any right of setoff or counterclaim or otherwise, obtain payment in respect of (a) Obligations in respect of the Revolving Facility due and payable to such Lender hereunder and under the other Loan Documents at such time in excess of its ratable share (according to the proportion of (i) the amount of such Obligations due and payable to such Lender at such time to (ii) the aggregate amount of the Obligations in respect of the Revolving Facility due and payable to all Lenders hereunder and under the other Loan Documents at such time) of payments on account of the Obligations in respect of the Revolving Facility due and payable to all Lenders hereunder and under the other Loan Documents at such time obtained by all the Lenders at such time or (b) Obligations in respect of any of the Revolving Facility owing (but not due and payable) to such Lender hereunder and under the other Loan Documents at such time in excess of its ratable share (according to the proportion of (i) the amount of such Obligations owing (but not due and payable) to such Lender at such time to (ii) the aggregate amount of the Obligations in respect of the Revolving Facility owing (but not due and payable) to all Lenders hereunder and under the other Loan Documents at such time) of payments on account of the Obligations in respect of the Revolving Facility owing (but not due and payable) to all Lenders hereunder and under the other Loan Documents at such time obtained by all of the Lenders at such time, then, in each case under clauses (a) and (b) above, the Lender receiving such greater proportion shall (A) notify the Administrative Agent of such fact, and (B) purchase (for cash at face value) participations in the Loans and subparticipations in L/C Obligations and Swingline Loans of the other Lenders, or make such other adjustments as shall be equitable, so that the benefit of all such payments shall be shared by the Lenders ratably in accordance with the aggregate amount of Obligations in respect of the Revolving Facility then due and payable to the Lenders or owing (but not due and payable) to the Lenders, as the case may be, provided that:

(1) if any such participations or subparticipations are purchased and all or any portion of the payment giving rise thereto is recovered, such participations or subparticipations shall be rescinded and the purchase price restored to the extent of such recovery, without interest; and

(2) the provisions of this Section shall not be construed to apply to (x) any payment made by or on behalf of the Borrower pursuant to and in accordance with the express terms of this Agreement (including the application of funds arising from the existence of a Defaulting Lender), (y) the application of Cash Collateral provided for in Section 2.14, or (z) any payment obtained by a Lender as consideration for the assignment of or sale of a participation in any of its Loans or subparticipations in L/C Obligations or Swingline Loans to any assignee or participant, other than an assignment to any Loan Party or any Affiliate thereof (as to which the provisions of this Section shall apply).

Each Loan Party consents to the foregoing and agrees, to the extent it may effectively do so under applicable Law, that any Lender acquiring a participation pursuant to the foregoing arrangements may exercise against such Loan Party rights of setoff and counterclaim with respect to such participation as fully as if such Lender were a direct creditor of such Loan Party in the amount of such participation.

2.14 Cash Collateral .

(a) Certain Credit Support Events . If (i) any L/C Issuer has honored any full or partial drawing request under any Letter of Credit and such drawing has resulted in an L/C Borrowing, (ii) as of the Letter of Credit Expiration Date, any L/C Obligation for any reason remains outstanding, (iii) the Borrower shall be required to provide Cash Collateral pursuant to Section 2.05 or 8.02(c), or (iv) there shall exist a Defaulting Lender, the Borrower shall immediately (in the case of clause (iii) above) or within one (1) Business Day (in all other cases) following any request by the Administrative Agent or any L/C Issuer, provide Cash Collateral in an amount not less than the applicable Minimum Collateral Amount (determined in the case of Cash Collateral provided pursuant to clause (iv) above, after giving effect to Section 2.15(a)(iv) and any Cash Collateral provided by the Defaulting Lender). Additionally, if the Administrative Agent notifies the Company at any time that the Outstanding Amount of all L/C Obligations at such time exceeds 105% of the Letter of Credit Sublimit then in effect, then within two (2) Business Days after receipt of such notice, the Company shall provide Cash Collateral for the Outstanding Amount of the L/C Obligations in an amount not less than the amount by which the Outstanding Amount of all L/C Obligations exceeds the Letter of Credit Sublimit.

(b) Grant of Security Interest . The Borrower, and to the extent provided by any Defaulting Lender, such Defaulting Lender, hereby grants to (and subjects to the control of) the Administrative Agent, for the benefit of the Administrative Agent, the L/C Issuers and the Lenders, and agrees to maintain, a first priority security interest in all such cash, deposit accounts and all balances therein, and all other property so provided as collateral pursuant hereto, and in all proceeds of the foregoing, all as security for the obligations to which such

Cash Collateral may be applied pursuant to Section 2.14(c). If at any time the Administrative Agent determines that Cash Collateral is subject to any right or claim of any Person other than the Administrative Agent or the L/C Issuers as herein provided, or that the total amount of such Cash Collateral is less than the Minimum Collateral Amount, the Borrower will, promptly upon demand by the Administrative Agent, pay or provide to the Administrative Agent additional Cash Collateral in an amount sufficient to eliminate such deficiency. All Cash Collateral (other than credit support not constituting funds subject to deposit) shall be maintained in one or more blocked, interest bearing deposit accounts at Bank of America (it being understood and agreed that Bank of America and the Administrative Agent make no warranty or guarantee as to the level of, or amount (if any) of, interest with respect to such deposit account). The Borrower shall pay on demand therefor from time to time all customary account opening, activity and other administrative fees and charges in connection with the maintenance and disbursement of Cash Collateral.

(c) Application . Notwithstanding anything to the contrary contained in this Agreement, Cash Collateral provided under any of this Section 2.14 or Sections 2.03, 2.05, 2.15 or 8.02 in respect of Letters of Credit shall be held and applied to the satisfaction of the specific L/C Obligations, obligations to fund participations therein (including, as to Cash Collateral provided by a Revolving Lender that is a Defaulting Lender, any interest accrued on such obligation) and other obligations for which the Cash Collateral was so provided, prior to any other application of such property as may be provided for herein.

(d) Release . Cash Collateral (or the appropriate portion thereof) provided to reduce Fronting Exposure or to secure other obligations shall be released promptly following (i) the elimination of the applicable Fronting Exposure or other obligations giving rise thereto (including by the termination of Defaulting Lender status of the applicable Revolving Lender (or, as appropriate, its assignee following compliance with Section 11.06(b)(vi))) or (ii) the determination by the Administrative Agent and the applicable L/C Issuer that there exists excess Cash Collateral; provided , however , (A) any such release shall be without prejudice to, and any disbursement or other transfer of Cash Collateral shall be and remain subject to, any other Lien conferred under the Loan Documents and the other applicable provisions of the Loan Documents, and (B) the Person providing Cash Collateral and the applicable L/C Issuer may agree that Cash Collateral shall not be released but instead held to support future anticipated Fronting Exposure or other obligations.

(e) Release of Lenders' Obligations . Notwithstanding anything to the contrary contained herein or in any other Loan Document, in the event that (i) any applicable L/C Issuer shall have issued, in accordance with Section 2.03(a)(ii)(B), a Letter of Credit with an expiry date occurring after the Letter of Credit Expiration Date and (ii) the Borrower shall have Cash Collateralized the Outstanding Amount of all such L/C Obligations in respect of such Letter of Credit pursuant to Section 2.14(a) above, then, upon the provision of such Cash Collateral and without any further action, each Lender hereunder shall be automatically released from any further obligation to such L/C Issuer in respect of such Letter of Credit, including, without limitation, any obligation of any such Lender to reimburse such L/C Issuer for amounts drawn under such Letter of Credit or to purchase any risk participation

therein; provided , however , that all such obligations of each Lender hereunder to such L/C Issuer in respect of such Letter of Credit shall be revived if any Cash Collateral provided by the Borrower in respect of such Letter of Credit is subsequently invalidated, declared to be fraudulent or preferential, set aside or required (including pursuant to any settlement entered into by the Administrative Agent or such L/C Issuer) to be repaid to a trustee, receiver or any other party, in connection with any proceeding under any Debtor Relief Laws or otherwise, all as if such Cash Collateral had not been provided. The obligations of the Lenders under this paragraph shall survive the Facility Termination Date.

2.15 Defaulting Lenders .

(a) Adjustments . Notwithstanding anything to the contrary contained in this Agreement, if any Lender becomes a Defaulting Lender, then, until such time as that Lender is no longer a Defaulting Lender, to the extent permitted by applicable Law:

(i) Waivers and Amendments . Such Defaulting Lender's right to approve or disapprove any amendment, waiver or consent with respect to this Agreement shall be restricted as set forth in the definition of "Required Lenders" and Section 11.01.

(ii) Defaulting Lender Waterfall . Any payment of principal, interest, fees or other amounts received by the Administrative Agent for the account of such Defaulting Lender (whether voluntary or mandatory, at maturity, pursuant to Article VIII or otherwise) or received by the Administrative Agent from a Defaulting Lender pursuant to Section 11.08 shall be applied at such time or times as may be determined by the Administrative Agent as follows: first , to the payment of any amounts owing by such Defaulting Lender to the Administrative Agent hereunder; second , to the payment on a pro rata basis of any amounts owing by such Defaulting Lender to any L/C Issuer or Swingline Lender hereunder; third , to Cash Collateralize each L/C Issuer's Fronting Exposure with respect to such Defaulting Lender in accordance with Section 2.14; fourth , as the Borrower may request (so long as no Default or Event of Default exists), to the funding of any Loan in respect of which such Defaulting Lender has failed to fund its portion thereof as required by this Agreement, as determined by the Administrative Agent; fifth , if so determined by the Administrative Agent and the Borrower, to be held in a deposit account and released pro rata in order to (A) satisfy such Defaulting Lender's potential future funding obligations with respect to Loans under this Agreement and (B) Cash Collateralize each L/C Issuer's future Fronting Exposure with respect to such Defaulting Lender with respect to future Letters of Credit issued under this Agreement, in accordance with Section 2.14; sixth , to the payment of any amounts owing to the Lenders, the L/C Issuers or Swingline Lender as a result of any judgment of a court of competent jurisdiction obtained by any Lender, any L/C Issuer or the Swingline Lender against such Defaulting Lender as a result of such Defaulting Lender's breach of its obligations under this Agreement; seventh , so long as no Default or Event of Default exists, to the payment of any amounts owing to the Borrower as a result of any

judgment of a court of competent jurisdiction obtained by the Borrower against such Defaulting Lender as a result of such Defaulting Lender's breach of its obligations under this Agreement; and eighth , to such Defaulting Lender or as otherwise as may be required under the Loan Documents in connection with any Lien conferred thereunder or directed by a court of competent jurisdiction; provided that if (1) such payment is a payment of the principal amount of any Loans or L/C Borrowings in respect of which such Defaulting Lender has not fully funded its appropriate share, and (2) such Loans were made or the related Letters of Credit were issued at a time when the conditions set forth in Section 4.02 were satisfied or waived, such payment shall be applied solely to pay the Loans of, and L/C Obligations owed to, all Non-Defaulting Lenders on a pro rata basis prior to being applied to the payment of any Loans of, or L/C Obligations owed to, such Defaulting Lender until such time as all Loans and funded and unfunded participations in L/C Obligations and Swingline Loans are held by the Lenders pro rata in accordance with the Revolving Commitments hereunder without giving effect to Section 2.15(a)(iv). Any payments, prepayments or other amounts paid or payable to a Defaulting Lender that are applied (or held) to pay amounts owed by a Defaulting Lender or to post Cash Collateral pursuant to this Section 2.15(a)(ii) shall be deemed paid to and redirected by such Defaulting Lender, and each Lender irrevocably consents hereto.

(iii) Certain Fees .

(A) Fees . No Defaulting Lender shall be entitled to receive any fee payable under Section 2.09(a) for any period during which that Lender is a Defaulting Lender (and the Borrower shall not be required to pay any such fee that otherwise would have been required to have been paid to that Defaulting Lender).

(B) Letter of Credit Fees . Each Defaulting Lender shall be entitled to receive Letter of Credit Fees for any period during which that Lender is a Defaulting Lender only to the extent allocable to its Applicable Revolving Percentage of the stated amount of Letters of Credit for which it has provided Cash Collateral pursuant to Section 2.14.

(C) Defaulting Lender Fees . With respect to any fee payable under Section 2.09(a) or any Letter of Credit Fee not required to be paid to any Defaulting Lender pursuant to clause (A) or (B) above, the Borrower shall (1) pay to each Non-Defaulting Lender that portion of any such fee otherwise payable to such Defaulting Lender with respect to such Defaulting Lender's participation in L/C Obligations or Swingline Loans that has been reallocated to such Non-Defaulting Lender pursuant to clause (iv) below, (2) pay to each L/C Issuer and Swingline Lender, as applicable, the amount of any such fee otherwise payable to such Defaulting Lender to the extent allocable to such L/C Issuer's or Swingline Lender's Fronting Exposure to such Defaulting Lender, and (3) not be required to pay the remaining amount of any such fee.

(iv) Reallocation of Applicable Revolving Percentages to Reduce Fronting Exposure . All or any part of such Defaulting Lender's participation in L/C Obligations and Swingline Loans shall be reallocated among the Non-Defaulting Lenders in accordance with their respective Applicable Revolving Percentages (calculated without regard to such Defaulting Lender's Revolving Commitment) but only to the extent that such reallocation does not cause the aggregate Revolving Exposure of any Non-Defaulting Lender to exceed such Non-Defaulting Lender's Revolving Commitment. Subject to Section 11.20, no reallocation hereunder shall constitute a waiver or release of any claim of any party hereunder against a Defaulting Lender arising from that Lender having become a Defaulting Lender, including any claim of a Non-Defaulting Lender as a result of such Non-Defaulting Lender's increased exposure following such reallocation.

(v) Cash Collateral, Repayment of Swingline Loans . If the reallocation described in clause (a)(iv) above cannot, or can only partially, be effected, the Borrower shall, without prejudice to any right or remedy available to it hereunder or under applicable Law, (A) first, prepay Swingline Loans in an amount equal to the Swingline Lender's Fronting Exposure and (B) second, Cash Collateralize each L/C Issuer's Fronting Exposure in accordance with the procedures set forth in Section 2.14.

(b) Defaulting Lender Cure . If the Borrower, the Administrative Agent, Swingline Lender and the L/C Issuers agree in writing that a Lender is no longer a Defaulting Lender, the Administrative Agent will so notify the parties hereto, whereupon as of the effective date specified in such notice and subject to any conditions set forth therein (which may include arrangements with respect to any Cash Collateral), that Lender will, to the extent applicable, purchase at par that portion of outstanding Loans of the other Lenders or take such other actions as the Administrative Agent may determine to be necessary to cause the Loans and funded and unfunded participations in Letters of Credit and Swingline Loans to be held on a pro rata basis by the Lenders in accordance with their Applicable Percentages (without giving effect to Section 2.15(a)(iv)), whereupon such Lender will cease to be a Defaulting Lender; provided that no adjustments will be made retroactively with respect to fees accrued or payments made by or on behalf of the Borrower while that Lender was a Defaulting Lender; and provided , further , that except to the extent otherwise expressly agreed by the affected parties, no change hereunder from Defaulting Lender to Lender will constitute a waiver or release of any claim of any party hereunder arising from that Lender's having been a Defaulting Lender.

2.16 Increase in Revolving Commitments .

(a) Increase in Revolving Facility .

(i) Upon notice to the Administrative Agent (which shall promptly notify the Revolving Lenders), the Borrower may from time to time after the Closing Date, request an increase in the Revolving Facility by an aggregate amount (for all such requests) not to exceed $300,000,000 (any such increase in the Revolving Facility,

an " Incremental Revolving Facility "); provided that (i) any such request for an Incremental Revolving Facility shall be in a minimum amount of $25,000,000, and in increments of $5,000,000 in excess thereof, or, if less, the entire remaining amount available for such Incremental Revolving Facility, and (ii) in no event shall the Aggregate Revolving Commitments under the Revolving Facility (after giving effect to all requested increases therein) exceed $800,000,000. Subject to the terms and conditions hereof, the Borrower may seek commitments from existing Lenders or any other Person that is an Eligible Assignee who shall become a Revolving Lender in connection therewith. At the time of sending such notice, the Borrower (in consultation with the Administrative Agent) shall specify the time period within which each Revolving Lender is requested to respond (which shall in no event be less than ten (10) Business Days from the date of delivery of such notice to the Revolving Lenders).

(ii) Revolving Lender Elections to Increase . Each Revolving Lender shall notify the Administrative Agent within such time period whether or not it agrees to increase its Revolving Commitment and, if so, whether by an amount equal to, greater than, or less than its Applicable Percentage of such requested increase. Any Revolving Lender not responding within such time period shall be deemed to have declined to increase its Revolving Commitment.

(iii) Notification by Administrative Agent; Additional Revolving Lenders . The Administrative Agent shall notify the Borrower and each Revolving Lender of the Revolving Lenders' responses to each request made hereunder. To achieve the full amount of a requested increase (to the extent the existing Revolving Lenders do not agree to provide the entire amount of the requested increase), and subject to the approval of the Administrative Agent, the L/C Issuers and the Swingline Lender, the Borrower may also invite additional Eligible Assignees to become Revolving Lenders (together with any existing Revolving Lender participating in such increase, each, an " Increasing Revolving Lender ") pursuant to a joinder agreement in form and substance reasonably satisfactory to the Administrative Agent and its counsel. Nothing contained herein shall constitute, or otherwise be deemed to be, a commitment on the part of any Revolving Lender to participate in any increase in the Revolving Facility.

(iv) Effective Date and Allocations . If the Revolving Facility is increased in accordance with this Section, the Administrative Agent and the Borrower shall determine (x) the effective date of any such increase (the " Revolving Facility Increase Effective Date ") and (y) the final allocation of such increase among the Increasing Revolving Lenders and Schedule 1.01(b) attached hereto shall be automatically updated to reflect the same. The Administrative Agent shall promptly notify the Borrower and the Revolving Lenders of the final allocation of such increase and the Revolving Facility Increase Effective Date.

(b) Conditions to Effectiveness of Increase . As a condition precedent to each such increase in the Revolving Facility pursuant to this Section 2.16:

(i) as of the Revolving Increase Effective Date, before and after giving effect to such increase, (A) no Default or Event of Default shall then exist or would exist after giving effect thereto exists, (B) the Borrower shall demonstrate to the reasonable satisfaction of the Administrative Agent that, after giving effect to such increase on a Pro Forma Basis (as if the entire amount of the Incremental Revolving Facility has been fully-funded), the Borrower is in Pro Forma Compliance, and (C) the representations and warranties contained in Article V and each other Loan Documents shall be true and correct in all material respects (or in the case of a representation or warranty that is already subject to a materiality condition, in all respects), except to the extent that such representations and warranties specifically refer to an earlier date, in which case they shall be true and correct as of such earlier date, and except that for purposes of this Section 2.16 , the representations and warranties contained in clauses (a) and (b) of Section 5.05 shall be deemed to refer to the most recent statements furnished pursuant to clauses (a) and (b) , respectively, of Section 6.01 .

(ii) the Borrower shall have delivered to the Administrative Agent a certificate of each Loan Party dated as of the Revolving Facility Increase Effective Date, signed by a Responsible Officer of such Loan Party (x) certifying and attaching the resolutions adopted by such Loan Party approving or consenting to such increase, and (y) certifying (and attaching calculations, as appropriate, in reasonable detail necessary to demonstrate) that, before and after giving effect to such increase each, of the conditions set forth in clause (i) above are satisfied; and

(iii) the Borrower shall have delivered, or cause to be delivered, customary legal opinions, officers' certificates, reaffirmation agreements and other documents consistent in all material respects with those delivered on the Closing Date under Section 4.01 with respect to the Borrower and all applicable Subsidiary Guarantors (other than changes to such legal opinions resulting from a change in Law, change in fact or change to counsel's form of opinion reasonably satisfactory to the Administrative Agent) as reasonably requested by the Administrative Agent in connection with each such increase in the Revolving Facility.

The Borrower shall prepay any Revolving Loans outstanding on the Revolving Increase Effective Date (and pay any additional amounts required pursuant to Section 3.05) to the extent necessary to keep the outstanding Revolving Loans ratable with any revised Applicable Revolving Percentages arising from any nonratable increase in the Revolving Commitments under this Section 2.16.

(c) Terms of Increase . Any increase in the Revolving Facility shall be made on the same terms (including, without limitation, interest, payment, amortization and maturity terms), and shall be subject to the same conditions as existing Revolving Commitments except customary arrangement or commitment fees payable to the Arrangers or one or more

Increasing Revolving Lenders may be different from those paid with respect to the existing Revolving Commitments of the existing Lenders on or prior to the Closing Date or with respect to any other Increasing Revolving Lender in connection with any other increase in the Revolving Credit Facility pursuant to this Section 2.16.

(d) Conflicting Provisions . This Section 2.16 shall supersede any provisions in Section 2.13 or 11.01 to the contrary.

ARTICLE III

TAXES, YIELD PROTECTION AND ILLEGALITY

3.01 Taxes .

(a) Payments Free of Taxes; Obligation to Withhold; Payments on Account of Taxes .

(i) Any and all payments by or on account of any obligation of any Loan Party under any Loan Document shall be made without deduction or withholding for any Taxes, except as required by applicable Laws. If any applicable Laws (as determined in the good faith discretion of the Administrative Agent) require the deduction or withholding of any Tax from any such payment by the Administrative Agent or a Loan Party, then the Administrative Agent or such Loan Party shall be entitled to make such deduction or withholding, upon the basis of the information and documentation to be delivered pursuant to subsection (e) below.

(ii) If any Loan Party or the Administrative Agent shall be required by the Code to withhold or deduct any Taxes, including both United States federal backup withholding and withholding taxes, from any payment, then (A) the Administrative Agent shall withhold or make such deductions as are determined by the Administrative Agent to be required based upon the information and documentation it has received pursuant to subsection (e) below, (B) the Administrative Agent shall timely pay the full amount withheld or deducted to the relevant Governmental Authority in accordance with the Code, and (C) to the extent that the withholding or deduction is made on account of Indemnified Taxes, the sum payable by the applicable Loan Party shall be increased as necessary so that after any required withholding or the making of all required deductions (including deductions applicable to additional sums payable under this Section 3.01) the applicable Recipient receives an amount equal to the sum it would have received had no such withholding or deduction been made.

(iii) If any Loan Party or the Administrative Agent shall be required by any applicable Laws other than the Code to withhold or deduct any Taxes from any payment, then (A) such Loan Party or the Administrative Agent, as required by such Laws, shall withhold or make such deductions as are determined by it to be required based upon the information and documentation it has received pursuant to subsection

(e) below, (B) such Loan Party or the Administrative Agent, to the extent required by such Laws, shall timely pay the full amount withheld or deducted to the relevant Governmental Authority in accordance with such Laws, and (C) to the extent that the withholding or deduction is made on account of Indemnified Taxes, the sum payable by the applicable Loan Party shall be increased as necessary so that after any required withholding or the making of all required deductions (including deductions applicable to additional sums payable under this Section 3.01) the applicable Recipient receives an amount equal to the sum it would have received had no such withholding or deduction been made.

(b) Payment of Other Taxes by the Loan Parties . Without limiting the provisions of subsection (a) above, the Loan Parties shall timely pay to the relevant Governmental Authority in accordance with applicable law, or at the option of the Administrative Agent timely reimburse it for the payment of, any Other Taxes.

(c) Tax Indemnifications .

(i) Each of the Loan Parties shall, and does hereby, jointly and severally indemnify each Recipient, and shall make payment in respect thereof within ten (10) days after demand therefor, for the full amount of any Indemnified Taxes (including Indemnified Taxes imposed or asserted on or attributable to amounts payable under this Section 3.01) payable or paid by such Recipient or required to be withheld or deducted from a payment to such Recipient, and any penalties, interest and reasonable expenses arising therefrom or with respect thereto, whether or not such Indemnified Taxes were correctly or legally imposed or asserted by the relevant Governmental Authority. A certificate as to the amount of such payment or liability delivered to the Borrower by a Lender or an L/C Issuer (with a copy to the Administrative Agent), or by the Administrative Agent on its own behalf or on behalf of a Lender or an L/C Issuer, shall be conclusive absent manifest error. Each of the Loan Parties shall also, and does hereby, jointly and severally indemnify the Administrative Agent, and shall make payment in respect thereof within ten (10) days after demand therefor, for any amount which a Lender or an L/C Issuer for any reason fails to pay indefeasibly to the Administrative Agent as required pursuant to Section 3.01(c)(ii) below.

(ii) Each Lender and each L/C Issuer shall, and does hereby, severally indemnify and shall make payment in respect thereof within ten (10) days after demand therefor, (A) the Administrative Agent against any Indemnified Taxes attributable to such Lender or such L/C Issuer (but only to the extent that any Loan Party has not already indemnified the Administrative Agent for such Indemnified Taxes and without limiting the obligation of the Loan Parties to do so), (B) the Administrative Agent and the Loan Parties, as applicable, against any Taxes attributable to such Lender's failure to comply with the provisions of Section 11.06(d) relating to the maintenance of a Participant Register and (C) the Administrative Agent and the Loan Parties, as applicable, against any Excluded Taxes attributable

to such Lender or such L/C Issuer, in each case, that are payable or paid by the Administrative Agent or a Loan Party in connection with any Loan Document, and any reasonable expenses arising therefrom or with respect thereto, whether or not such Taxes were correctly or legally imposed or asserted by the relevant Governmental Authority. A certificate as to the amount of such payment or liability delivered to any Lender by the Administrative Agent shall be conclusive absent manifest error. Each Lender and each L/C Issuer hereby authorizes the Administrative Agent to set off and apply any and all amounts at any time owing to such Lender or such L/C Issuer, as the case may be, under this Agreement or any other Loan Document against any amount due to the Administrative Agent under this clause (ii).

(d) Evidence of Payments . As soon as practicable after any payment of Taxes by any Loan Party to a Governmental Authority, as provided in this Section 3.01, the Borrower shall deliver to the Administrative Agent the original or a certified copy of a receipt issued by such Governmental Authority evidencing such payment, a copy of any return reporting such payment or other evidence of such payment reasonably satisfactory to the Administrative Agent.

(e) Status of Lenders; Tax Documentation .

(i) Any Lender that is entitled to an exemption from or reduction of withholding Tax with respect to payments made under any Loan Document shall deliver to the Borrower and the Administrative Agent, at the time or times reasonably requested by the Borrower or the Administrative Agent, such properly completed and executed documentation reasonably requested by the Borrower or the Administrative Agent as will permit such payments to be made without withholding or at a reduced rate of withholding. In addition, any Lender, if reasonably requested by the Borrower or the Administrative Agent, shall deliver such other documentation prescribed by applicable Law or reasonably requested by the Borrower or the Administrative Agent as will enable the Borrower or the Administrative Agent to determine whether or not such Lender is subject to backup withholding or information reporting requirements. Notwithstanding anything to the contrary in the preceding two sentences, the completion, execution and submission of such documentation (other than such documentation set forth in Section 3.01(e)(ii)(A), (ii)(B) and (ii)(D) below) shall not be required if in the Lender's reasonable judgment such completion, execution or submission would subject such Lender to any material unreimbursed cost or expense or would materially prejudice the legal or commercial position of such Lender.

(ii) Without limiting the generality of the foregoing, in the event that the Borrower is a U.S. Person,

(A) any Lender that is a U.S. Person shall deliver to the Borrower and the Administrative Agent on or prior to the date on which such Lender becomes a Lender under this Agreement (and from time to time thereafter

upon the reasonable request of the Borrower or the Administrative Agent), executed copies of IRS Form W-9 certifying that such Lender is exempt from U.S. federal backup withholding tax;

(B) any Foreign Lender shall, to the extent it is legally entitled to do so, deliver to the Borrower and the Administrative Agent (in such number of copies as shall be requested by the recipient) on or prior to the date on which such Foreign Lender becomes a Lender under this Agreement (and from time to time thereafter upon the reasonable request of the Borrower or the Administrative Agent), whichever of the following is applicable:

(1) in the case of a Foreign Lender claiming the benefits of an income tax treaty to which the United States is a party (x) with respect to payments of interest under any Loan Document, executed copies of IRS Form W-8BEN-E (or W-8BEN, as applicable) establishing an exemption from, or reduction of, U.S. federal withholding Tax pursuant to the "interest" article of such tax treaty and (y) with respect to any other applicable payments under any Loan Document, IRS Form W-8BEN-E (or W-8BEN, as applicable) establishing an exemption from, or reduction of, U.S. federal withholding Tax pursuant to the "business profits" or "other income" article of such tax treaty;

(2) executed originals of IRS Form W-8ECI;

(3) in the case of a Foreign Lender claiming the benefits of the exemption for portfolio interest under Section 881(c) of the Code, (x) a certificate substantially in the form of Exhibit K-1 to the effect that such Foreign Lender is not a "bank" within the meaning of Section 881(c)(3)(A) of the Code, a "10 percent shareholder" of the Borrower within the meaning of Section 881(c)(3)(B) of the Code, or a "controlled foreign corporation" described in Section 881(c)(3)(C) of the Code (a " U.S. Tax Compliance Certificate ") and (y) executed copies of IRS Form W-8BEN-E (or W-8BEN, as applicable); or

(4) to the extent a Foreign Lender is not the beneficial owner, executed copies of IRS Form W-8IMY, accompanied by IRS Form W-8ECI, IRS Form W-8BEN-E (or W-8BEN, as applicable), a U.S. Tax Compliance Certificate substantially in the form of Exhibit K-2 or Exhibit K-3 , IRS Form W-9, and/or other certification documents from each beneficial owner, as applicable; provided that if the Foreign Lender is a partnership and one or more direct or indirect partners of such Foreign Lender are claiming the portfolio interest exemption, such Foreign Lender may provide a U.S. Tax Compliance

Certificate substantially in the form of Exhibit K-4 on behalf of each such direct and indirect partner;

(C) any Foreign Lender shall, to the extent it is legally entitled to do so, deliver to the Borrower and the Administrative Agent (in such number of copies as shall be requested by the recipient) on or prior to the date on which such Foreign Lender becomes a Lender under this Agreement (and from time to time thereafter upon the reasonable request of the Borrower or the Administrative Agent), executed copies (or originals, as required) of any other form prescribed by applicable Law as a basis for claiming exemption from or a reduction in U.S. federal withholding Tax, duly completed, together with such supplementary documentation as may be prescribed by applicable Law to permit the Borrower or the Administrative Agent to determine the withholding or deduction required to be made; and

(D) if a payment made to a Lender under any Loan Document would be subject to U.S. federal withholding Tax imposed by FATCA if such Lender were to fail to comply with the applicable reporting requirements of FATCA (including those contained in Section 1471(b) or 1472(b) of the Code, as applicable), such Lender shall deliver to the Borrower and the Administrative Agent at the time or times prescribed by law and at such time or times reasonably requested by the Borrower or the Administrative Agent such documentation prescribed by applicable Law (including as prescribed by Section 1471(b)(3)(C)(i) of the Code) and such additional documentation reasonably requested by the Borrower or the Administrative Agent as may be necessary for the Borrower and the Administrative Agent to comply with their obligations under FATCA and to determine that such Lender has complied with such Lender's obligations under FATCA or to determine the amount to deduct and withhold from such payment. Solely for purposes of this clause (D), "FATCA" shall include any amendments made to FATCA after the date of this Agreement.

(iii) Each Lender agrees that if any form or certification it previously delivered pursuant to this Section 3.01 expires or becomes obsolete or inaccurate in any respect, it shall update such form or certification or promptly notify the Borrower and the Administrative Agent in writing of its legal inability to do so.

(f) Treatment of Certain Refunds . Unless required by applicable Laws, at no time shall the Administrative Agent have any obligation to file for or otherwise pursue on behalf of a Lender or an L/C Issuer, or have any obligation to pay to any Lender or any L/C Issuer, any refund of Taxes withheld or deducted from funds paid for the account of such Lender or such L/C Issuer, as the case may be. If any Recipient determines, in its sole discretion exercised in good faith, that it has received a refund of any Taxes as to which it has been indemnified by any Loan Party or with respect to which any Loan Party has paid additional amounts pursuant to this Section 3.01, it shall pay to such Loan Party an amount

equal to such refund (but only to the extent of indemnity payments made, or additional amounts paid, by such Loan Party under this Section 3.01 with respect to the Taxes giving rise to such refund), net of all out-of-pocket expenses (including Taxes) incurred by such Recipient, as the case may be, and without interest (other than any interest paid by the relevant Governmental Authority with respect to such refund), provided that each Loan Party, upon the request of the Recipient, agrees to repay the amount paid over to such Loan Party (plus any penalties, interest or other charges imposed by the relevant Governmental Authority) to the Recipient in the event the Recipient is required to repay such refund to such Governmental Authority. Notwithstanding anything to the contrary in this subsection, in no event will the applicable Recipient be required to pay any amount to such Loan Party pursuant to this subsection the payment of which would place the Recipient in a less favorable net after-Tax position than such Recipient would have been in if the Tax subject to indemnification and giving rise to such refund had not been deducted, withheld or otherwise imposed and the indemnification payments or additional amounts with respect to such Tax had never been paid. This subsection shall not be construed to require any Recipient to make available its tax returns (or any other information relating to its taxes that it deems confidential) to any Loan Party or any other Person.

(g) Survival. Each party's obligations under this Section 3.01 shall survive the resignation or replacement of the Administrative Agent or any assignment of rights by, or the replacement of, a Lender or an L/C Issuer, the termination of the Revolving Commitments and the repayment, satisfaction or discharge of all other Obligations.

3.02 Illegality.

(a) If any Lender determines that any Law has made it unlawful, or that any Governmental Authority has asserted that it is unlawful, for any Lender or its Lending Office to perform any of its obligations hereunder or to make, maintain or fund or charge interest with respect to any Credit Extension or to determine or charge interest rates based upon the Eurodollar Rate, or any Governmental Authority has imposed material restrictions on the authority of such Lender to purchase or sell, or to take deposits of, Dollars in the London interbank market, then, on notice thereof by such Lender to the Borrower through the Administrative Agent, (a) any obligation of such Lender to issue, make, maintain, fund or charge interest with respect to any such Credit Extension or continue Eurodollar Rate Loans or to convert Base Rate Loans to Eurodollar Rate Loans shall be suspended, and (b) if such notice asserts the illegality of such Lender making or maintaining Base Rate Loans the interest rate on which is determined by reference to the Eurodollar Rate component of the Base Rate, the interest rate on which Base Rate Loans of such Lender shall, if necessary to avoid such illegality, be determined by the Administrative Agent without reference to the Eurodollar Rate component of the Base Rate, in each case until such Lender notifies the Administrative Agent and the Borrower that the circumstances giving rise to such determination no longer exist. Upon receipt of such notice, (i) the Borrower shall, upon demand from such Lender (with a copy to the Administrative Agent), prepay or, if applicable, convert all Eurodollar Rate Loans of such Lender to Base Rate Loans (the interest rate on which Base Rate Loans of such Lender shall, if necessary to avoid such illegality, be

determined by the Administrative Agent without reference to the Eurodollar Rate component of the Base Rate), either on the last day of the Interest Period therefor, if such Lender may lawfully continue to maintain such Eurodollar Rate Loans to such day, or immediately, if such Lender may not lawfully continue to maintain such Eurodollar Rate Loans and (ii) if such notice asserts the illegality of such Lender determining or charging interest rates based upon the Eurodollar Rate, the Administrative Agent shall during the period of such suspension compute the Base Rate applicable to such Lender without reference to the Eurodollar Rate component thereof until the Administrative Agent is advised in writing by such Lender that it is no longer illegal for such Lender to determine or charge interest rates based upon the Eurodollar Rate. Upon any such prepayment or conversion, the Borrower shall also pay accrued interest on the amount so prepaid or converted.

(b) If, in any applicable jurisdiction, the Administrative Agent or the applicable L/C Issuer determines that any Law has made it unlawful, or that any Governmental Authority has asserted that it is unlawful, for the Administrative Agent or the applicable L/C Issuer to (i) perform any of its obligations hereunder or under any other Loan Document, or (ii) issue, make, maintain, fund or charge interest or fees with respect to any Credit Extension such Person shall promptly notify the Administrative Agent, then, upon the Administrative Agent notifying the Borrower, and until such notice by such Person is revoked, any obligation of such Person to issue, make, maintain, fund or charge interest or fees with respect to any such Credit Extension shall be suspended, and to the extent required by applicable Law, cancelled. Upon receipt of such notice, the Loan Parties shall, (A) repay that Person's applicable Obligations on the date specified by such Person in the notice delivered to the Administrative Agent (being no earlier than the last day of any applicable grace period permitted by applicable Law) and (B) take all reasonable actions requested by such Person to mitigate or avoid such illegality.

3.03 Inability to Determine Rates .

(a) If in connection with any request for a Eurodollar Rate Loan or a conversion to or continuation thereof, (i) the Administrative Agent determines that (A) Dollar deposits are not being offered to banks in the London interbank eurodollar market for the applicable amount and Interest Period of such Eurodollar Rate Loan, or (B) adequate and reasonable means do not exist for determining the Eurodollar Rate for any requested Interest Period with respect to a proposed Eurodollar Rate Loan or in connection with an existing or proposed Base Rate Loan (in each case with respect to clause (i), " Impacted Loans "), or (ii) the Administrative Agent or the Required Lenders determine that for any reason Eurodollar Rate for any requested Interest Period with respect to a proposed Eurodollar Rate Loan does not adequately and fairly reflect the cost to such Lenders of funding such Loan, the Administrative Agent will promptly so notify the Borrower and each Lender. Thereafter, (x) the obligation of the Lenders to make or maintain Eurodollar Rate Loans shall be suspended (to the extent of the affected Eurodollar Rate Loans or Interest Periods), and (y) in the event of a determination described in the preceding sentence with respect to the Eurodollar Rate component of the Base Rate, the utilization of the Eurodollar Rate component in determining the Base Rate shall be suspended, in each case until the

Administrative Agent (upon the instruction of the Required Lenders) revokes such notice. Upon receipt of such notice, the Borrower may revoke any pending request for a Borrowing of, conversion to or continuation of Eurodollar Rate Loans (to the extent of the affected Eurodollar Rate Loans or Interest Periods) or, failing that, will be deemed to have converted such request into a request for a Borrowing of Base Rate Loans in the amount specified therein.

(b) Notwithstanding the foregoing, if the Administrative Agent has made the determination described in clause (a)(i) of this Section, the Administrative Agent in consultation with the Borrower and the Required Lenders, may establish an alternative interest rate for the Impacted Loans, in which case, such alternative rate of interest shall apply with respect to the Impacted Loans until (1) the Administrative Agent revokes the notice delivered with respect to the Impacted Loans under clause (a)(i) of this Section, (2) the Administrative Agent or the Required Lenders notify the Administrative Agent and the Borrower that such alternative interest rate does not adequately and fairly reflect the cost to such Lenders of funding the Impacted Loans, or (3) any Lender determines that any Law has made it unlawful, or that any Governmental Authority has asserted that it is unlawful, for such Lender or its applicable Lending Office to make, maintain or fund Loans whose interest is determined by reference to such alternative rate of interest or to determine or charge interest rates based upon such rate or any Governmental Authority has imposed material restrictions on the authority of such Lender to do any of the foregoing and provides the Administrative Agent and the Borrower written notice thereof.

3.04 Increased Costs; Reserves on Eurodollar Rate Loans .

(a) Increased Costs Generally . If any Change in Law shall:

(i) impose, modify or deem applicable any reserve, special deposit, compulsory loan, insurance charge or similar requirement against assets of, deposits with or for the account of, or credit extended or participated in by, any Lender (except any reserve requirement contemplated by Section 3.04(d)) or any L/C Issuer;

(ii) subject any Recipient to any Taxes (other than (A) Indemnified Taxes, (B) Taxes described in clauses (b) through (d) of the definition of Excluded Taxes and (C) Connection Income Taxes) on its loans, loan principal, letters of credit, commitments, or other obligations, or its deposits, reserves, other liabilities or capital attributable thereto; or

(iii) impose on any Lender or any L/C Issuer or the London interbank market any other condition, cost or expense affecting this Agreement or Eurodollar Rate Loans made by such Lender or any Letter of Credit or participation therein;

and the result of any of the foregoing shall be to increase the cost to such Lender of making, converting to, continuing or maintaining any Loan (or of maintaining its obligation to make any such Loan), or to increase the cost to such Lender or such L/C Issuer of participating in, issuing or maintaining any Letter of Credit (or of maintaining its obligation to participate in or to issue any

Letter of Credit), or to reduce the amount of any sum received or receivable by such Lender or such L/C Issuer hereunder (whether of principal, interest or any other amount) then, upon request of such Lender or such L/C Issuer, the Borrower will pay to such Lender or such L/C Issuer, as the case may be, such additional amount or amounts as will compensate such Lender or such L/C Issuer, as the case may be, for such additional costs incurred or reduction suffered.

(b) Capital Requirements . If any Lender or any L/C Issuer determines that any Change in Law affecting such Lender or such L/C Issuer or any Lending Office of such Lender or such Lender's or such L/C Issuer's holding company, if any, regarding capital or liquidity requirements has or would have the effect of reducing the rate of return on such Lender's or such L/C Issuer's capital or on the capital of such Lender's or such L/C Issuer's holding company, if any, as a consequence of this Agreement, the Revolving Commitments of such Lender or the Loans made by, or participations in Letters of Credit or Swingline Loans held by, such Lender, or the Letters of Credit issued by such L/C Issuer, to a level below that which such Lender or such L/C Issuer or such Lender's or such L/C Issuer's holding company could have achieved but for such Change in Law (taking into consideration such Lender's or such L/C Issuer's policies and the policies of such Lender's or such L/C Issuer's holding company with respect to capital adequacy), then from time to time the Borrower will pay to such Lender or such L/C Issuer, as the case may be, such additional amount or amounts as will compensate such Lender or such L/C Issuer or such Lender's or such L/C Issuer's holding company for any such reduction suffered.

(c) Certificates for Reimbursement . A certificate of a Lender or an L/C Issuer setting forth the amount or amounts necessary to compensate such Lender or such L/C Issuer or its holding company, as the case may be, as specified in subsection (a) or (b) of this Section and delivered to the Borrower shall be conclusive absent manifest error. The Borrower shall pay such Lender or such L/C Issuer, as the case may be, the amount shown as due on any such certificate within ten (10) days after receipt thereof.

(d) Reserves on Eurodollar Rate Loans . The Borrower shall pay to each Lender, (i) as long as such Lender shall be required to maintain reserves with respect to liabilities or assets consisting of or including eurocurrency funds or deposits (currently known as "Eurocurrency liabilities"), additional interest on the unpaid principal amount of each Eurodollar Rate Loan equal to the actual costs of such reserves allocated to such Loan by such Lender (as determined by such Lender in good faith, which determination shall be conclusive), and (ii) as long as such Lender shall be required to comply with any reserve ratio requirement or analogous requirement of any central banking or financial regulatory authority imposed in respect of the maintenance of the Revolving Commitments or the funding of the Loans, such additional costs (expressed as a percentage per annum and rounded upwards, if necessary, to the nearest five decimal places) equal to the actual costs allocated to such Revolving Commitment or Loan by such Lender (as determined by such Lender in good faith, which determination shall be conclusive), which in each case shall be due and payable on each date on which interest is payable on such Loan, provided the Borrower shall have received at least ten (10) days' prior notice (with a copy to the Administrative Agent) of such additional interest or costs from such Lender. If a Lender

fails to give notice ten (10) days prior to the relevant Interest Payment Date, such additional interest shall be due and payable ten (10) days from receipt of such notice.

(e) Delay in Requests . Failure or delay on the part of any Lender or any L/C Issuer to demand compensation pursuant to the foregoing provisions of this Section 3.04 shall not constitute a waiver of such Lender's or such L/C Issuer's right to demand such compensation, provided that the Borrower shall not be required to compensate a Lender or an L/C Issuer pursuant to the foregoing provisions of this Section for any increased costs incurred or reductions suffered more than nine (9) months prior to the date that such Lender or such L/C Issuer, as the case may be, notifies the Borrower of the Change in Law giving rise to such increased costs or reductions and of such Lender's or such L/C Issuer's intention to claim compensation therefor (except that, if the Change in Law giving rise to such increased costs or reductions is retroactive, then the nine (9) month period referred to above shall be extended to include the period of retroactive effect thereof).

3.05 Compensation for Losses .

Upon written demand of any Lender (with a copy to the Administrative Agent) from time to time, setting forth in reasonable detail the basis for, and manner of, calculating such compensation, the Borrower shall promptly compensate such Lender for and hold such Lender harmless from any loss, cost or expense incurred by it as a result of:

(a) any continuation, conversion, payment or prepayment of any Loan other than a Base Rate Loan on a day other than the last day of the Interest Period for such Loan (whether voluntary, mandatory, automatic, by reason of acceleration, or otherwise);

(b) any failure by the Borrower (for a reason other than the failure of such Lender to make a Loan) to prepay, borrow, continue or convert any Loan other than a Base Rate Loan on the date or in the amount notified by the Borrower;

(c) any assignment of a Eurodollar Rate Loan on a day other than the last day of the Interest Period therefor as a result of a request by the Borrower pursuant to Section 11.13; or

(d) any failure by any Borrower to make payment of any drawing under any Letter of Credit (or interest due thereon) denominated in an Alternative Currency on its scheduled due date or any payment thereof in a different currency

including any loss or expense (but excluding any loss of anticipated profits) arising from the liquidation or reemployment of funds obtained by it to maintain such Loan or from fees payable to terminate the deposits from which such funds were obtained (but excluding any loss of anticipated profits). The Borrower shall also pay any customary administrative fees charged by such Lender in connection with the foregoing.

For purposes of calculating amounts payable by the Borrower to the Lenders under this Section 3.05 , each Lender shall be deemed to have funded each Eurodollar Rate Loan made by it at the

Eurodollar Rate for such Loan by a matching deposit or other borrowing in the London interbank eurodollar market for a comparable amount and for a comparable period, whether or not such Eurodollar Rate Loan was in fact so funded.

3.06 Mitigation Obligations; Replacement of Lenders .

(a) Designation of a Different Lending Office . If any Lender requests compensation under Section 3.04, or requires the Borrower to pay any Indemnified Taxes or additional amounts to any Lender, any L/C Issuer, or any Governmental Authority for the account of any Lender or any L/C Issuer pursuant to Section 3.01, or if any Lender gives a notice pursuant to Section 3.02, then at the request of the Borrower, such Lender or such L/C Issuer shall, as applicable, use reasonable efforts to designate a different Lending Office for funding or booking its Loans hereunder or to assign its rights and obligations hereunder to another of its offices, branches or affiliates, if, in the judgment of such Lender or such L/C Issuer, such designation or assignment (i) would eliminate or reduce amounts payable pursuant to Section 3.01 or 3.04, as the case may be, in the future, or eliminate the need for the notice pursuant to Section 3.02, as applicable, and (ii) in each case, would not subject such Lender or such L/C Issuer, as the case may be, to any unreimbursed cost or expense and would not otherwise be disadvantageous to such Lender or such L/C Issuer, as the case may be. The Borrower hereby agrees to pay all reasonable costs and expenses incurred by any Lender or any L/C Issuer in connection with any such designation or assignment.

(b) Replacement of Lenders . If any Lender requests compensation under Section 3.04, or if the Borrower is required to pay any Indemnified Taxes or additional amounts to any Lender or any Governmental Authority for the account of any Lender pursuant to Section 3.01 and, in each case, such Lender has declined or is unable to designate a different lending office in accordance with Section 3.06(a), the Borrower may replace such Lender in accordance with Section 11.13.

3.07 Survival .

All of the Borrower's obligations under this Article III and the Lenders' obligations under Section 3.01(c)(ii) shall, in each case, survive termination of the Aggregate Revolving Commitments, repayment of all other Obligations hereunder, resignation of the Administrative Agent and the Facility Termination Date.

ARTICLE IV

CONDITIONS PRECEDENT TO CREDIT EXTENSIONS

4.01 Conditions of Initial Credit Extension .

The obligation of each L/C Issuer and each Lender to make its initial Credit Extension hereunder is subject to satisfaction or waiver (in accordance with Section 11.01) of the following conditions precedent (in each case, subject to Section 6.19):

(a) Execution of Credit Agreement; Loan Documents . The Administrative Agent shall have received (i) counterparts of this Agreement, executed by a Responsible Officer of each Loan Party and a duly authorized officer of each Lender, L/C Issuer and the Administrative Agent, (ii) for the account of each Lender requesting a Revolving Note, a Revolving Note executed by a Responsible Officer of the Borrower, (iii) counterparts of the Security Agreement and each other Collateral Document required to be delivered on the Closing Date, executed by a Responsible Officer of the applicable Loan Parties and a duly authorized officer of each other Person party thereto, as applicable and (iv) counterparts of any other Loan Document required to be delivered on the Closing Date, executed by a Responsible Officer of the applicable Loan Party and a duly authorized officer of each other Person party thereto, each of which shall be in form and substance reasonably satisfactory to the Administrative Agent, the Arrangers and each of the Lenders.

(b) Officer's Certificate . The Administrative Agent shall have received a certificate of a Responsible Officer of each Loan Party dated the Closing Date, certifying as to the Organization Documents of such Loan Party (which, to the extent filed with a Governmental Authority, shall be certified as of a recent date by such Governmental Authority), the resolutions of the governing body of such Loan Party, the good standing, existence or its equivalent of such Loan Party and of the incumbency (including specimen signatures) of the Responsible Officers of such Loan Party, each in form and substance reasonably satisfactory to the Administrative Agent.

(c) Legal Opinions of Counsel . The Administrative Agent shall have received a favorable opinion of Skadden, Arps, Slate, Meagher & Flom LLP, counsel for the Loan Parties, dated the Closing Date and addressed to the Administrative Agent and the Lenders, in form and substance reasonably acceptable to the Administrative Agent, covering such matters relating to the Loan Documents and the transactions contemplated thereby as the Administrative Agent and the Lenders shall reasonably request.

(d) Financial Statements . The Administrative Agent and the Lenders shall have received copies of the financial statements referred to in Section 5.05, each in form and substance reasonably satisfactory to each of them.

(e) Personal Property Collateral . The Administrative Agent shall have received, in form and substance satisfactory to the Administrative Agent:

(i) (A) searches of UCC filings in the jurisdiction of incorporation or formation, as applicable, of each Loan Party and each jurisdiction where any Collateral is located or where a filing would need to be made in order to perfect the Administrative Agent's security interest in the Collateral, copies of the financing statements on file in such jurisdictions and evidence that no Liens exist other than Permitted Liens and (B) tax lien, judgment and litigation searches;

(ii) completed UCC financing statements for each appropriate jurisdiction as is necessary, in the Administrative Agent's sole discretion, to perfect the Administrative Agent's security interest in the Collateral;

(iii) stock or membership certificates, if any, evidencing the Pledged Equity and undated stock or transfer powers duly executed in blank; in each case to the extent such Pledged Equity is certificated;

(iv) to the extent required to be delivered, filed, registered or recorded pursuant to the terms and conditions of the Collateral Documents, all instruments, documents and chattel paper in the possession of any of the Loan Parties, together with allonges or assignments as may be necessary or appropriate to create and perfect the Administrative Agent's and the Lenders' security interest in the Collateral; and

(v) evidence that all other actions that the Administrative Agent may deem reasonably necessary or desirable in order to perfect the Liens created under the Security Agreement have been taken (including receipt of duly executed payoff letters and UCC-3 termination statements) or otherwise provided for in a manner reasonably satisfactory to the Administrative Agent.

(f) Insurance . The Administrative Agent shall have received customary copies certificates, and endorsements of insurance or insurance binders evidencing insurance meeting the requirements set forth herein or in the Collateral Documents.

(g) Solvency Certificate . The Administrative Agent shall have received a Solvency Certificate signed by a Responsible Officer of the Borrower as to the financial condition, solvency and related matters of the Loan Parties and their Restricted Subsidiaries, on a consolidated basis, in each case, after giving effect to the initial borrowings under the Loan Documents and the other transactions contemplated hereby.

(h) Officer's Certificate; Perfection Certificate . The Administrative Agent shall have received (i) a certificate or certificates executed by a Responsible Officer of the Borrower as of the Closing Date, certifying as to the matters set forth in clauses (j) and (k) of this Section 4.01 and the matters set forth in Section 4.02(a) and (b), and (ii) the Perfection Certificate executed by a Responsible Officer of the Borrower.

(i) Loan Notice . The Administrative Agent shall have received a Loan Notice with respect to any Loans to be made on the Closing Date.

(j) Existing Indebtedness of the Loan Parties . The Administrative Agent shall have received a customary payoff letter with respect to, and evidence (reasonably satisfactory to the Administrative Agent) that, all Indebtedness of the Borrower and its Restricted Subsidiaries under the Existing Credit Agreement shall be repaid in full and all security interests related thereto shall be terminated on or prior to the Closing Date and the Administrative Agent.

(k) Material Adverse Effect . There shall have been no event or circumstance since the date of the Audited Financial Statements (including any action, suit, investigation or proceeding pending or, to the knowledge of the Loan Parties, threatened in any court or

before any arbitrator) that has had or would be reasonably expected to have, either individually or in the aggregate, a Material Adverse Effect.

(l) Consents. The Administrative Agent shall have received a certificate of a Responsible Officer of the Borrower either (A) attaching copies of all consents, licenses and approvals required in connection with the execution, delivery and performance by each Loan Party and the validity against such Loan Party of the Loan Documents to which it is a party, and such consents, licenses and approvals shall be in full force and effect, or (B) stating that no such consents, licenses or approvals are so required.

(m) Fees and Expenses. The Administrative Agent, the Lenders and the Arrangers shall have received all reasonable fees and expenses (including the reasonable fees and expenses of counsel (including any local counsel) for the Administrative Agent), if any, owing pursuant to the Fee Letter, Section 2.09 and the other Loan Documents; provided that in the case of any such expenses, such expenses shall be invoiced at least three (3) business days prior to the Closing Date.

Without limiting the generality of the provisions of the last paragraph of Section 9.03, for purposes of determining compliance with the conditions specified in this Section, each Lender that has signed this Agreement shall be deemed to have consented to, approved or accepted or to be satisfied with, each document or other matter required thereunder to be consented to or approved by or acceptable or satisfactory to a Lender unless the Administrative Agent shall have received notice from such Lender prior to the proposed Closing Date specifying its objection thereto.

4.02 Conditions to all Credit Extensions.

The obligation of each Lender and each L/C Issuer to honor any Request for Credit Extension (other than a Loan Notice requesting only a conversion of Loans to the other Type, or a continuation of Eurodollar Rate Loans) is subject to the following conditions precedent:

(a) Representations and Warranties. The representations and warranties of the Borrower and each other Loan Party contained in Section 2.03(a)(i), Article V or any other Loan Document, shall (i) with respect to representations and warranties that contain a materiality qualification, be true and correct on and as of the date of such Credit Extension and (ii) with respect to representations and warranties that do not contain a materiality qualification, be true and correct in all material respects on and as of the date of such Credit Extension, and except that for purposes of this Section 4.02, the representations and warranties contained in Sections 5.05(a) and (b) shall be deemed to refer to the most recent statements furnished pursuant to Sections 6.01(a) and (b), respectively.

(b) Default. No Default or Event of Default shall exist, or would result from such proposed Credit Extension or from the application of the proceeds thereof.

(c) Request for Credit Extension. The Administrative Agent and, if applicable, the applicable L/C Issuer or the Swingline Lender, shall have received a Request for Credit Extension in accordance with the requirements hereof.

(d) Alternative Currency . In the case of a Credit Extension to be denominated in an Alternative Currency, such currency remains an Eligible Currency.

Each Request for Credit Extension (other than a Loan Notice requesting only a conversion of Loans to the other Type or a continuation of Eurodollar Rate Loans) submitted by the Borrower shall be deemed to be a representation and warranty that the conditions specified in Sections 4.02(a) and (b) have been satisfied on and as of the date of the applicable Credit Extension.

ARTICLE V

REPRESENTATIONS AND WARRANTIES

Each Loan Party represents and warrants to the Administrative Agent and the Lenders, as of the date made or deemed made, that:

5.01 Existence, Qualification and Power .

Each Loan Party and each of its Restricted Subsidiaries (a) is duly organized or formed, validly existing and, as applicable, in good standing (to the extent that such concept exists in such jurisdiction) under the Laws of the jurisdiction of its incorporation or organization, (b) has all requisite power and authority to (i) own or lease its assets and carry on its business and (ii) execute, deliver and perform its obligations under the Loan Documents to which it is a party and consummate the transactions contemplated thereby, and (c) is duly qualified and is licensed and, as applicable, in good standing (to the extent that such concept exists in such jurisdiction) under the Laws of each jurisdiction where its ownership, lease or operation of properties or the conduct of its business requires such qualification or license; except in each case referred to in clause (a) (other than with respect to any Loan Party), (b)(i) (other than with respect to any Borrower) or (c), to the extent that failure to do so would not reasonably be expected to have a Material Adverse Effect.

5.02 Authorization; No Contravention .

The execution, delivery and performance by each Loan Party of each Loan Document to which such Person is a party have been duly authorized by all necessary corporate or other organizational action, and do not and will not (with the passage of time) (i) contravene the terms of any of such Person's Organization Documents, (ii) conflict with or result in any breach or contravention of, or the creation of any Lien (other than Liens created under the Loan Documents) under, or require any payment to be made under (A) any Contractual Obligation to which such Person is a party or affecting such Person or the properties of such Person or any of its Subsidiaries or (B) any order, injunction, writ or decree of any Governmental Authority or any arbitral award to which such Person or its property is subject or (iii) violate any applicable Law, except in the case of this clauses (ii) and (iii) above, with respect to any conflict, breach, violation, or payment, to the extent that such conflict, breach, violation, or payment would not reasonably be expected to result in, individually or in the aggregate, a Material Adverse Effect.

5.03 Governmental Authorization; Other Consents .

No approval, consent, exemption, authorization, or other action by, or notice to, or filing with, any Governmental Authority or any other Person is necessary or required in connection with (a) the execution, delivery or performance by, or enforcement against, any Loan Party of this Agreement or any other Loan Document, (b) the grant by any Loan Party of the Liens granted by it pursuant to the Collateral Documents or (c) the perfection or maintenance of the Liens created under the Collateral Documents (including the first priority nature thereof, subject only to Permitted Liens), except for (i) filings and other actions necessary to perfect the Liens on the Collateral granted by the Loan Parties in favor of the Secured Parties, (ii) the approvals, consents, exemptions, authorizations, actions, notices and filings which have been duly obtained, taken, given or made and which are in full force and effect, (iii) filings with the SEC, including a Current Report on Form 8-K and (iv) those approvals, consents, exemptions, authorizations or other actions, notices or filings, the failure of which to obtain or make would not reasonably be expected to have a Material Adverse Effect.

5.04 Binding Effect .

This Agreement has been, and each other Loan Document, when delivered hereunder, will have been, duly executed and delivered by each Loan Party that is party thereto. This Agreement constitutes, and each other Loan Document when so delivered will constitute, a legal, valid and binding obligation of such Loan Party, enforceable against each Loan Party that is party thereto in accordance with its terms, subject to applicable bankruptcy, insolvency, reorganization, moratorium or other laws affecting creditors' rights generally and subject to general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law).

5.05 Financial Statements; No Material Adverse Effect .

(a) Audited Financial Statements . The Audited Financial Statements (i) were prepared in accordance with GAAP consistently applied throughout the period covered thereby, except as otherwise expressly noted therein; and (ii) fairly present in all material respects the financial condition of the Borrower and its Restricted Subsidiaries as of the date thereof and their results of operations, cash flows and changes in shareholder's equity for the period covered thereby in accordance with GAAP consistently applied throughout the period covered thereby, except as otherwise expressly noted therein.

(b) Quarterly Financial Statements . The unaudited Consolidated balance sheet of the Borrower and its Restricted Subsidiaries dated March 31, 2016 and June 30, 2016, and the related Consolidated statements of income or operations, shareholders' equity and cash flows for the fiscal quarter, as applicable, ended on that date (i) were prepared in accordance with GAAP consistently applied throughout the period covered thereby, except as otherwise expressly noted therein, and (ii) fairly present in all material respects the financial condition of the Borrower and its Restricted Subsidiaries as of the date thereof and their results of operations, cash flows and changes in shareholders' equity for the period covered thereby, subject, in the case of clauses (i) and (ii), to the absence of footnotes and to normal year-end audit adjustments.

(c) Material Adverse Effect. Since the date of the balance sheet included in the Audited Financial Statements, there has been no event or circumstance, either individually or in the aggregate, that has had or would reasonably be expected to have a Material Adverse Effect.

(d) Forecasted Financials. The Consolidated forecasted balance sheets, statements of income and cash flows of the Borrower and its Restricted Subsidiaries delivered pursuant to Section 4.01 or Section 6.01 were prepared in good faith on the basis of the assumptions stated therein, which assumptions were believed by management of the Borrower to be reasonable at the time made; it being recognized by the Administrative Agent and the Lenders that such projections are as to future events and are not to be viewed as facts, the projections are subject to significant uncertainties and contingencies, many of which are beyond the control of the Borrower and the Restricted Subsidiaries, that no assurance can be given that any particular projections will be realized and that actual results during the period or periods covered by any such projections may differ from the projected results and such differences may be material.

5.06 Litigation.

There are no actions, suits, proceedings, claims or disputes pending or, to the knowledge of the Loan Parties, threatened in writing, at law, in equity, in arbitration or before any Governmental Authority, by or against any Loan Party or any Restricted Subsidiary of any Loan Party or against any of their properties or revenues that (a) purport to affect or pertain to this Agreement or any other Loan Document or any of the transactions contemplated hereby, or (b) that are reasonably likely to be adversely determined and, if so determined, either individually or in the aggregate would reasonably be expected to have a Material Adverse Effect.

5.07 No Default.

Neither any Loan Party nor any Restricted Subsidiary thereof is in default under or with respect to, or a party to, any Contractual Obligation that would, either individually or in the aggregate, reasonably be expected to have a Material Adverse Effect. No Default has occurred and is continuing or would result from the consummation of the transactions contemplated by this Agreement or any other Loan Document.

5.08 Ownership of Property.

Each Loan Party and each of its Restricted Subsidiaries has good and marketable title in fee simple to, or valid leasehold interests in, all real property necessary or used in the ordinary conduct of its business, except for such defects in title that do not interfere with its ability to conduct its business or to utilize such assets for their intended purposes, except where the failure to have such title or interests would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

5.09 Environmental Compliance.

The Loan Parties and their respective Restricted Subsidiaries conduct in the ordinary course of business a review of the effect of existing Environmental Laws and claims alleging potential liability or responsibility for violation of any Environmental Law on their respective businesses, operations and properties, and as a result thereof the Loan Parties have reasonably concluded that such Environmental Laws and claims would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

5.10 Insurance .

The properties of the Borrower and its Restricted Subsidiaries are insured with financially sound and reputable insurance companies not Affiliates of the Borrower, in such amounts (after giving effect to any self-insurance compatible with the following standards), with such deductibles and covering such risks as are customarily carried by companies of a similar size engaged in similar businesses and owning similar properties.

5.11 Taxes .

Each Loan Party and their respective Restricted Subsidiaries have filed all material federal and state and other material tax returns and reports required to be filed, and have paid all material federal and state and other material taxes, assessments, fees and other governmental charges levied or imposed upon them or their properties, income or assets otherwise due and payable, except those which are being contested in good faith by appropriate proceedings and for which adequate reserves have been provided in accordance with GAAP. There is no proposed tax assessment against any Loan Party or any of their respective Restricted Subsidiaries that would, if made, have a Material Adverse Effect, nor is there any tax sharing agreement applicable to any Loan Party or any of their respective Restricted Subsidiaries.

5.12 ERISA Compliance .

(a) Each Plan is in compliance in all material respects with the applicable provisions of ERISA, the Code and other federal or state laws. Each Pension Plan that is intended to be a qualified plan under Section 401(a) of the Code has received a favorable determination letter or is subject to a favorable opinion letter from the IRS to the effect that the form of such Plan is qualified under Section 401(a) of the Code and the trust related thereto has been determined by the IRS to be exempt from federal income tax under Section 501(a) of the Code, or an application for such a letter is currently being processed by the IRS. To the best knowledge of the Loan Parties, nothing has occurred that would prevent or cause the loss of such tax-qualified status other than qualification defects that can be corrected under the Employee Plans Compliance Resolution System described in IRS Revenue Procedures 2013-12, 2015-27 and 2015-18 where such correction would not be expected to result in a Material Adverse Effect.

(b) There are no pending or, to the knowledge of the Loan Parties, threatened claims, actions or lawsuits, or action by any Governmental Authority, with respect to any Plan that would reasonably be expected to have a Material Adverse Effect. There has been no prohibited transaction or violation of the fiduciary responsibility rules with respect to

any Plan that has resulted or would reasonably be expected to result in a Material Adverse Effect.

(c) Except as would not, either individually or in the aggregate, reasonably be expected to result in, a Material Adverse Effect: (i) no ERISA Event has occurred, and no Loan Party nor any ERISA Affiliate is aware of any fact, event or circumstance that would reasonably be expected to constitute or result in an ERISA Event with respect to any Pension Plan or Multiemployer Plan; (ii) as of the most recent valuation date for any Pension Plan, the funding target attainment percentage (as defined in Section 430(d)(2) of the Code) is 60% or higher and no Loan Party nor any ERISA Affiliate knows of any facts or circumstances that would reasonably be expected to cause the funding target attainment percentage for any such plan to drop below 60% as of the most recent valuation date; (iii) no Loan Party nor any ERISA Affiliate has incurred any liability to the PBGC other than for the payment of premiums, and there are no premium payments which have become due that are unpaid; (iv) neither the Borrower nor any ERISA Affiliate has engaged in a transaction that could be subject to Section 4069 or Section 4212(c) of ERISA; and (v) no Pension Plan has been terminated by the plan administrator thereof nor by the PBGC, and no event or circumstance has occurred or exists that would reasonably be expected to cause the PBGC to institute proceedings under Title IV of ERISA to terminate any Pension Plan.

(d) With respect to each scheme or arrangement mandated by a government other than the United States (a " Foreign Government Scheme or Arrangement ") and with respect to each employee benefit plan maintained or contributed to by the Borrower, any Loan Party or any of their respective Restricted Subsidiaries that is not subject to United States law (a " Foreign Plan "), except as would not, individually or in the aggregate, reasonably be expected to result in a Material Adverse Effect:

(i) any employer and employee contributions required by law or by the terms of any Foreign Government Scheme or Arrangement or any Foreign Plan have been made, or, if applicable, accrued, in accordance with normal accounting practices of the jurisdiction in which such plan is maintained;

(ii) the Fair Market Value of the assets of each funded Foreign Plan, the liability of each insurer for any Foreign Plan funded through insurance or the book reserve established for any Foreign Plan, together with any accrued contributions, is sufficient to procure or provide for the accrued benefit obligations, as of the date hereof, with respect to all current and former participants in such Foreign Plan according to the actuarial assumptions and valuations most recently used to account for such obligations in accordance with applicable generally accepted accounting principles of the jurisdiction in which such plan is maintained; and

(iii) each Foreign Plan required to be registered has been registered and has been maintained in good standing with applicable regulatory authorities.

5.13 Margin Regulations; Investment Company Act .

(a) Margin Regulations . The Borrower is not engaged and will not engage, principally or as one of its important activities, in the business of purchasing or carrying margin stock (within the meaning of Regulation U issued by the FRB), or extending credit for the purpose of purchasing or carrying margin stock, and the proceeds of the Loans will not be used, in each case, in a manner that would violate Regulation U.

(b) Investment Company Act . None of the Loan Parties is or is required to be registered as an "investment company" under the Investment Company Act of 1940.

5.14 Disclosure .

No report, financial statement, certificate or other information furnished in writing by or on behalf of any Loan Party (other than projected financial information and information of a general economic or industry nature) to the Administrative Agent or any Lender in connection with the transactions contemplated hereby and the negotiation of this Agreement or delivered hereunder or under any other Loan Document (in each case as modified or supplemented by other information so furnished) when taken as a whole, together with disclosures made by the Borrower in filings with the SEC that are made available to the Administrative Agent and the Lenders pursuant to the terms of this Agreement, contains any material misstatement of fact or omits to state any material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not materially misleading; provided that, with respect to projected financial information, each Loan Party represents only that such information was prepared in good faith based upon assumptions believed to be reasonable at the time made; it being understood (A) that such projections and forecasts are as to future events and are not to be viewed as facts, that such projections are subject to significant uncertainties and contingencies, many of which are beyond the control of the Borrower and its Subsidiaries, that no assurance can be given that any particular projection or forecast will be realized and that actual results during the period or periods covered by any such projections or forecasts may differ significantly from the projected results and such differences may be material and that such projections and forecast are not a guarantee of future financial performance and (B) that no representation is made with respect to information of a general economic or general industry nature.

5.15 Compliance with Laws .

(a) Each Loan Party and each Restricted Subsidiary thereof is in compliance with the requirements of all Laws and all orders, writs, injunctions and decrees applicable to it or to its properties, except in such instances in which (a) such requirement of Law or order, writ, injunction or decree is being contested in good faith by appropriate proceedings diligently conducted or (b) the failure to comply therewith, either individually or in the aggregate, would not reasonably be expected to have a Material Adverse Effect.

(b) Each Loan Party and each Restricted Subsidiary thereof is in compliance in all material respects with all applicable statutes, regulations, policies, guidances or guidelines issued by the United States Food and Drug Administration (" FDA ") (or analogous foreign, state or local Governmental Authority), having regulatory authority over any Loan Party's or any Restricted Subsidiary's products or operations (the " Business "), including,

but not limited to, the following: (i) the Federal Food, Drug, and Cosmetic Act, as amended, and the regulations promulgated thereunder; (ii) the anti-kickback provisions of the Social Security Act, 42 U.S.C. § 1320a-7b(b), the Civil Monetary Penalty Statute (42 U.S.C. § 1320a-7a), the Stark Law (42 U.S.C. § 1395nn), the False Claims Act (31 U.S.C. § 3729 et seq.), or has been excluded or threatened with exclusion under state or federal statutes or regulations, including under 42 U.S.C. § 1320a-7 or relevant regulations in 42 C.F.R. Part 1001, or assessed or threatened with assessment of civil money penalties pursuant to 42 C.F.R. Part 1001; and (iv) applicable state Laws and regulations governing the distribution of pharmaceutical products (collectively, the " Regulatory Laws ").

(c) Each Loan Party and each Restricted Subsidiary holds all permits, licenses, certificates, consents, product listings, registrations and other authorizations issued by any Governmental Authority necessary and material to operate the Business as currently conducted in compliance with the Regulatory Laws (collectively, the " Permits ") and all such Permits are in full force and effect, in each case, except where such failure to hold or be in full force and effect would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

5.16 Solvency .

The Borrower, together with its Restricted Subsidiaries, on a Consolidated basis are Solvent.

5.17 Sanctions Concerns and Anti-Corruption Laws .

(a) Sanctions Concerns . No Loan Party, nor any Restricted Subsidiary, nor, to the knowledge of the Borrower and its Restricted Subsidiaries, any director, officer, employee, agent, or affiliate thereof, is an individual or entity that is, or is owned or controlled by any individual or entity that is (i) included on OFAC's List of Specially Designated Nationals, HMT's Consolidated List of Financial Sanctions Targets and the Investment Ban List, or any similar list enforced by any other relevant Sanctions authority or (ii) located, organized or resident in a Designated Jurisdiction (such Persons referred to herein as " Sanctioned Persons ").

(b) Anti-Corruption Laws . The Loan Parties and their Restricted Subsidiaries have conducted their business in compliance in all material respects with the United States Foreign Corrupt Practices Act of 1977, the UK Bribery Act 2010 and other similar anti-corruption legislation in other jurisdictions, and have instituted and maintained policies and procedures designed to promote and achieve compliance in all material respects with such laws.

5.18 Responsible Officers .

Set forth on Schedule 1.01(c) are Responsible Officers, holding the offices indicated next to their respective names, as of the Closing Date and as of the last date such Schedule was required to be updated in accordance with Section 6.02 and such Responsible Officers are the duly elected

and qualified officers of such Loan Party and are duly authorized to execute and deliver, on behalf of the respective Loan Party, this Agreement, the Revolving Notes and the other Loan Documents.

5.19 Subsidiaries; Equity Interests; Loan Parties .

(a) Subsidiaries, Joint Ventures, Partnerships and Equity Investments . Set forth on Schedule 5.19(a) , is the following information which is true and complete in all respects as of the Closing Date and as of the last date such Schedule was required to be updated in accordance with Section 6.02: (i) a complete and accurate list of all Subsidiaries, joint ventures and partnerships and other equity investments of the Loan Parties, (ii) the number of shares of each class of Equity Interests in each Subsidiary outstanding, (iii) the number and percentage of outstanding shares of each class of Equity Interests owned by the Loan Parties and their Subsidiaries and (iv) the class or nature of such Equity Interests (i.e. voting, non-voting, preferred, etc.). The outstanding Equity Interests in all Subsidiaries of the Borrower are validly issued, fully paid and non-assessable and are owned free and clear of all Liens.

(b) Loan Parties . Set forth on Schedule 5.19(b) is a complete and accurate list of all Loan Parties, showing as of the Closing Date, or as of the last date such Schedule was required to be updated in accordance with Section 6.02, (as to each Loan Party) (i) the exact legal name, (ii) any former legal names of such Loan Party in the four (4) months prior to the Closing Date, (iii) the jurisdiction of its incorporation or organization, as applicable, (iv) the type of organization, (v) the address of its chief executive office, (vi) its U.S. federal taxpayer identification number, (vii) the organization identification number, and (viii) ownership information (e.g. publicly held or if private or partnership, the owners and partners of each of the Loan Parties).

5.20 Collateral Representations .

(a) Collateral Documents . The provisions of the Collateral Documents are effective, upon execution and delivery thereof, to create in favor of the Administrative Agent for the benefit of the Secured Parties a legal, valid and enforceable first priority Lien (subject to Permitted Liens) on all right, title and interest of the respective Loan Parties in the Collateral described therein to the extent required to be perfected therein, except as to enforcement, as may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or other laws affecting creditors' rights generally and subject to general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law). Except for filings contemplated hereby and by the Collateral Documents, no filing or other action will be necessary to perfect or protect such Liens.

(b) Documents, Instrument, and Tangible Chattel Paper . Set forth on Schedule 5.20(b) , as of the Closing Date and as of the last date such Schedule was required to be updated in accordance with Section 6.02, is a description of all Documents, Instruments, and Tangible Chattel Paper of the Loan Parties (including the Loan Party owning such Document, Instrument and Tangible Chattel Paper and such other information as reasonably requested by the Administrative Agent).

(c) Deposit Accounts, Electronic Chattel Paper, Letter-of-Credit Rights, and Securities Accounts .

(i) Set forth on Schedule 5.20(c)(i) , as of the Closing Date and as of the last date such Schedule was required to be updated in accordance with Section 6.02, is a description of all Deposit Accounts and Securities Accounts of the Loan Parties, including the name of (A) the applicable Loan Party, (B) in the case of a Deposit Account, the depository institution and average amount held in such Deposit Account and whether such account is a zero balance account or a payroll account, and (C) in the case of a Securities Account, the Securities Intermediary or issuer and the average aggregate market value held in such Securities Account, as applicable.

(ii) Set forth on Schedule 5.20(c)(ii) , as of the Closing Date and as of the last date such Schedule was required to be updated in accordance with Section 6.02, is a description of all Electronic Chattel Paper (as defined in the UCC) and Letter-of-Credit Rights (as defined in the UCC) of the Loan Parties, including the name of (A) the applicable Loan Party, (B) in the case of Electronic Chattel Paper (as defined in the UCC), the account debtor and (C) in the case of Letter-of-Credit Rights (as defined in the UCC), the issuer or nominated person, as applicable.

(d) Commercial Tort Claims . Set forth on Schedule 5.20(d) , as of the Closing Date and as of the last date such Schedule was required to be updated in accordance with Section 6.02, is a description of all Commercial Tort Claims of the Loan Parties (detailing such Commercial Tort Claim in such detail as reasonably requested by the Administrative Agent).

(e) Pledged Equity Interests . Set forth on Schedule 5.20(e) , as of the Closing Date and as of the last date such Schedule was required to be updated in accordance with Section 6.02, is a list of (i) all Pledged Equity and (ii) all other Equity Interests required to be pledged to the Administrative Agent pursuant to the Collateral Documents (in each case, detailing the Loan Party pledging such Equity Interests, the Person whose Equity Interests are pledged, the number of shares of each class of Equity Interests, the certificate number and percentage ownership of outstanding shares of each class of Equity Interests and the class or nature of such Equity Interests (i.e. voting, non-voting, preferred, etc.).

(f) Properties . Set forth on Schedule 5.20(f) , as of the Closing Date and as of the last date such Schedule was required to be updated in accordance with Section 6.02, is a list of (A) each headquarter location of the Loan Parties, (B) each other location where any significant administrative or governmental functions are performed, (C) each other location where the Loan Parties maintain any books or records (electronic or otherwise) and (D) each location where any personal property Collateral is located at any premises owned or leased by a Loan Party.

5.21 [Reserved] .

5.22 Intellectual Property; Licenses, Etc .

Each Loan Party and each of its Restricted Subsidiaries own, or possess the right to use, all of the trademarks, service marks, trade names, copyrights, patents, patent rights, franchises, licenses and other intellectual property rights (collectively, " IP Rights ") that (a) consist of the Material Intellectual Property and (b) except where the failure to own or possess the right to use such IP Rights would reasonably be expected to have a Material Adverse Effect, consists of other IP Rights reasonably necessary for the operation of their respective businesses. To the knowledge of the Borrower, no slogan or other advertising device, product, process, method, substance, part or other material now employed, by any Loan Party or any of their Restricted Subsidiaries infringes upon any rights held by any other Person, except in each case, to the extent that such infringement would not reasonably be expected to result in a Material Adverse Effect. No claim or litigation regarding any of the foregoing is pending or, to the knowledge of the Loan Parties, threatened in writing, against the Loan Parties or any of their Restricted Subsidiaries which, either individually or in the aggregate, would reasonably be expected to have a Material Adverse Effect.

5.23 EEA Financial Institutions .

No Loan Party is an EEA Financial Institution.

ARTICLE VI
AFFIRMATIVE COVENANTS

Each of the Loan Parties hereby covenants and agrees that on the Closing Date and thereafter until the Facility Termination Date, such Loan Party shall, and shall cause each of their Restricted Subsidiaries to:

6.01 Financial Statements .

Deliver to the Administrative Agent for further distribution to each Lender:

(a) Audited Financial Statements . As soon as available, but in any event within ninety (90) days after the end of each fiscal year of the Borrower a Consolidated balance sheet of the Borrower and its Restricted Subsidiaries as at the end of such fiscal year, and the related Consolidated statements of income or operations, changes in shareholders' equity and cash flows for such fiscal year, setting forth in each case in comparative form the figures for the previous fiscal year, all in reasonable detail and prepared in accordance with GAAP, audited and accompanied by a report and opinion of an independent certified public accountant of nationally recognized standing reasonably acceptable to the Administrative Agent, which report and opinion shall be prepared in accordance with generally accepted auditing standards and shall not be subject to any "going concern" or like qualification or exception or any qualification or exception as to the scope of such audit.

(b) Quarterly Financial Statements . As soon as available, but in any event within forty-five (45) days after the end of each of the first three (3) fiscal quarters of each fiscal year of the Borrower (commencing with the fiscal quarter ended September 30, 2016), a Consolidated balance sheet of the Borrower and its Restricted Subsidiaries as at the end of such fiscal quarter, and the related Consolidated statements of income or operations, changes

in shareholders' equity and cash flows for such fiscal quarter and for the portion of the Borrower's fiscal year then ended, setting forth in each case in comparative form the figures for the corresponding fiscal quarter of the previous fiscal year and the corresponding portion of the previous fiscal year, all in reasonable detail and prepared in accordance with GAAP, such Consolidated statements to be certified by the chief executive officer, chief financial officer, treasurer or controller who is a Responsible Officer of the Borrower as fairly presenting in all material respects the financial condition, results of operations, shareholders' equity and cash flows of the Borrower and its Restricted Subsidiaries, subject only to normal year-end audit adjustments and the absence of footnotes.

(c) Budget. As soon as available, but in any event within ninety (90) days after the end of each fiscal year of the Borrower, an annual budget of the Borrower and its Restricted Subsidiaries on a Consolidated basis, including forecasts prepared by management of the Borrower, in a form reasonably satisfactory to the Administrative Agent, of projected Consolidated statements of income or operations and projected cash flows of the Borrower and its Restricted Subsidiaries on a quarterly basis for the immediately following fiscal year.

As to any information contained in materials furnished pursuant to Section 6.02(c), the Borrower shall not be separately required to furnish such information under Section 6.01(a) or (b) above, but the foregoing shall not be in derogation of the obligation of the Borrower to furnish the information and materials described in Sections 6.01(a) and (b) above at the times specified therein.

6.02 Certificates; Other Information.

Deliver to the Administrative Agent for further distribution to each Lender:

(a) Compliance Certificate. Within five (5) Business Days of delivery of the financial statements referred to in Sections 6.01(a) and (b), a duly completed Compliance Certificate signed by the chief executive officer, chief financial officer, treasurer or controller which is a Responsible Officer of the Borrower.

(b) Updated Schedules. Within fifteen (15) days of delivery of the financial statements referred to in Section 6.01(a), the following updated Schedules to this Agreement (which may, if delivered earlier, be attached to the Compliance Certificate) to the extent required to make the representation related to such Schedule true and correct in all material respects as of the date of such update is provided: 1.01(c), 5.19(a), 5.19(b), 5.20(b), 5.20(c)(i), 5.20(c)(ii), 5.20(d), 5.20(e) and 5.20(f).

(c) Annual Reports; Etc. Promptly after the same are publicly available, copies of all annual, regular, periodic and special reports and registration statements which the Borrower may file or be required to file with the SEC under Section 13 or 15(d) of the Securities Exchange Act of 1934, or with any national securities exchange, and in any case not otherwise required to be delivered to the Administrative Agent pursuant hereto.

(d) [Reserved].

(e) Additional Information . Promptly, such additional information regarding the business, financial, legal or corporate affairs of the Borrower or any of its Restricted Subsidiaries, or compliance with the terms of the Loan Documents, as the Administrative Agent or any Lender may from time to time reasonably request.

Documents required to be delivered pursuant to Section 6.01(a) or (b) or Section 6.02(c) (to the extent any such documents are included in materials otherwise filed with the SEC) may be delivered electronically and if so delivered, shall be deemed to have been delivered on the date on which such documents are (a) available via the EDGAR system of the SEC on the internet or (b) posted on the Borrower's website on the Internet at the website address listed on Schedule 1.01(a) ; or on the Borrower's behalf on an Internet or intranet website, if any, to which each Lender and the Administrative Agent have access (whether a commercial, third-party website or whether sponsored by the Administrative Agent); provided that: (i) the Borrower shall deliver paper copies of such documents to the Administrative Agent or any Lender upon its request to the Borrower to deliver such paper copies until a written request to cease delivering paper copies is given by the Administrative Agent or such Lender and (ii) the Borrower shall notify the Administrative Agent and each Lender (by fax transmission or e-mail transmission) of the posting of any such documents and provide to the Administrative Agent by e-mail electronic versions (i.e., soft copies) of such documents. The Administrative Agent shall have no obligation to request the delivery of or to maintain paper copies of the documents referred to above, and in any event shall have no responsibility to monitor compliance by the Borrower with any such request by a Lender for delivery, and each Lender shall be solely responsible for requesting delivery to it or maintaining its copies of such documents.

The Borrower hereby acknowledges that (A) the Administrative Agent and/or an Affiliate thereof may, but shall not be obligated to, make available to the Lenders and the L/C Issuers materials and/or information provided by or on behalf of the Borrower hereunder (collectively, " Borrower Materials ") by posting the Borrower Materials on IntraLinks, Syndtrak, ClearPar or a substantially similar electronic transmission system (the " Platform ") and (B) certain of the Lenders (each, a " Public Lender ") may have personnel who do not wish to receive material non-public information with respect to the Borrower or its Affiliates, or the respective securities of any of the foregoing, and who may be engaged in investment and other market-related activities with respect to such Persons' securities. The Borrower hereby agrees that it will use commercially reasonable efforts to identify that portion of the Borrower Materials that may be distributed to the Public Lenders and that (1) all such Borrower Materials shall be clearly and conspicuously marked "PUBLIC" which, at a minimum, shall mean that the word "PUBLIC" shall appear prominently on the first page thereof; (2) by marking Borrower Materials "PUBLIC," the Borrower shall be deemed to have authorized the Administrative Agent, any Affiliate thereof, the Arrangers, the L/C Issuers and the Lenders to treat such Borrower Materials as not containing any material non-public information (although it may be sensitive and proprietary) with respect to the Borrower or its securities for purposes of United States federal and state securities laws (provided , however , that to the extent such Borrower Materials constitute Information, they shall be treated as set forth in Section 11.07); (3) all Borrower Materials marked "PUBLIC" are permitted to be made available through a portion of the Platform designated "Public Side Information;" and (4) the Administrative Agent and any Affiliate thereof and the Arrangers shall be entitled to treat any Borrower Materials that are not

marked "PUBLIC" as being suitable only for posting on a portion of the Platform not designated "Public Side Information." Notwithstanding the foregoing, the Borrower shall be under no obligation to mark any Borrower Materials "PUBLIC".

Notwithstanding anything to the contrary in this Section 6.02, no Loan Party shall be required to provide any information in respect of which disclosure is prohibited by any applicable Laws binding on such Loan Party.

6.03 Notices .

Promptly, but in any event within three (3) Business Days of any Loan Party obtaining knowledge thereof, notify the Administrative Agent (which will promptly furnish such information to each Lender):

(a) of the occurrence of any Default;

(b) of any matter that has resulted or would reasonably be expected to result in a Material Adverse Effect, including (i) breach or non-performance of, or any default under, a Contractual Obligation of the Borrower or any of its Restricted Subsidiary; (ii) any dispute, litigation, investigation, proceeding or suspension between any Loan Party or any of their respective Restricted Subsidiary and any Governmental Authority; or (iii) the commencement of, or any material development in, any litigation or proceeding affecting any Loan Party or any of their respective Restricted Subsidiary, including pursuant to any applicable Environmental Laws;

(c) of the occurrence of any ERISA Event that has resulted or would reasonably be expected to result in liability of $25,000,000 or more;

(d) (i) of any correspondence (i) to the FDA (or analogous foreign, state or local Governmental Authority) from the Borrower or any Restricted Subsidiary or (ii) to the Borrower or any Restricted Subsidiary from the FDA (or analogous foreign, state or local Governmental Authority) (including any so called "warning letter", "untitled letter", FDA Form 483 or similar notification), in each case, that contains information or data that has resulted or is reasonably expected to result in a significant adverse change to the label (package insert) for ORKAMBI (lumacaftor in combination with ivacaftor) or KALYDECO (ivacaftor) in the United States or to the label (package insert) of any other drug offered for commercial sale by the Borrower or any of its Restricted Subsidiary at the time of such correspondence;

(e) the receipt of any so called "warning letter", "untitled letter", FDA Form 483 or similar notification, in each case, from the FDA (or analogous foreign, state or local Governmental Authority) that identifies any material manufacturing deficiencies (whether by any Loan Party or any Restricted Subsidiary and/or by any such Loan Party's or such Restricted Subsidiary's suppliers, contract manufacturers, and/or third-party manufacturers) with respect to any drug offered for commercial sale by the Borrower or any of its Restricted Subsidiary; and

(f) of any material change in accounting policies or financial reporting practices by any Loan Party or any Restricted Subsidiary thereof, including any determination by the Borrower referred to in Section 2.10(b) (but excluding for the avoidance of doubt, any decision by the Borrower to consolidate or deconsolidate an entity as a variable interest entity pursuant to FASB ASC 810).

Each notice pursuant to this Section 6.03 shall be accompanied by a statement of a Responsible Officer of the Borrower setting forth details of the occurrence referred to therein and, to the extent applicable, stating what action the Borrower has taken and proposes to take with respect thereto. Each notice pursuant to Section 6.03(a) shall describe with reasonable particularity any and all provisions of this Agreement and any other Loan Document that have been breached.

6.04 Payment of Obligations .

(a) Pay and discharge as the same shall become due and payable, all its obligations and liabilities (excluding tax liabilities described in clause (b) of this 6.04), including (i) all lawful claims which, if unpaid, would by law become a Lien upon its property unless the same are being contested in good faith and to the extent (x) enforcement action on account of any such Lien has not been taken and (y) adequate reserves in accordance with GAAP are being maintained by such Person; and (ii) all Indebtedness, as and when due and payable, but subject to any subordination provisions contained in any instrument or agreement evidencing such Indebtedness, in each case, except to the extent that failure to pay the same would not reasonably be expected to, individually or in the aggregate, have a Material Adverse Effect.

(b) The Borrower and its Restricted Subsidiaries will pay all material federal and material state and other material tax liabilities, assessments and governmental charges or levies upon it or its properties or assets, in each case, required to be paid by them, unless the same are being contested in good faith by appropriate proceedings and adequate reserves in accordance with GAAP are being maintained by the Borrower or such Restricted Subsidiary.

6.05 Preservation of Existence, Etc .

(a) Preserve, renew and maintain in full force and effect its legal existence and good standing (to the extent that such concept exists in such jurisdiction) under the Laws of the jurisdiction of its organization except in a transaction permitted by Section 7.04 or 7.05 , except, in the case of any Restricted Subsidiary of the Borrower that is not a Loan Party, to the extent the failure to do so would not reasonably be expected to result in a Material Adverse Effect; and

(b) take all reasonable action to maintain all rights, privileges, permits, licenses and franchises necessary in the normal conduct of its business, except to the extent that failure to do so would not reasonably be expected to have a Material Adverse Effect, or as otherwise permitted hereunder.

6.06 Maintenance of Properties; Intellectual Property .

(a) Except if the failure to do so would not reasonably be expected to have a Material Adverse Effect, maintain, preserve and protect all of its material tangible properties and equipment necessary in the operation of its business in good working order and condition, ordinary wear and tear excepted.

(b) Except as may be permitted pursuant to Section 7.05, take all reasonable actions necessary to maintain and pursue each application, to obtain the relevant registration and to maintain the registration of each of its Material Intellectual Property (now or hereafter existing) of the Loan Parties and their Restricted Subsidiaries, including, where appropriate, the filing of applications for renewal, affidavits of use, affidavits of non-contestability and opposition and interference and cancellation proceedings.

6.07 Maintenance of Insurance .

(a) Maintenance of Insurance . Maintain with financially sound and reputable insurance companies not Affiliates of the Borrower, insurance with respect to its properties and business against loss or damage of the kinds customarily insured against by Persons engaged in the same or similar business, of such types and in such amounts (after giving effect to any self-insurance compatible with the following standards) as are customarily carried by companies of a similar size engaged in similar businesses.

(b) Evidence of Insurance . Cause the Administrative Agent to be named as lenders' loss payable, loss payee or mortgagee, as its interest may appear, and/or additional insured with respect of any such insurance providing liability coverage or coverage in respect of any Collateral, and cause, unless otherwise agreed to by the Administrative Agent, each provider of any such insurance to agree, by endorsement upon the policy or policies issued by it or by independent instruments furnished to the Administrative Agent that it will give the Administrative Agent thirty (30) days prior written notice before any such policy or policies shall be altered or cancelled (or ten (10) days prior notice in the case of cancellation due to the nonpayment of premiums). Annually, upon expiration of current insurance coverage, the Loan Parties shall provide, or cause to be provided, to the Administrative Agent, such evidence of insurance as reasonably requested by the Administrative Agent.

6.08 Compliance with Laws .

Comply with the requirements of all applicable Laws and all orders, writs, injunctions and decrees applicable to it or to its business or property, except in such instances in which (a) such requirement of Law or order, writ, injunction or decree is being contested in good faith by appropriate proceedings diligently conducted; or (b) the failure to comply therewith would not reasonably be expected to have a Material Adverse Effect.

6.09 Books and Records .

(a) Maintain proper books of record and account, in which full, true and correct entries in conformity with GAAP consistently applied shall be made of all financial transactions and matters involving the assets and business of such Loan Party or such Restricted Subsidiary, as the case may be; and

(b) maintain such books of record and account in material conformity with all applicable requirements of any Governmental Authority having regulatory jurisdiction over such Loan Party or such Restricted Subsidiary, as the case may be.

6.10 Inspection Rights .

Permit representatives and independent contractors of the Administrative Agent (accompanied by a reasonable number of representatives of the Lenders) to visit and inspect any of its properties, to examine its corporate, financial and operating records, and make copies thereof or abstracts therefrom, and to discuss its affairs, finances and accounts with its officers, and independent public accountants, all at such reasonable times during normal business hours and as often as may be reasonably desired, upon reasonable advance notice to the Borrower, in each case, subject to reasonable requirements of confidentiality and attorney-client privilege, including requirements imposed by law or by contract; provided that in the event that information is withheld as a result of any confidentiality or attorney-client privilege, the Borrower shall (i) use commercially reasonable efforts to obtain waivers of such confidentiality obligations or eliminate any such restriction and to communicate, to the extent permitted, the applicable information in a way that would not violate such restrictions and (ii) notify the Administrative Agent to the extent the Borrower and its Restricted Subsidiaries are not providing otherwise requested information; provided , however , that (a) except during the occurrence and continuance of an Event of Default, the Borrower shall not be required to reimburse the Administrative Agent for the charges, costs and expenses in connection with such visits or inspections and the Administrative Agent shall not exercise rights under this Section 6.10 more often than one (1) time per year and (b) after the occurrence and during the continuance of an Event of Default, the Administrative Agent (or any of its representatives or independent contractors) may do any of the foregoing at the expense of the Borrower at any time during normal business hours and without advance notice.

6.11 Use of Proceeds .

Use the proceeds of the Credit Extensions (a) to refinance on the Closing Date Indebtedness outstanding under the Existing Credit Agreement and (b) otherwise for general corporate purposes not in contravention of any Law or of any Loan Document; provided , however, that the Credit Extensions shall not be utilized to finance any hostile Acquisition (as evidenced by a calculation of cash and Cash Equivalents on hand at the Borrower immediately after giving effect to the consummation of such Acquisition and reflecting the application of all cash and Cash Equivalents utilized in connection with the consummation of such Acquisition).

6.12 [Reserved].

6.13 Covenant to Guarantee Obligations .

The Loan Parties will cause each of their Restricted Subsidiaries (other than any Excluded Subsidiary) whether newly formed, after acquired or otherwise existing to promptly (and in any event within forty-five (45) days thereafter (or such longer period of time as agreed to by the Administrative Agent in its reasonable discretion)) become a Guarantor hereunder by way of execution of a Joinder Agreement. In connection therewith, the Loan Parties shall give notice to the Administrative Agent within ten (10) days after creating a Restricted Subsidiary (or such longer period of time as agreed to by the Administrative Agent in its reasonable discretion), or acquiring the Equity Interests of any other Person that would constitute a Restricted Subsidiary. In connection with the foregoing, the Loan Parties shall deliver to the Administrative Agent, with respect to each new Subsidiary Guarantor to the extent applicable, (i) substantially the same documentation required pursuant to Sections 4.01(b), (c), (e), (f) and 6.14, (ii) such information necessary to complete any required "know your customer", PATRIOT Act, Sanctions, OFAC and FCPA diligence, in scope, and with results, reasonably satisfactory to the Administrative Agent, and (iii) such other documents or agreements as the Administrative Agent may reasonably request.

6.14 Covenant to Give Security .

Except with respect to Excluded Property:

(a) Equity Interests and Personal Property . Each Loan Party will cause the Pledged Equity and all of its tangible and intangible personal property now owned or hereafter acquired by it to be subject at all times to a first priority, perfected Lien (subject to Permitted Liens to the extent permitted by the Loan Documents) in favor of the Administrative Agent for the benefit of the Secured Parties to secure the Secured Obligations pursuant to the terms and conditions of the Collateral Documents. Each Loan Party shall provide opinions of counsel and any filings and deliveries reasonably necessary in connection therewith to perfect the security interests therein, all in form and substance reasonably satisfactory to the Administrative Agent.

(b) Landlord Waivers . In the case of the headquarter locations of the Borrower at 50 Northern Avenue, Boston, Massachusetts and 11 Fan Pier Boulevard, Boston, Massachusetts, the Borrower shall use commercially reasonable efforts to provide the Administrative Agent, on or prior to the date that is ninety (90) days after the Closing Date, with such consents and waivers from the landlords on such real property to the extent the Borrower is able to secure such consents and waivers after using commercially reasonable efforts (such consents and waivers shall be in form and substance satisfactory to the Administrative Agent, it being acknowledged and agreed that any Landlord Waiver is satisfactory to the Administrative Agent); provided to the extent the Borrower is unable to secure such consents and waivers after using commercially reasonable efforts, such requirement shall be waived by the Administrative Agent; provided further that, in the event, at any time following the Closing Date, any additional location serves as a headquarters for the operations of the Borrower, the Borrower shall, on or prior to the date that is ninety (90) days after the date on which such real property lease is entered into, use commercially reasonable efforts to provide the Administrative Agent with consents and waivers from the landlord on such real property (it being understood and agreed that to the extent the Borrower

is unable to secure such consents and waivers after using commercially reasonable efforts, such requirement shall be waived by the Administrative Agent).

(c) Account Control Agreements . Each of the Loan Parties shall not open, maintain or otherwise have any deposit or other accounts (including securities accounts) at any bank or other financial institution, or any other account where money or securities are or may be deposited or maintained with any Person, other than (a) deposit accounts that are maintained at (x) all times with Bank of America or (y) depositary institutions as to which the Administrative Agent shall have received (within ninety (90) days after the reasonable request of the Administrative Agent (exercised in its sole discretion)) a Qualifying Control Agreement (for the avoidance of doubt, it being understood that any deposit account maintained at a depository institution as to which the Administrative Agent has not made a request for a Qualifying Control Agreement may continue to remain in place, provided the Administrative Agent shall at all times retain its right to request a Qualifying Control Agreement for such deposit accounts (subject to any exclusionary criteria provided for in the Loan Documents)), (b) securities accounts that are maintained at all times with financial institutions as to which the Administrative Agent shall have received, to the extent reasonably requested by the Administrative Agent, a Qualifying Control Agreement, and (c) deposit accounts established solely as payroll and other zero balance accounts.

(d) Further Assurances . At any time upon the reasonable request of the Administrative Agent, each Loan Party and each of their respective Restricted Subsidiary shall promptly execute and deliver any and all further instruments and documents and take all such other action as the Administrative Agent may deem reasonably necessary or advisable to maintain in favor of the Administrative Agent, for the benefit of the Secured Parties, Liens and insurance rights on the Collateral that are duly perfected in accordance with the requirements of, or the obligations of the Loan Parties under, the Loan Documents and all applicable Laws.

Notwithstanding anything to the contrary contained in this Section 6.14 , in no event shall (i) perfection (except to the extent perfected through the filing of Uniform Commercial Code financing statements) be required with respect to (x) deposit, securities or other accounts holding balance of less than $1,000,000 individually and, collectively, in the aggregate for all such accounts, $20,000,000, and (ii) any actions in any non-U.S. jurisdiction or required by the Laws of any non-U.S. jurisdiction be required in order to create any security interests in any Collateral or to perfect any security interest in such Collateral.

Further, notwithstanding anything to the contrary contain in this Section 6.14, the Loan Parties and their Restricted Subsidiary shall not be required to grant a Lien in specific Collateral or perfect a Lien on specific Collateral, if the Administrative Agent determines in writing, in its reasonable discretion, that the costs and burdens to the Loan Parties and their Restricted Subsidiary of obtaining or perfecting a Lien in such Collateral are excessive in relation to value to the Secured Parties afforded by the grant of a Lien in or perfection of a Lien on such specific Collateral.

6.15 Further Assurances .

Promptly upon the reasonable request by the Administrative Agent, or any Lender through the Administrative Agent, (a) correct any material defect or error that may be discovered in any Loan Document or in the execution, acknowledgment, filing or recordation thereof, and (b) do, execute, acknowledge, deliver, record, re-record, file, re-file, register and re-register any and all such further acts, deeds, certificates, assurances and other instruments as the Administrative Agent, or any Lender through the Administrative Agent, may reasonably require from time to time in order to (i) carry out more effectively the purposes of the Loan Documents, (ii) to the fullest extent permitted by applicable Law, subject any Loan Party's or any of their respective Restricted Subsidiary' properties, assets, rights or interests to the Liens now or hereafter intended to be covered by any of the Collateral Documents, (iii) perfect and maintain the validity, effectiveness and priority of any of the Collateral Documents and any of the Liens intended to be created thereunder and (iv) assure, convey, grant, assign, transfer, preserve, protect and confirm more effectively unto the Secured Parties the rights granted or now or hereafter intended to be granted to the Secured Parties under any Loan Document or under any other instrument executed in connection with any Loan Document to which any Loan Party or any of their respective Restricted Subsidiary is or is to be a party, and cause each of its Restricted Subsidiary to do so.

6.16 Compliance with Environmental Laws .

Comply and make all reasonable efforts to cause all lessees and other Persons operating or occupying its properties to comply, with all applicable Environmental Laws and Environmental Permits, except to the extent that such non-compliance would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect; obtain and renew all Environmental Permits necessary for its operations and properties, except to the extent that such failure to have obtained or renewed such permits would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect; and to the extent required by Environmental Laws, conduct any investigation, study, sampling and testing, and undertake any cleanup, removal, remedial or other action necessary to remove and clean up all Hazardous Materials from any of its properties, in accordance with the requirements of all Environmental Laws, except for the failure to conduct any such action that would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect; provided , however, that neither the Borrower nor any of its Restricted Subsidiary shall be required to undertake any such cleanup, removal, remedial or other action to the extent that its obligation to do so is being contested in good faith and by proper proceedings and appropriate reserves are being maintained with respect to such circumstances in accordance with GAAP.

6.17 Approvals and Authorizations .

Without limiting the generality of Section 6.08, the Borrower and each Restricted Subsidiary shall comply with all approvals, authorizations and Permits at all times issued by any Government Authority in connection with the development, testing, manufacture, marketing or sale of any product advertised, developed, manufactured, marketed, offered for sale, used or otherwise distributed by the Borrower or any Restricted Subsidiary, in each case, that are required in connection with the Loan Documents, unless the failure to do so would not reasonably be expected to have a Material Adverse Effect.

6.18 Anti-Corruption Laws .

Conduct its business in material compliance with the United States Foreign Corrupt Practices Act of 1977, the UK Bribery Act 2010 and other similar applicable anti-corruption legislation in other jurisdictions and maintain policies and procedures reasonably designed to promote and achieve such compliance with such laws.

6.19 Post-Closing Covenant .

The Borrower shall comply with the terms and conditions set forth on Schedule 6.19 in each case within the time limits specified on such schedule (or such later time as the Administrative Agent shall agree in its reasonable discretion).

ARTICLE VII

NEGATIVE COVENANTS

Each of the Loan Parties hereby covenants and agrees that on the Closing Date and thereafter until the Facility Termination Date, no Loan Party shall, nor shall it permit any of its Restricted Subsidiaries to, directly or indirectly:

7.01 Liens .

Create, incur, assume or suffer to exist any Lien upon any of its property, assets or revenues, whether now owned or hereafter acquired, except for the following (the " Permitted Liens "):

(a) Liens pursuant to any Loan Document (including Liens on Cash Collateral);

(b) Liens existing on the Closing Date and listed on Schedule 7.01 and any modifications, replacements, renewals, or extensions thereof; provided that (i) the Lien does not encumber any property other than (A) property encumbered on the Closing Date, (B) after-acquired property that is affixed or incorporated into the property encumbered by such Lien on the Closing Date, (C) proceeds and products thereof, (ii) the replacement, renewal, extension or refinancing of the obligations secured or benefited by such Liens, to the extent constituting Indebtedness, is permitted by Section 7.02(b), and (iii) the direct or any contingent obligor with respect thereto is not changed;

(c) (i) Liens for Taxes which are not yet due or which are being contested in good faith and by appropriate proceedings diligently conducted, if adequate reserves with respect thereto are maintained on the books of the applicable Person in accordance with GAAP (or, for Foreign Subsidiaries, in conformity with generally accepted accounting principles that are applicable in their respective jurisdiction of organization) and (ii) other Liens for Taxes (securing Tax liabilities in an aggregate amount not in excess of $2,500,000 at any time outstanding) which are not yet delinquent for a period of more than forty-five (45) days;

(d) statutory Liens such as carriers', warehousemen's, mechanics', materialmen's, repairmen's or other like Liens arising in the ordinary course of business which are not overdue for a period of more than thirty (30) days or which are being contested in good faith and by appropriate proceedings diligently conducted, if adequate reserves with respect thereto are maintained on the books of the applicable Person;

(e) pledges or deposits in the ordinary course of business in connection with workers' compensation, unemployment insurance and other social security legislation, other than any Lien imposed by ERISA;

(f) deposits to secure the performance of bids, trade contracts and leases (other than Indebtedness), statutory obligations, surety and appeal bonds, performance bonds and other obligations of a like nature incurred in the ordinary course of business;

(g) easements, rights-of-way, restrictions and other similar encumbrances affecting real property which, in the aggregate do not in any case materially interfere with the ordinary conduct of the business of the applicable Person;

(h) Liens securing judgments for the payment of money (or appeal or other surety bonds relating to such judgments) not constituting an Event of Default under Section 8.01(h);

(i) Liens securing Indebtedness permitted under Section 7.02(c) ; provided that such Liens do not at any time encumber any property other than the property financed by such Indebtedness except for accessions to such property and the proceeds and the products thereof; provided that individual financings of equipment permitted to be secured hereunder provided by one Person (or its Affiliates) may be cross collateralized to other financings of equipment under Section 7.02(c) provided by such Person (or its Affiliates);

(j) bankers' Liens, rights of setoff and other similar Liens existing solely with respect to cash and Cash Equivalents on deposit in one or more accounts maintained by the Borrower or any of its Subsidiaries, in each case in the ordinary course of business in favor of the bank or banks with which such accounts are maintained, securing solely the customary amounts owing to such bank with respect to cash management and operating account arrangements; provided , that in no case shall any such Liens secure (either directly or indirectly) the repayment of any Indebtedness for borrowed money;

(k) any interest or title of a lessor, licensor, sublicensor, or sublessor under any lease, license, sublicense or sublease entered into by any Loan Party or any Restricted Subsidiary thereof in the ordinary course of business and covering only the assets so leased, licensed, sublicensed or subleased;

(l) Liens (i) of a collection bank arising under Section 4-210 of the UCC on items in the course of collection, or (ii) in favor of a banking institution or securities intermediary arising as a matter of law or under the banking institution's general terms of

business encumbering deposits (including the right of set-off) and which are within the general parameters customary in the banking industry;

(m) any zoning, building or similar laws or rights reserved to or vested in any Governmental Authority;

(n) Liens on the assets and Equity Interests of Foreign Subsidiaries (that do not constitute Collateral) securing Indebtedness permitted under Section 7.02(j) and 7.02(r);

(o) leases, licenses, subleases or sublicenses to the extent permitted under 7.05(g), 7.05(i), 7.05(j), and 7.05(n);

(p) Liens in favor of customs and revenue authorities arising as a matter of law to secure payment of customs duties in connection with the importation of goods in the ordinary course of business;

(q) Liens (A) on cash advances or escrow deposits in favor of the seller of any property to be acquired in an Investment permitted pursuant to Section 7.03 to be applied against the purchase price for such Investment or otherwise in connection with any escrow arrangements with respect to any such Investment or any Disposition permitted under Section 7.05 (including any letter of intent or purchase agreement with respect to such Investment or Disposition), or (B) consisting of an agreement to dispose of any property in a Disposition permitted under Section 7.05, in each case, solely to the extent such Investment or Disposition, as the case may be, would have been permitted on the date of the creation of such Lien;

(r) Liens granted by a Restricted Subsidiary that is not a Loan Party in favor of any Loan Party;

(s) Liens existing on property (other than Liens on the Equity Interests of any Person that becomes a Restricted Subsidiary) at the time of its acquisition or existing on the property of any Person at the time such Person becomes a Restricted Subsidiary (other than as a result of a Subsidiary Redesignation), in each case, after the date hereof securing Indebtedness permitted under Section 7.02(i); provided that (A) such Lien was not created in contemplation of such Acquisition or such Person becoming a Restricted Subsidiary, (B) such Lien does not extend to any Collateral or, other than with respect to proceeds or products of the assets subject to such Liens, extend to or cover any other assets or property of such Person, and (C) such Lien shall secure only those obligations which it secures on the date of such acquisition or the date such Person becomes a Restricted Subsidiary, as the case may be;

(t) Liens deemed to exist in connection with Investments in repurchase agreements related to Cash Equivalents permitted under Section 7.03 ;

(u) [Reserved];

(v) Liens on insurance policies and the proceeds thereof securing the financing of the premiums with respect thereto and deposits made in the ordinary course of business to secure liability to insurance carriers;

(w) Liens arising out of conditional sale, title retention, consignment or similar arrangements for the purchase or sale of goods entered into by the Borrower or any Restricted Subsidiary in the ordinary course of business;

(x) Liens on cash collateral granted in favor of any Lenders and/or L/C Issuers created as a result of any requirement or option to Cash Collateralize pursuant to this Agreement; and

(y) other Liens securing Indebtedness or other obligations outstanding in an aggregate principal amount not to exceed $25,000,000.

For purposes of determining compliance with this Section 7.01 , in the event that a Lien securing an item of Indebtedness (or any portion thereof) meets the criteria of one or more of the categories of permitted Liens (or any portion thereof) described in this Sections 7.01, the Borrower may, in its sole discretion, classify or divide such Lien securing such item of Indebtedness (or any portion thereof) in any manner that complies with this Section 7.01 and will be entitled to only include the amount and type of such Lien or such item of Indebtedness secured by such Lien (or any portion thereof) in one of the above clauses and such Lien securing such item of Indebtedness (or portion thereof) will be treated as being incurred or existing pursuant to only such clause or clauses (or any portion thereof).

Notwithstanding the foregoing to the contrary, no Loan Party shall, nor shall it permit any of its Restricted Subsidiaries to, directly or indirectly create, incur, assume or suffer to exist any Lien upon (x) any Real Property (other than Indebtedness contemplated under Section 7.01(d), (h) or (i) above) or (y) any of its Intellectual Property, in each case, to secure any Indebtedness.

7.02 Indebtedness .

Create, incur, assume or suffer to exist any Indebtedness, except:

(a) Indebtedness under the Loan Documents;

(b) Indebtedness outstanding on the date hereof and listed on Schedule 7.02 and any refinancings, refundings, renewals or extensions thereof; provided that the amount of such Indebtedness is not increased at the time of such refinancing, refunding, renewal or extension except by an amount equal to a reasonable premium or other reasonable amount paid, and fees and expenses reasonably incurred, in connection with such refinancing (including upfront fees and original issue discount thereon) and by an amount equal to any existing commitments unutilized thereunder and the direct or any contingent obligor with respect thereto is not changed, as a result of or in connection with such refinancing, refunding, renewal or extension; and, still further, that the terms relating to principal amount, amortization, maturity, collateral (if any) and subordination, standstill and related terms (if

any), and other material terms taken as a whole, of any such refinancing, refunding, renewing or extending Indebtedness, and of any agreement entered into and of any instrument issued in connection therewith, are no less favorable in any material respect to the Loan Parties or the Lenders (as determined in good faith by a Responsible Officer of the Borrower) than the terms of any agreement or instrument governing the Indebtedness being refinanced, refunded, renewed or extended;

(c) Indebtedness in respect of Capitalized Leases, Synthetic Lease Obligations and purchase money obligations for fixed or capital assets within the limitations set forth in Section 7.01(i) ; provided , however , that the aggregate amount of all such Indebtedness shall not exceed $30,000,000 in any fiscal year;

(d) Indebtedness of (i) a Loan Party to any other Loan Party, (ii) a Loan Party to any other Restricted Subsidiary that is not a Loan Party and (iii) any Restricted Subsidiary that is not a Loan Party to any Loan Party or any other Restricted Subsidiary, which Indebtedness shall (A) subject to the additional requirements of Section 7.03(t), in the case of Indebtedness owed by any Restricted Subsidiary to a Loan Party, to the extent required by the Administrative Agent, be evidenced by promissory notes which shall be pledged to the Administrative Agent as Collateral for the Secured Obligations in accordance with the terms of the Security Agreement and (B) in the case of Indebtedness owed by any Loan Party to any Restricted Subsidiary that is not a Loan Party be unsecured and, to the extent all such Indebtedness of all Loan Parties to any Restricted Subsidiary that is not a Loan Party exceeds $1,000,000 at any time outstanding, be subordinated in right of payment to the Secured Obligations on the terms set forth in the Intercompany Subordination Agreement or otherwise on terms reasonably satisfactory to the Administrative Agent (" Intercompany Debt ");

(e) Guarantees of Indebtedness of the Loan Parties otherwise permitted hereunder;

(f) obligations (contingent or otherwise) existing or arising under any Swap Contract, provided that such obligations are (or were) entered into by such Person in the ordinary course of business for the purpose of directly mitigating risks associated with fluctuations in interest rates or foreign exchange rates; and

(g) other Indebtedness (including Convertible Bond Indebtedness) of one or more Loan Parties not contemplated by the above provisions; provided that (i) no Default shall exist or would result therefrom, (ii) the Loan Parties are in Pro Forma Compliance, (iii) such Indebtedness shall not have a maturity date occurring earlier than one hundred twenty (120) days after the Maturity Date, (iv) such Indebtedness shall not be Guaranteed by any Subsidiary of the Borrower that is not a Loan Party, and (v) all such Indebtedness shall be unsecured;

(h) to the extent constituting Indebtedness, Warrant Transactions not otherwise prohibited by this Agreement;

(i) Indebtedness of any Person that becomes a Restricted Subsidiary of the Borrower (or of any Person not previously a Subsidiary that is merged, amalgamated or consolidated with or into the Borrower or a Restricted Subsidiary) after the Closing Date as a result of a Permitted Acquisition, or Indebtedness of any Person that is assumed by the Borrower or any of its Restricted Subsidiaries in connection with an Acquisition of assets by the Borrower or such Restricted Subsidiary in a Permitted Acquisition; provided that (A) such Indebtedness is not incurred in contemplation of such Permitted Acquisition and (B) that the aggregate principal amount of Indebtedness that is outstanding in reliance on this clause (i) shall not, at any time outstanding, exceed $25,000,000;

(j) Indebtedness of Foreign Subsidiaries, provided that the aggregate amount of such Indebtedness, including all Indebtedness of Vertex Europe and all CF Asset Subsidiaries, shall not exceed $25,000,000 at any time outstanding;

(k) obligations of the Borrower or any of its Restricted Subsidiaries in respect of any overdraft and related liabilities arising from treasury, depository, credit card, purchasing card and cash management services or any automated clearing house transfers of funds and other Indebtedness in respect of netting services, overdraft protections, cash pooling, employee credit cards and similar arrangements, in each case, in connection with deposit accounts in the ordinary course of business;

(l) Indebtedness consisting of obligations in respect of surety, stay, customs and appeal bonds, performance bonds and performance and completion guarantees provided by the Borrower or any of its Restricted Subsidiaries, in each case in the ordinary course of business or consistent with past practice;

(m) Indebtedness under letters of credit or bank guarantees issued on behalf of Foreign Subsidiaries (and not issued under this Agreement) in an aggregate amount not to exceed $5,000,000 at any one time outstanding;

(n) Indebtedness representing deferred compensation or stock-based compensation to employees of the Borrower and its Restricted Subsidiaries incurred in the ordinary course of business;

(o) Indebtedness constituting indemnification obligations or obligations for the payment of the purchase price (pending the consummation of such transaction) or other contingent purchase price adjustments incurred in an Investment or any Disposition, in each case permitted under this Agreement;

(p) Indebtedness consisting of obligations under deferred consideration (earnouts, royalty payments, indemnifications, incentive non-competes, milestone payments and other contingent obligations) incurred in connection with any Permitted Acquisition or other Investment permitted hereunder or otherwise in connection with research and development licensing agreements, collaboration agreements or development agreements;

(q) Indebtedness consisting of insurance premium financing and take or pay obligations contained in supply agreements in the ordinary course of business; and

(r) other Indebtedness in an aggregate principal amount not to exceed $15,000,000 at any time outstanding.

For purposes of determining compliance with this Section 7.02 , in the event that an item of Indebtedness (or any portion thereof) meets the criteria of one or more of the categories of permitted Indebtedness (or any portion thereof) described in this Sections 7.02 , the Borrower may, in its sole discretion, classify or divide such item of Indebtedness (or any portion thereof) in any manner that complies with this Section 7.02 and will be entitled to only include the amount and type of such item of Indebtedness (or any portion thereof) in one of the above clauses (or any portion thereof) and such item of Indebtedness (or any portion thereof) shall be treated as having been incurred or existing pursuant to only such clause or clauses (or any portion thereof); provided that all Indebtedness outstanding under this Agreement shall at all times be deemed to have been incurred pursuant to clause (a) of this Section 7.02 .

Notwithstanding the foregoing to the contrary, Vertex Europe and the CF Asset Subsidiaries shall not create, incur, assume or suffer to exist any Indebtedness (other than (x) Intercompany Debt, except Intercompany Debt owed by Vertex Europe or any CF Asset Subsidiary to any Restricted Subsidiary that is not a Loan Party, and (y) Indebtedness of Vertex Europe outstanding as of the Closing Date in the amounts, and owing to the Restricted Subsidiaries, set forth on Schedule 7.02) in an aggregate amount in excess of $20,000,000 at any one time outstanding.

7.03 Investments .

Make any Investments, except:

(a) Investments held by the Borrower and its Restricted Subsidiaries in the form of cash or Cash Equivalents;

(b) advances to officers, directors, managers, consultants and employees (or, in the case of (ii) below, any future or present officer, director, manager, consultant or employee (or their respective estates, heirs, family members, spouses and former spouses, domestic partners and former domestic partners or beneficiaries under their estates)) of the Borrower or any Restricted Subsidiaries (i) in an aggregate amount not to exceed $10,000,000 at any time outstanding, for relocation, (ii) in connection with such Person's purchase of Equity Interests of the Borrower; provided that no cash is actually advanced pursuant to this clause (ii), and (iii) for entertainment, travel and similar purposes in the ordinary course of business;

(c) (i) Investments by the Borrower and its Restricted Subsidiaries in their respective Restricted Subsidiaries outstanding on the date hereof and set forth on Schedule 7.03(c) , (ii) additional Investments by the Borrower and its Restricted Subsidiaries in Loan Parties, (iii) additional Investments by Restricted Subsidiaries of the Borrower that are not Loan Parties in other Restricted Subsidiaries that are not Loan Parties and (iv) so long as no Event of Default has occurred and is continuing or would result from such Investment,

additional Investments by the Loan Parties in Restricted Subsidiaries that are not Loan Parties in an aggregate amount invested from the date hereof not to exceed $20,000,000 over the term of this Agreement);

(d) Investments consisting of extensions of credit in the nature of accounts receivable or notes receivable arising from the grant of trade credit in the ordinary course of business, and Investments received in satisfaction or partial satisfaction thereof from financially troubled account debtors in the ordinary course of business and Investments consisting of prepayments to suppliers, licensors and licensees in the ordinary course of business;

(e) Guarantees permitted by Section 7.02 ;

(f) Investments existing on the date hereof (other than those referred to in Section 7.03(c)) and set forth on Schedule 7.03(f) ;

(g) Permitted Acquisitions;

(h) Investments (including debt obligations) received in connection with the bankruptcy or reorganization of suppliers and customers and in settlement of delinquent obligations of, and other disputes with, customers and suppliers arising in the ordinary course of business;

(i) Investments in Unrestricted Subsidiaries (including any Permitted Acquisition of any Unrestricted Subsidiary); provided that (i) no Event of Default has occurred and is continuing or, on a Pro Forma Basis after giving effect to such Investment, would result therefrom, (ii) the aggregate amount of all Investments in Unrestricted Subsidiaries pursuant to this Section 7.03 (including (x) any Guarantees of Indebtedness of any such Unrestricted Subsidiary and (y) the Fair Market Value of the assets of any Unrestricted Subsidiary (at the time of such Unrestricted Subsidiary's designation as such), which shall be deemed an Investment) shall not exceed in the aggregate $250,000,000 during the term of this Agreement (it being understood and agreed that such aggregate limitation for purposes of determining compliance with this clause (ii) shall be calculated without giving effect to any return representing a return of capital with respect to such Unrestricted Subsidiary, whether or not repaid in cash prior to such time of determination (including as a result of Subsidiary Redesignation));

(j) promissory notes and other non-cash consideration received in connection with Dispositions permitted by Section 7.05 (other than 7.05(d));

(k) Investments in the ordinary course of business consisting of Uniform Commercial Code Article 3 endorsements for collection or deposit and Uniform Commercial Code Article 4 customary trade arrangements with customers consistent with past practices;

(l) advances of payroll payments to employees in the ordinary course of business;

(m) Investments in Swap Contracts permitted hereunder;

(n) Guarantees by the Borrower or any of its Restricted Subsidiaries of operating leases (other than Capitalized Leases) or of other obligations that do not constitute Indebtedness, in each case entered into in the ordinary course of business;

(o) the forgiveness or conversion to equity (other than Disqualified Stock) of any Indebtedness owed by a Loan Party or any other Restricted Subsidiary to any third party and permitted by Section 7.02;

(p) Investments of a Person that is (i) acquired and becomes a Restricted Subsidiary or (ii) merged or amalgamated or consolidated into any Restricted Subsidiary, in each case, in connection with a Permitted Acquisition after the Closing Date to the extent that such Investments were not made in contemplation of or in connection with such Permitted Acquisition, merger, amalgamation or consolidation and were in existence on the date of such Permitted Acquisition, merger, amalgamation or consolidation;

(q) Investments to the extent that payment for such Investments is made solely by the issuance of Equity Interests of the Borrower; provided that (x) no Default shall exist or would result therefrom and (y) such Investments are maintained with a Loan Party;

(r) Investments made solely with the proceeds of the issuance of Equity Interests of the Borrower substantially contemporaneously with the receipt by the Borrower of such proceeds; provided that (x) no Default shall exist or would result therefrom and (y) such Investments are maintained with a Loan Party;

(s) Investments by any Loan Party in any Restricted Subsidiary that is not a Loan Party (including from the proceeds of the issuance of Equity Interests of the Borrower) in an amount required to permit such Restricted Subsidiary to make an R&D Collaboration Payment or consummate a Permitted Acquisition (substantially contemporaneously with the receipt by such Restricted Subsidiary of the proceeds of such Investment); provided that (i) any such Investment (A) shall be made in the form of a loan (which is secured by assets of the Restricted Subsidiary receiving such Investment, up to the value of such loan), and (B) be evidenced by loan documentation which shall be (x) in form and substance reasonably satisfactory to the Administrative Agent and (y) collaterally assigned to the Administrative Agent as collateral security for the Secured Obligations, (ii) no Default shall exist or would result therefrom and (iii) immediately after giving effect to such Investment, the Borrower shall be in Pro Forma Compliance (provided that with respect to any Investment to permit a Restricted Subsidiary to make an R&D Collaboration Payment, Pro Forma Compliance shall be determined based on the Stated Ratio);

(t) Investments (other than Acquisitions) consisting of R&D Collaboration Payments; provided that no Default shall exist or would result therefrom, with compliance with the requirements of Section 7.11(a) being determined based on the Stated Ratio required thereunder (except solely to the extent that the determination of compliance with the Consolidated Leverage Ratio is then being determined based on the Adjusted Consolidated

Leverage Ratio as a result of the consummation of any Permitted Material Acquisition, in which case compliance for purposes of this clause (t) shall be determined based on the Adjusted Consolidated Leverage Ratio then in effect);

(u) to the extent constituting Investments, Capped Call Transactions and Convertible Bond Hedge Transactions permitted under Section 7.06(h); and

(v) other Investments of the Borrower and its Restricted Subsidiaries (except Investments in Unrestricted Subsidiaries) not contemplated by the above; provided that (x) no Default shall exist or would result therefrom and (y) immediately after giving effect to such Investment, the Borrower shall be in Pro Forma Compliance, provided further that the Consolidated Leverage Ratio shall not exceed, on a Pro Forma Basis, 2.50 to 1.00.

For purposes of determining compliance with this Section 7.03, in the event that an Investment (or any portion thereof) meets the criteria of one or more of the categories of permitted Investments (or any portion thereof) described in this Section 7.03, the Borrower may, in its sole discretion, classify or divide such Investment (or any portion thereof) in any manner that complies with this Section 7.03 and will be entitled to only include the amount and type of such Investment (or any portion thereof) in one of the above clauses (or any portion thereof) and such Investment (or any portion thereof) shall be treated as having been made or existing pursuant to only such clause or clauses (or any portion thereof), provided that Investments in Unrestricted Subsidiaries shall at all times be limited to those permitted pursuant to Section 7.03(i).

7.04 Fundamental Changes .

Merge, dissolve, liquidate, consolidate with or into another Person, or Dispose of (whether in one transaction or in a series of transactions) all or substantially all of its assets (whether now owned or hereafter acquired) to or in favor of any Person, except that:

(a) any Restricted Subsidiary of the Borrower may merge or consolidate with or dissolve or liquidate into (i) the Borrower; provided that the Borrower shall be the continuing or surviving Person, or (ii) so long as no Default would result therefrom, any one or more other Restricted Subsidiaries, provided that (x) when any Loan Party (other than the Borrower) is merging with another Restricted Subsidiary, a Loan Party shall be the continuing or surviving Person and (y) no such merger shall cause any then existing Loan Party to become a CFC or Foreign Subsidiary that would not be required to be a Subsidiary Guarantor pursuant to Section 6.13;

(b) any Loan Party (other than the Borrower) may Dispose of all or substantially all of its assets (upon voluntary liquidation or otherwise) to the Borrower or to another Loan Party;

(c) any Restricted Subsidiary of the Borrower may dispose of all or substantially all its assets (including any Disposition that is in the nature of a liquidation) to any Loan Party or, to the extent such Restricted Subsidiary that is disposing of its assets is not a Loan

Party and so long as no Default would result therefrom, to any other Restricted Subsidiary of the Borrower;

(d) in connection with any Permitted Acquisition or other Investments permitted by Section 7.03, any Restricted Subsidiary of the Borrower may merge into or consolidate with any other Person or permit any other Person to merge into or consolidate with it; provided that (i) no Default shall exist or would result therefrom, (ii) the Person surviving such merger shall be a Restricted Subsidiary of the Borrower, and (iii) in the case of any such merger to which any Loan Party (other than the Borrower) is a party, such Loan Party is the surviving Person;

(e) so long as no Default shall exist or would result therefrom, each of the Borrower and any of its Restricted Subsidiaries may merge into or consolidate with any other Person or permit any other Person to merge into or consolidate with it; provided , however , that in each case, immediately after giving effect thereto (i) in the case of any such merger to which the Borrower is a party, (x) the Borrower is the surviving Person or (y) if the Person formed by or surviving any such merger or consolidation is not the Borrower (any such Person, the " Successor Borrower "), (A) the Successor Borrower shall be an entity organized or existing under the Laws of the United States, any state thereof or the District of Columbia and such transaction shall not have an adverse effect on the attachment, perfection or priority of the Liens granted under the Collateral Documents, (B) the Successor Borrower shall expressly assume all the obligations of the Borrower under this Agreement and the other Loan Documents to which the Borrower is a party pursuant to documents in form and substance reasonably satisfactory to the Administrative Agent, (C) each other Loan Party, shall have confirmed that its Guarantee shall apply to the Successor Borrower's obligations under the Loan Documents pursuant to documents in form and substance reasonably satisfactory to the Administrative Agent, (D) each other Loan Party, shall have by a supplement to the Security Agreement and the other applicable Collateral Documents, in form and substance satisfactory to the Administrative Agent, confirmed that its obligations thereunder shall apply to the Successor Borrower's obligations under the Loan Documents, (E) the Borrower shall have delivered to the Administrative Agent such supporting resolutions, incumbency certificates, opinions of counsel and other documents or information, in form, content and scope reasonably satisfactory to the Administrative Agent, as may be required by the Administrative Agent and (F) the Administrative Agent and the Lenders shall have received satisfactory results of "know your customer", Sanctions, Act and other similar due diligence reasonably requested by the Administrative Agent and the Lenders, (ii) in the case of any such merger to which any Loan Party (other than the Borrower) is a party, such Loan Party is the surviving Person and (iii) in the case of any such merger to which any Restricted Subsidiary (other than a Loan Party) is a party, such surviving Person shall be a Restricted Subsidiary; and

(f) any Restricted Subsidiary may merge, dissolve, liquidate, consolidate with or into another Person or Dispose of all or substantially all of its assets to the extent such Disposition is permitted under Section 7.05 .

7.05 Dispositions .

Make any Disposition, except:

(a) Dispositions of inventory in the ordinary course of business;

(b) Dispositions of obsolete or worn out property, whether now owned or hereafter acquired, in the ordinary course of business and Dispositions of property no longer used, useful or economically practicable to maintain in the conduct of the business of the Borrower and any of its Restricted Subsidiaries (other than Intellectual Property);

(c) Dispositions of equipment or real property to the extent that (i) such property is exchanged for credit against the purchase price of similar replacement property or (ii) the proceeds of such Disposition are reasonably promptly applied to the purchase price of such replacement property;

(d) Dispositions permitted by Section 7.04 (other than Section 7.04(f)), Investments permitted by Section 7.03 , Restricted Payments permitted by Section 7.06 and Liens permitted by Section 7.01 , in each case, solely to the extent constituting a Disposition;

(e) Dispositions of property by any Restricted Subsidiary of the Borrower to the Borrower or to a Wholly-Owned Subsidiary of the Borrower; provided that if the transferor of such property is a Subsidiary Guarantor, the transferee thereof must either be the Borrower or a Subsidiary Guarantor or otherwise an Investment in a non-Loan Party permitted under Section 7.03 ;

(f) Dispositions of defaulted accounts receivable in connection with the collection or compromise thereof in the ordinary course of business;

(g) leases, subleases, licenses or sublicenses of property (excluding any licenses or sub-licenses of Intellectual Property) in the ordinary course of business and which do not materially interfere with the business of the Borrower and its Restricted Subsidiaries, taken as a whole;

(h) Dispositions in the ordinary course of business consisting of the abandonment or allowing to lapse, of (i) Intellectual Property (other than Cystic Fibrosis Drug Franchise Assets) or (ii) Cystic Fibrosis Drug Franchise Assets which are not material to the value of the Cystic Fibrosis Drug Franchise Assets (taken as a whole), and which, in each case of clauses (i) and (ii), in the reasonable good faith determination of the Borrower are uneconomical to maintain, non-strategic, negligible, obsolete or otherwise not material in the conduct of its business;

(i) Dispositions consisting of licenses, sublicenses or contributions of Intellectual Property (other than Cystic Fibrosis Drug Franchise Assets) pursuant to licensing, joint marketing, distribution or research and development arrangements in the

ordinary course of business in the life science industry, on customary terms provided that such Disposition would not reasonably be expected to result in a Material Adverse Effect;

(j) Dispositions consisting of non-exclusive licenses or sublicenses of (or other non-exclusive grants of rights to use or exploit) Intellectual Property consistent with past practice (including inter-company agreements between the Borrower or a Loan Party and Restricted Subsidiaries), provided that none of the foregoing (either individually or in the aggregate) (x) could reasonably be expected to result in a Material Adverse Effect or (y) materially interfere with the business of the Loan Parties and their Restricted Subsidiaries, taken as a whole;

(k) utilization of cash and Cash Equivalents in the ordinary course of business;

(l) Dispositions of Investments in joint ventures to the extent required by, or made pursuant to customary buy/sell arrangements between, the joint venture parties set forth in joint venture arrangements and similar binding arrangements;

(m) the unwinding of Swap Contracts permitted hereunder pursuant to their terms;

(n) Dispositions of Intellectual Property (other than Material Intellectual Property) owned by a Loan Party to a Foreign Subsidiary of the Borrower that is a Restricted Subsidiary; provided that (i) the Foreign Subsidiary receiving such Intellectual Property shall covenant and agree not to pledge any interest in such Intellectual Property to any Person (other than a Loan Party), (ii) any such transferred Intellectual Property shall be subject to a perpetual exclusive license in favor of the Loan Parties for use in the North America in form and substance reasonably satisfactory to the Administrative Agent, and which license shall (1) not be subject to any anti-assignment or change of control provisions (in each case limiting the Loan Party), (2) expressly permit the creation, continuation and performance of the any Lien thereon securing the Secured Obligations, (3) be terminable at will by the Loan Parties, (3) require the Administrative Agent's consent for any amendment of the license agreement that alters the terms and conditions of the license agreement in any manner adverse to the interests of a Loan Party or the Lenders, (4) specify that it may not be terminated in connection with a Loan Party's bankruptcy, (5) include the right of any Loan Party that is a party thereto to assume and assign the license in the event of its bankruptcy or insolvency, and (6) include a covenant by the Foreign Subsidiary not to move for, or consent to, the termination of or rejection of the license in a bankruptcy or insolvency of the Foreign Subsidiary, and (iii) any Foreign Subsidiary receiving such Intellectual Property shall at all times remain a Restricted Subsidiary and shall not conduct any other material business other than (1) holding such Intellectual Property, (2) entering into license agreements in the ordinary course of business with Foreign Subsidiaries that are Restricted Subsidiaries for use of such Intellectual Property in foreign jurisdictions in the ordinary course of Business and (3) entering into license agreements with third parties for use in foreign jurisdictions in the ordinary course of business in the life sciences industry, on customary terms for fair value;

(o) the exercise and settlement, unwind or termination of any Convertible Bond Hedge Transaction or Capped Call Transaction, except (i) where the Borrower would be required to make a cash payment in the case of any such exercise, or (ii) in the case of settlement, unwind or termination where such settlement, unwind or termination would result in a net payment by the Borrower to the counterparty in an amount that is not otherwise permitted to be paid pursuant to Section 7.06(i);

(p) Dispositions by the Borrower and its Restricted Subsidiaries of non-commercial programs and business lines (other than, in each case, the Cystic Fibrosis Drug Franchise Assets) not otherwise permitted under this Section 7.05 ; provided that at the time of such Disposition, no Event of Default shall exist or would result from such Disposition;

(q) Dispositions by the Borrower and its Restricted Subsidiaries not otherwise permitted under this Section 7.05 (other than disposition of any Material Intellectual Property); provided that (i) at the time of such Disposition, no Default shall exist or would result from such Disposition, and (ii) the aggregate book value of all property Disposed of in reliance on this clause (p) in any fiscal year shall not exceed $10,000,000;

provided , however , that any Disposition pursuant to this Section 7.05 (other than Section 7.05(a), (d), (e), (f) and (h)) shall be for Fair Market Value.

7.06 Restricted Payments .

Declare or make, directly or indirectly, any Restricted Payment, or issue or sell any Equity Interests, except:

(a) each Restricted Subsidiary may make Restricted Payments to the Borrower, the Subsidiary Guarantors and any other Person that owns an Equity Interest in such Restricted Subsidiary, provided that, in the case of any Restricted Subsidiary that is not a Wholly Owned Subsidiary, such Restricted Payments are made to the holders of such Equity Interests ratably (or on a more favorable basis from the perspective of the Borrower and its Wholly-Owned Subsidiaries, taken as a whole) according to their respective holdings of the type of Equity Interest in respect of which such Restricted Payment is being made;

(b) the Borrower and each Restricted Subsidiary may declare and make dividend payments or other distributions payable solely in the common stock, other common Equity Interests of such Person or Qualified Stock of such Person;

(c) the Borrower may issue and sell any warrants or options with respect to its Qualified Stock pursuant to any executive compensation or stock option plan;

(d) the Borrower may issue and sell its Equity Interests constituting Qualified Stock;

(e) the Borrower and each Restricted Subsidiary may purchase, redeem or otherwise acquire Equity Interests issued by it with the proceeds received from the substantially concurrent issue of new shares of its common stock or other Qualified Stock;

(f) the Borrower and each Restricted Subsidiary may make Restricted Payments to shareholders of any Person (other than an Affiliate of the Borrower) acquired by merger pursuant to an Investment permitted under this Agreement, at the time of such Acquisition;

(g) the Borrower and each of its Restricted Subsidiaries may (A) repurchase at the issue price Equity Interests held by former directors, officers, employees and consultants in an amount not to exceed $100,000 in any fiscal year; (B) pay withholding or similar Taxes payable by present or former directors, officers, employees or consultants in respect of their Equity Interests and (C) repurchase Equity Interests deemed to occur upon a cashless exercise of options or warrants;

(h) the Borrower may make Restricted Payments to implement Capped Call Transactions and Convertible Bond Hedge Transactions in connection with the issuance of Convertible Bond Indebtedness, provided such Restricted Payments are made solely with the proceeds of such related Convertible Bond Indebtedness and any Warrant Transactions;

(i) the Borrower may declare and make other Restricted Payments not otherwise permitted by this Section 7.06 (including, making Restricted Payments to exercise, settle, unwind or terminate any Convertible Bond Hedge Transaction, Capped Call Transaction or Warrant Transaction, as applicable, or honor any request in connection with any conversion of Convertible Bond Indebtedness and make cash payments in lieu of fractional shares in connection therewith), provided that (x) no Default shall exist or would result therefrom and (y) immediately after giving effect to such Restricted Payment, the Borrower shall be in Pro Forma Compliance, provided that the Consolidated Leverage Ratio shall not exceed, on a Pro Forma Basis, 2.50 to 1.00;

(j) the Borrower and any Restricted Subsidiary may pay cash in lieu of fractional shares in connection with any dividend, split or combination of its Equity Interests; and

(k) the Borrower may make Restricted Payments, pursuant to and in accordance with equity compensation plans or programs and other benefit and compensation plans, programs or agreements for directors, officers, employees or advisors of the Borrower and its Subsidiaries.

7.07 Change in Nature of Business .

Engage in any material line of business substantially different from those lines of business conducted by the Borrower and its Restricted Subsidiaries on the date hereof or any business substantially related or incidental thereto or reasonable extensions thereof.

7.08 Transactions with Affiliates .

Enter into or permit to exist any transaction or series of transactions with any officer, director or Affiliate of such Person other than (a) transactions among the Loan Parties and their Restricted Subsidiaries (or any entity that becomes a Restricted Subsidiary as a result of such transaction permitted by this Agreement), (b) intercompany transactions among the Loan Parties and their Restricted Subsidiaries expressly permitted by this Agreement and Investments by the Loan Parties and their Restricted Subsidiaries in Unrestricted Subsidiaries permitted under Section 7.03(i) , (c) customary directors' fees, indemnification and similar arrangements, consulting fees, employee salaries, bonuses or employment agreements, compensation or employee benefit arrangements, incentive and severance arrangements with any officer, director or employee of a Loan Party or a Restricted Subsidiary entered into in the ordinary course of business, (d) Restricted Payments permitted under Section 7.06 and Investments permitted under Section 7.03 (e) written agreements entered into or assumed in connection with acquisitions of other businesses with Persons who were not Affiliates prior to such transactions approved by a majority of the Board of Directors of the Borrower and (f) except as otherwise specifically limited in this Agreement, other transactions which are entered into in the ordinary course of such Person's business on fair and reasonable terms and conditions substantially as favorable to such Person as would be obtainable by it in a comparable arm's length transaction with a Person other than an officer, director or Affiliate.

7.09 Burdensome Agreements .

Enter into, or permit to exist, any Contractual Obligation (except for this Agreement and the other Loan Documents) that (a) encumbers or restricts the ability of any Loan Party or its Restricted Subsidiaries to (i) make Restricted Payments to any Loan Party or Restricted Subsidiary except for any agreement in effect (A) on the date hereof and set forth on Schedule 7.09 or (B) at the time any Restricted Subsidiary becomes a Restricted Subsidiary of the Borrower, so long as such agreement was not entered into in contemplation of such Person becoming a Restricted Subsidiary of the Borrower, (ii) pay any Indebtedness or other obligation owed to any Loan Party, or (iii) create any Lien upon any of their properties or assets, whether now owned or hereafter acquired to secure the Secured Obligations, except, in the case of clause (a)(iii) only, for (A) any document or instrument governing Indebtedness incurred pursuant to Section 7.02(c) , provided that any such restriction contained therein relates only to the asset or assets constructed or acquired in connection therewith, (B) any negative pledge contained in Indebtedness incurred in accordance with Section 7.02(g) so long as such negative pledge permits Liens on the assets of the Loan Parties securing the Secured Obligations (as such Secured Obligations may be modified, increased, extended, refinanced, renewed or replaced from time to time), (C) Contractual Obligations that (1) are customary restrictions that arise in connection with any Disposition permitted by Section 7.05 , so long as such Contractual Obligations relate only to the asset or Person subject to such Disposition, (2) are customary provisions in joint venture agreements and other similar agreements applicable to joint ventures permitted under Section 7.03 , so long as such Contractual Obligations are applicable only to such joint venture, and (3) are customary restrictions on leases, subleases, in-licenses (including sublicenses thereof) or asset sale agreements otherwise permitted hereby so long as such restrictions relate only to the assets subject thereto, (D) restrict subletting or assignment of any lease governing a leasehold interest, (E) restrictions imposed by applicable Law; or (b) requires the grant of any Lien on property for any obligation if a Lien on such property is given as security for the Secured Obligations.

7.10 Use of Proceeds .

Use the proceeds of any Credit Extension, whether directly or indirectly, and whether immediately, incidentally or ultimately, to (a) purchase or carry margin stock (within the meaning of Regulation U of the FRB) or to extend credit to others for the purpose of purchasing or carrying margin stock or to refund indebtedness originally incurred for such purpose or (b) finance any hostile Acquisition (as evidenced by a calculation of cash and Cash Equivalents on hand at the Borrower immediately after giving effect to the consummation of such Acquisition and reflecting the application of all cash and Cash Equivalents utilized in connection with the consummation of such Acquisition).

7.11 Financial Covenants .

(a) Consolidated Leverage Ratio . Permit the Consolidated Leverage Ratio as of the end of any Measurement Period (commencing with the fiscal quarter ending September 30, 2016) ending as of the end of any fiscal quarter of the Borrower and its Restricted Subsidiaries to be greater than 3.00 to 1.00 (such ratio, the " Stated Ratio "); provided , however , that upon consummation of a Permitted Material Acquisition and upon the written election of the Borrower (which may be exercised not more than two (2) times during the term of this Agreement) to the Administrative Agent (which shall promptly notify the Lenders), the Borrower may increase the maximum Consolidated Leverage Ratio to 3.50 to 1.00 (the " Adjusted Consolidated Leverage Ratio "). The Adjusted Consolidated Leverage Ratio shall be effective as of the date of consummation of the Permitted Material Acquisition (including, without limitation, for determining Pro Forma Compliance with the requirements of this Agreement for such Permitted Material Acquisition) and (i) shall step down by 0.25x (*i.e.* , a quarter turn) after two (2) full fiscal quarters following the date of the consummation of such Permitted Material Acquisition and (ii) shall step down by an additional 0.25x (*i.e.* , a quarter turn) and return to the Stated Ratio after four (4) full fiscal quarters following the date of the consummation of such Permitted Material Acquisition. Notwithstanding anything in the foregoing to the contrary, in the event that the Borrower makes any such election to adjust the Consolidated Leverage Ratio as set forth above during concurrent periods for Permitted Material Acquisitions occurring within any period of four full fiscal quarters following the date of the consummation of such Permitted Material Acquisitions, the step downs (as set forth above) shall occur after the end of the two and four (respectively) full fiscal quarters following the date of consummation of the most recent Permitted Material Acquisition (on account of which the Consolidated Leverage Ratio was adjusted).

(b) Consolidated EBITDA . Permit the Consolidated EBITDA as of the end of any Measurement Period (commencing with the fiscal quarter ending September 30, 2016) ending as of the end of any fiscal quarter of the Borrower to be less than $200,000,000.

7.12 Amendments of Organization Documents; Fiscal Year; Legal Name, State of Formation; Form of Entity and Accounting Changes .

(a) Amend any Organization Documents of the Borrower or any of its Restricted Subsidiaries, in a manner adverse to the Lenders or the Administrative Agent in any material respect;

(b) change the fiscal year of the Borrower or any of its Restricted Subsidiaries, provided , however, that any Person that becomes a Restricted Subsidiary after the date hereof may change its fiscal year to be the same as the Borrower;

(c) without providing ten (10) days prior written notice to the Administrative Agent (or such shorter period of time as agreed to by the Administrative Agent), change in the name, state of formation or organization, form of organization or principal place of business of the Borrower or any other Loan Party; or

(d) make any other change in accounting policies or reporting practices of the Borrower or any of its Restricted Subsidiaries, except as required by GAAP.

7.13 Sale and Leaseback Transactions .

Enter into any Sale and Leaseback Transaction, unless (a) (i) the sale or transfer of such property is permitted by Section 7.05 and (ii) any Capitalized Lease obligations or Liens arising in connection therewith are permitted by Sections 7.01(i) and 7.02(c) , as the case may be; or (b) the sale and lease-back occurs within 90 days of the acquisition thereof to finance such acquisition.

7.14 Prepayments, Etc. of Indebtedness .

Prepay, redeem, purchase, defease or otherwise satisfy or obligate itself to do so prior to the scheduled maturity thereof in any manner (including by the exercise of any right of setoff), or make any payment in violation of any subordination, standstill or collateral sharing terms of or governing, any Indebtedness, that is subordinated in right of payment to the Obligations or any other Indebtedness except (a) the prepayment of the Credit Extensions in accordance with the terms of this Agreement, (b) regularly scheduled or mandatory repayments of Indebtedness (other than subordinated Indebtedness, in violation of any subordination, standstill or collateral sharing terms of or governing any such Indebtedness) permitted under this Agreement and refinancings and refundings of applicable Indebtedness in compliance with Section 7.02(b) , (c) payments of Indebtedness (other than subordinated Indebtedness, in violation of any subordination, standstill or collateral sharing terms of or governing any such Indebtedness) with an outstanding principal balance that is not in excess of $10,000,000, (d) the conversion of any such Indebtedness to Equity Interests (other than Disqualified Stock), (e) payments of subordinated Indebtedness (including, subordinated Intercompany Debt), subject to the applicable subordination terms related thereto, (f) payment of earnouts, milestone payments, royalty payments in the ordinary course of business as such amounts become due (or are about to become due and payable), (g) payment of Intercompany Debt owing to any Loan Party, and (h) a prepayment, redemption, purchase, defeasement or other satisfaction not otherwise permitted by this Section 7.14, provided that (x) no Default shall exist or would result therefrom and (y) immediately after giving effect thereto, the Borrower shall be in Pro Forma Compliance, provided that the Consolidated Leverage Ratio shall not exceed, on a Pro Forma Basis, 2.50 to 1.00.

7.15 Amendment, Etc. of Indebtedness .

Amend, modify or change in any manner any term or condition of any (a) Indebtedness (other than (i) Indebtedness arising under the Loan Documents, (ii) subordinated Indebtedness, or (iii) Indebtedness permitted under Section 7.02(a), (c), (f) or (h)) if such amendment or modification is, when taken as a whole, adverse to the interests of the Lenders or the Administrative Agent in any material respect or (b) subordinated Indebtedness other than pursuant to the subordination provisions thereof; provided that nothing herein shall restrict the refinancing of any Indebtedness otherwise permitted under this Agreement.

7.16 Sanctions .

Directly or indirectly, use any Credit Extension or the proceeds of any Credit Extension, or lend, contribute or otherwise make available such Credit Extension or the proceeds of any Credit Extension to any Person, to fund any activities of or business with any Sanctioned Person, or in any Designated Jurisdiction, in each case, in violation of applicable Sanctions, or in any other manner that will result in a violation by any Person party hereto (including any Person participating in the transaction, whether as Lender, as Arranger, Administrative Agent, L/C Issuer, Swingline Lender, or otherwise) of Sanctions.

7.17 Anti-Corruption Laws .

Directly or indirectly, use any Credit Extension or the proceeds of any Credit Extension for any purpose which would breach the United States Foreign Corrupt Practices Act of 1977, the UK Bribery Act 2010 and other similar anti-corruption legislation in other jurisdictions.

7.18 Massachusetts Security Corporation .

With regard to the Massachusetts Security Corporation, conduct, transact or otherwise engage in any material operating or business activities other than investment activities that would not reasonably be expected to result in the loss of the Massachusetts Security Corporation's qualification as a Massachusetts security corporation under Mass. Gen. L. c. 63, §38B.

7.19 Unrestricted Subsidiaries .

Permit any Unrestricted Subsidiary to (i) own, or possess the right to use, any Intellectual Property, or (ii) own any of the material economic rights derived from any Intellectual Property, in each case with respect to clause (i) or (ii), covering the Cystic Fibrosis Drug Franchise Assets.

ARTICLE VIII

EVENTS OF DEFAULT AND REMEDIES

8.01 Events of Default .

Any of the following shall constitute an Event of Default:

(a) Non-Payment . The Borrower or any other Loan Party fails to pay (i) when and as required to be paid herein and in the currency required hereunder, any amount of principal of any Loan or any L/C Obligation or deposit any funds as Cash Collateral in respect of L/C Obligations, (ii) within three (3) Business Days after the same becomes due, any interest on any Loan or on any L/C Obligation, or any fee due hereunder, or (iii) within five (5) Business Days after the same becomes due, any other amount payable hereunder or under any other Loan Document; or

(b) Specific Covenants . Any Loan Party fails to perform or observe any term, covenant or agreement contained in any of Section 6.01, 6.02(a), 6.03(a), 6.05(a), 6.07(a), 6.10, 6.11, 6.13, 6.14, 6.19, Article VII or Article X; or

(c) Other Defaults . Any Loan Party fails to perform or observe (i) the covenant set forth in Section 6.02 (other than 6.02(a)) or 6.03 (other than 6.03(a)) and such failure continues for five (5) Business Days or (ii) any other covenant or agreement (not specified in Section 8.01(a) or (b) above) contained in any Loan Document on its part to be performed or observed and such failure continues for thirty (30) days after the earlier of (x) any Loan Party becoming aware thereof and (y) the Administrative Agent providing any Loan Party written notice thereof; or

(d) Representations and Warranties . Any representation, warranty, certification or statement of fact made or deemed made by or on behalf of the Borrower or any other Loan Party herein, in any other Loan Document, shall be incorrect or misleading in any material respect (except that such materiality qualifier shall not be applicable to any representations, warranties, certificates or statement of fact that already are qualified or modified by materiality in the text thereof) when made or deemed made; or

(e) Cross-Default . (i) Any Loan Party or any Restricted Subsidiary thereof (A) fails to make any payment when due (whether by scheduled maturity, required prepayment, acceleration, demand, or otherwise) in respect of any Indebtedness or Guarantee (other than Indebtedness hereunder, Intercompany Debt owing to a Loan Party and Indebtedness under Swap Contracts) having an aggregate principal amount (including undrawn committed or available amounts and including amounts owing to all creditors under any combined or syndicated credit arrangement) of more than the Threshold Amount, or (B) fails to observe or perform any other agreement or condition relating to any such Indebtedness or Guarantee or contained in any instrument or agreement evidencing, securing or relating thereto, or any other event occurs, the effect of which default or other event is to require, or to permit the holder or holders of such Indebtedness or the beneficiary or beneficiaries of such Guarantee (or a trustee or agent on behalf of such holder or holders or beneficiary or beneficiaries) to require, with the giving of notice if required, such Indebtedness to be demanded or to become due or to be repurchased, prepaid, defeased or redeemed (automatically or otherwise), or an offer to repurchase, prepay, defease or redeem such Indebtedness to be made, prior to its stated maturity (it being understood, for the avoidance of any doubt, the occurrence of events causing Convertible Bond Indebtedness to become convertible, or conversions of

Convertible Bond Indebtedness in accordance with its terms and the satisfaction by the Borrower of its obligations in connection with conversions of Convertible Bond Indebtedness through (x) the issuance of Qualified Stock and (y) cash payments in lieu of fractional shares required to be paid upon such conversions, shall not constitute an Event of Default under this clause (e)(i)(B)), or such Guarantee to become payable or cash collateral in respect thereof to be demanded; or (ii) there occurs under any Swap Contract an Early Termination Date (as defined in such Swap Contract) resulting from (A) any event of default under such Swap Contract as to which a Loan Party or any Restricted Subsidiary thereof is the Defaulting Party (as defined in such Swap Contract) or (B) any Termination Event (as so defined) under such Swap Contract as to which a Loan Party or any Restricted Subsidiary thereof is an Affected Party (as so defined) and, in either event, the Swap Termination Value owed by such Loan Party or such Restricted Subsidiary as a result thereof is greater than the Threshold Amount; or (iii) any Loan Party or any Restricted Subsidiary thereof fails to make any payment beyond the applicable grace period with respect thereto or observe or perform any agreement or condition set forth in any lease for the Specified Leased Locations (or contained in any instrument or agreement evidencing or relating thereto), or any other event occurs, the effect of which default or other event is to cause, or to permit the landlord under such lease to cause, with the giving of notice if required, such lease to be terminated or the landlord to enforce any of its remedies thereunder; or

(f) Insolvency Proceedings, Etc. Any Loan Party or any Restricted Subsidiary thereof (other than an Immaterial Subsidiary) institutes or consents to the institution of any proceeding under any Debtor Relief Law, or makes an assignment for the benefit of creditors; or applies for or consents to the appointment of any receiver, trustee, custodian, conservator, liquidator, rehabilitator or similar officer for it or for all or any material part of its property; or any receiver, trustee, custodian, conservator, liquidator, rehabilitator or similar officer is appointed without the application or consent of such Person and the appointment continues undischarged or unstayed for sixty (60) calendar days; or any proceeding under any Debtor Relief Law relating to any such Person or to all or any material part of its property is instituted without the consent of such Person and continues undismissed or unstayed for sixty (60) calendar days, or an order for relief is entered in any such proceeding; or

(g) Inability to Pay Debts; Attachment . (i) Any Loan Party or any Restricted Subsidiary (other than an Immaterial Subsidiary) thereof becomes unable or admits in writing its inability or fails generally to pay its debts as they become due, or (ii) any writ or warrant of attachment or execution or similar process is issued or levied against all or any material part of the property of any such Person and is not released, vacated or fully bonded within forty-five (45) days after its issue or levy; or

(h) Judgments . There is entered against any Loan Party or any Subsidiary thereof (i) one or more final judgments or orders for the payment of money in an aggregate amount (as to all such judgments and orders) exceeding the Threshold Amount (to the extent not paid or otherwise not covered by independent third-party insurance as to which the insurer has been notified of the potential claim and acknowledges coverage), or (ii) any one or more non-monetary final judgments that have, or could reasonably be expected to have,

individually or in the aggregate, a Material Adverse Effect and, in either case, (A) enforcement proceedings are commenced by any creditor upon such judgment or order, or (B) there is a period of thirty (30) consecutive days during which a stay of enforcement of such judgment, by reason of a pending appeal or otherwise, is not in effect; or

(i) ERISA . (i) An ERISA Event occurs with respect to a Pension Plan or Multiemployer Plan which has resulted or would reasonably be expected to result in liability of any Loan Party under Title IV of ERISA to the Pension Plan, Multiemployer Plan or the PBGC in an aggregate amount in excess of the Threshold Amount, or (ii) the Borrower or any ERISA Affiliate fails to pay when due, after the expiration of any applicable grace period, any installment payment with respect to its withdrawal liability under Section 4201 of ERISA under a Multiemployer Plan in an aggregate amount in excess of the Threshold Amount; or

(j) Invalidity of Loan Documents . Any provision of any Loan Document, at any time after its execution and delivery and for any reason other than as expressly permitted hereunder or thereunder or satisfaction in full of all Obligations arising under the Loan Documents, ceases to be in full force and effect; or any Loan Party or any other Person contests in any manner the validity or enforceability of any provision of any Loan Document other than in connection with the release of a Subsidiary Guarantor in accordance with the terms hereof; any Loan Party denies that it has any or further liability or obligation under any provision of any Loan Document, or purports to revoke, terminate or rescind any provision of any Loan Document; or it is or becomes unlawful for a Loan Party to perform any of its obligations under the Loan Documents; or

(k) Collateral Documents . Any Collateral Document after delivery thereof pursuant to the terms of the Loan Documents shall for any reason cease to create a valid and perfected first priority Lien (subject to Permitted Liens) on the Collateral purported to be covered thereby, or any Loan Party shall assert the invalidity of such Liens; or

(l) Change of Control . There occurs any Change of Control; or

(m) Product Recall . Any mandatory product recall shall be required pursuant to any order or directive of any Governmental Authority affecting the products manufactured, sold or distributed by the Borrower or any of its Restricted Subsidiaries that would reasonably be expected to either result in (x) liability or (y) a decrease revenue during any twelve (12) consecutive month period, in each case, in excess of $250,000,000.

8.02 Remedies upon Event of Default .

If any Event of Default occurs and is continuing, the Administrative Agent shall, at the request of, or may, with the consent of, the Required Lenders, take any or all of the following actions:

(a) declare the Revolving Commitment of each Lender to make Loans and any obligation of each L/C Issuer to make L/C Credit Extensions to be terminated, whereupon such commitments and obligation shall be terminated;

(b) declare the unpaid principal amount of all outstanding Loans, all interest accrued and unpaid thereon, and all other amounts owing or payable hereunder or under any other Loan Document to be immediately due and payable, without presentment, demand, protest or other notice of any kind, all of which are hereby expressly waived by the Borrower;

(c) require that the Borrower Cash Collateralize the L/C Obligations (in an amount equal to the Minimum Collateral Amount with respect thereto); and

(d) exercise on behalf of itself, the Lenders and the L/C Issuers all rights and remedies available to it, the Lenders and the L/C Issuers under the Loan Documents or applicable Law or equity;

provided , however , that upon the occurrence of an actual or deemed entry of an order for relief with respect to the Borrower under the Bankruptcy Code of the United States, the obligation of each Lender to make Loans and any obligation of any L/C Issuer to make L/C Credit Extensions shall automatically terminate, the unpaid principal amount of all outstanding Loans and all interest and other amounts as aforesaid shall automatically become due and payable, and the obligation of the Borrower to Cash Collateralize the L/C Obligations as aforesaid shall automatically become effective, in each case without further act of the Administrative Agent or any Lender.

8.03 Application of Funds .

After the exercise of remedies provided for in Section 8.02 (or after the Loans have automatically become immediately due and payable and the L/C Obligations have automatically been required to be Cash Collateralized as set forth in the proviso to Section 8.02) or if at any time insufficient funds are received by and available to the Administrative Agent to pay fully all Secured Obligations then due hereunder, any amounts received on account of the Secured Obligations shall, subject to the provisions of Sections 2.14 and 2.15, be applied by the Administrative Agent in the following order:

First, to payment of that portion of the Secured Obligations constituting fees, indemnities, expenses and other amounts (including fees, charges and disbursements of counsel to the Administrative Agent and amounts payable under Article III) payable to the Administrative Agent in its capacity as such;

Second, to payment of that portion of the Secured Obligations constituting fees, indemnities and other amounts (other than principal, interest and Letter of Credit Fees) payable to the Lenders, and the L/C Issuers (including fees, charges and disbursements of counsel to the respective Lenders, and the L/C Issuers arising under the Loan Documents and amounts payable under Article III), ratably among them in proportion to the respective amounts described in this clause Second payable to them;

Third, to payment of that portion of the Secured Obligations constituting accrued and unpaid Letter of Credit Fees and interest on the Loans, L/C Borrowings and other Secured Obligations arising under the Loan Documents, ratably among the Lenders and the L/C

Issuers in proportion to the respective amounts described in this clause Third payable to them;

Fourth, to payment of that portion of the Secured Obligations constituting unpaid principal of the Loans and L/C Borrowings and to the Administrative Agent for the account of the L/C Issuers, to Cash Collateralize that portion of L/C Obligations comprised of the aggregate undrawn amount of Letters of Credit to the extent not otherwise Cash Collateralized by the Borrower pursuant to Sections 2.03 and 2.14, in each case ratably among the Administrative Agent, the Lenders and the L/C Issuers in proportion to the respective amounts described in this clause Fourth held by them;

Fifth, to payment of that portion of the Secured Obligations then owing under the Secured Hedge Agreements and Secured Cash Management Agreements, in each case ratably among the Hedge Banks and the Cash Management Banks in proportion to the respective amounts described in this clause Fifth held by them; and

Last , the balance, if any, after all of the Secured Obligations have been indefeasibly paid in full, to the Borrower or as otherwise required by Law.

Subject to Sections 2.03(c) and 2.14, amounts used to Cash Collateralize the aggregate undrawn amount of Letters of Credit pursuant to clause Fourth above shall be applied to satisfy drawings under such Letters of Credit as they occur. If any amount remains on deposit as Cash Collateral after all Letters of Credit have either been fully drawn or expired, such remaining amount shall be applied to the other Secured Obligations, if any, in the order set forth above. Excluded Swap Obligations with respect to any Guarantor shall not be paid with amounts received from such Guarantor or its assets, but appropriate adjustments shall be made with respect to payments from other Loan Parties to preserve the allocation to Secured Obligations otherwise set forth above in this Section.

Notwithstanding the foregoing, Secured Obligations arising under Secured Cash Management Agreements and Secured Hedge Agreements shall be excluded from the application described above if the Administrative Agent has not received a Secured Party Designation Notice, together with such supporting documentation as the Administrative Agent may reasonably request, from the applicable Cash Management Bank or Hedge Bank, as the case may be. Each Cash Management Bank or Hedge Bank not a party to this Agreement that has given the notice contemplated by the preceding sentence shall, by such notice, be deemed to have acknowledged and accepted the appointment of the Administrative Agent pursuant to the terms of Article IX for itself and its Affiliates as if a "Lender" party hereto.

ARTICLE IX

ADMINISTRATIVE AGENT

9.01 Appointment and Authority .

(a) Appointment. Each of the Lenders and each of the L/C Issuers hereby irrevocably appoints, designates and authorizes Bank of America to act on its behalf as the Administrative Agent hereunder and under the other Loan Documents and authorizes the Administrative Agent to take such actions on its behalf and to exercise such powers as are delegated to the Administrative Agent by the terms hereof or thereof, together with such actions and powers as are reasonably incidental thereto. The provisions of this Article are solely for the benefit of the Administrative Agent, the Lenders and the L/C Issuers, and neither the Borrower nor any other Loan Party shall have rights as a third party beneficiary of any of such provisions. It is understood and agreed that the use of the term "agent" herein or in any other Loan Documents (or any other similar term) with reference to the Administrative Agent is not intended to connote any fiduciary or other implied (or express) obligations arising under agency doctrine of any applicable Law. Instead such term is used as a matter of market custom, and is intended to create or reflect only an administrative relationship between contracting parties.

(b) Collateral Agent. The Administrative Agent shall also act as the "collateral agent" under the Loan Documents, and each of the Lenders (including in its capacities as a potential Hedge Bank and a potential Cash Management Bank) and each of the L/C Issuers hereby irrevocably appoints and authorizes the Administrative Agent to act as the agent of such Lender and such L/C Issuer for purposes of acquiring, holding and enforcing any and all Liens on Collateral granted by any of the Loan Parties to secure any of the Secured Obligations, together with such powers and discretion as are reasonably incidental thereto. In this connection, the Administrative Agent, as "collateral agent" and any co-agents, sub-agents and attorneys-in-fact appointed by the Administrative Agent pursuant to Section 9.05 for purposes of holding or enforcing any Lien on the Collateral (or any portion thereof) granted under the Collateral Documents, or for exercising any rights and remedies thereunder at the direction of the Administrative Agent, shall be entitled to the benefits of all provisions of this Article IX and Article XI (including Section 11.04(c), as though such co-agents, sub-agents and attorneys-in-fact were the "collateral agent" under the Loan Documents) as if set forth in full herein with respect thereto.

9.02 Rights as a Lender.

The Person serving as the Administrative Agent hereunder shall have the same rights and powers in its capacity as a Lender as any other Lender and may exercise the same as though it were not the Administrative Agent and the term "Lender" or "Lenders" shall, unless otherwise expressly indicated or unless the context otherwise requires, include the Person serving as the Administrative Agent hereunder in its individual capacity. Such Person and its Affiliates may accept deposits from, lend money to, own securities of, act as the financial advisor or in any other advisory capacity for and generally engage in any kind of banking, trust, financial, advisory, underwriting or other business with any Loan Party or any Subsidiary or other Affiliate thereof as if such Person were not the Administrative Agent hereunder and without any duty to account therefor to the Lenders or to provide notice to or consent of the Lenders with respect thereto.

9.03 Exculpatory Provisions.

The Administrative Agent shall not have any duties or obligations except those expressly set forth herein and in the other Loan Documents, and its duties hereunder shall be administrative in nature. Without limiting the generality of the foregoing, the Administrative Agent and its Related Parties:

(a) shall not be subject to any fiduciary or other implied duties, regardless of whether a Default has occurred and is continuing;

(b) shall not have any duty to take any discretionary action or exercise any discretionary powers, except discretionary rights and powers expressly contemplated hereby or by the other Loan Documents that the Administrative Agent is required to exercise as directed in writing by the Required Lenders (or such other number or percentage of the Lenders as shall be expressly provided for herein or in the other Loan Documents), provided that the Administrative Agent shall not be required to take any action that, in its opinion or the opinion of its counsel, may expose the Administrative Agent to liability or that is contrary to any Loan Document or applicable Law, including for the avoidance of doubt any action that may be in violation of the automatic stay under any Debtor Relief Law or that may effect a forfeiture, modification or termination of property of a Defaulting Lender in violation of any Debtor Relief Law; and

(c) shall not, except as expressly set forth herein and in the other Loan Documents, have any duty or responsibility to disclose, and shall not be liable for the failure to disclose, any information relating to any Loan Party or any of its Affiliates that is communicated to or obtained by the Person serving as the Administrative Agent or any of its Affiliates in any capacity.

Neither the Administrative Agent nor any of its Related Parties shall be liable for any action taken or not taken by the Administrative Agent under or in connection with this Agreement or any other Loan Document or the transactions contemplated hereby or thereby (i) with the consent or at the request of the Required Lenders (or such other number or percentage of the Lenders as shall be necessary), or as the Administrative Agent shall believe in good faith shall be necessary, under the circumstances as provided in Sections 11.01 and 8.02) or (ii) in the absence of its own gross negligence, willful misconduct or bad faith as determined by a court of competent jurisdiction by final and nonappealable judgment. The Administrative Agent shall be deemed not to have knowledge of any Default unless and until notice describing such Default is given in writing to the Administrative Agent by the Borrower, a Lender or an L/C Issuer.

Neither the Administrative Agent nor any of its Related Parties shall be responsible or have any liability for, or have any duty to ascertain, inquire into, monitor or enforce, compliance with the provisions of this Agreement relating to Disqualified Institutions. Without limiting the generality of the foregoing, the Administrative Agent shall not (i) be obligated to ascertain, monitor or inquire as to whether any Lender or prospective Lender is a Disqualified Institution or (ii) have any liability with respect to or arising out of any assignment of Loans, or disclosure of confidential information, to any Disqualified Institution.

Neither the Administrative Agent nor any of its Related Parties have any duty or obligation to any Lender or participant or any other Person to ascertain or inquire into (i) any statement, warranty or representation made in or in connection with this Agreement or any other Loan Document, (ii) the contents of any certificate, report or other document delivered hereunder or thereunder or in connection herewith or therewith, (iii) the performance or observance of any of the covenants, agreements or other terms or conditions set forth herein or therein or the occurrence of any Default, (iv) the validity, enforceability, effectiveness or genuineness of this Agreement, any other Loan Document or any other agreement, instrument or document, or the creation, perfection or priority of any Lien purported to be created by the Collateral Documents, (v) the value or the sufficiency of any Collateral, or (vi) the satisfaction of any condition set forth in Article IV or elsewhere herein, other than to confirm receipt of items expressly required to be delivered to the Administrative Agent.

9.04 Reliance by Administrative Agent .

The Administrative Agent shall be entitled to rely upon, and shall be fully protected in relying and shall not incur any liability for relying upon, any notice, request, certificate, communication, consent, statement, instrument, document or other writing (including any electronic message, Internet or intranet website posting or other distribution) believed by it to be genuine and to have been signed, sent or otherwise authenticated by the proper Person. The Administrative Agent also may rely upon any statement made to it orally or by telephone and believed by it to have been made by the proper Person, and shall be fully protected in relying and shall not incur any liability for relying thereon. In determining compliance with any condition hereunder to the making of a Loan, or the issuance, extension, renewal or increase of a Letter of Credit, that by its terms must be fulfilled to the satisfaction of a Lender or an L/C Issuer, the Administrative Agent may presume that such condition is satisfactory to such Lender or such L/C Issuer unless the Administrative Agent shall have received notice to the contrary from such Lender or such L/C Issuer prior to the making of such Loan or the issuance of such Letter of Credit. The Administrative Agent may consult with legal counsel (who may be counsel for the Loan Parties), independent accountants and other experts selected by it, and shall not be liable for any action taken or not taken by it in accordance with the advice of any such counsel, accountants or experts. For purposes of determining compliance with the conditions specified in Section 4.01, each Lender that has signed this Agreement shall be deemed to have consented to, approved or accepted or to be satisfied with, each document or other matter required thereunder to be consented to or approved by or acceptable or satisfactory to a Lender unless the Administrative Agent shall have received notice from such Lender prior to the proposed Closing Date specifying its objections.

9.05 Delegation of Duties .

The Administrative Agent may perform any and all of its duties and exercise its rights and powers hereunder or under any other Loan Document by or through any one or more sub-agents appointed by the Administrative Agent. The Administrative Agent and any such sub-agent may perform any and all of its duties and exercise its rights and powers by or through their respective Related Parties. The exculpatory provisions of this Article shall apply to any such sub-agent and to the Related Parties of the Administrative Agent and any such sub-agent, and shall apply to their

respective activities in connection with the syndication of the Facilities as well as activities as Administrative Agent. The Administrative Agent shall not be responsible for the negligence or misconduct of any sub-agents except to the extent that a court of competent jurisdiction determines in a final and nonappealable judgment that the Administrative Agent acted with gross negligence, willful misconduct or bad faith in the selection of such sub-agents.

9.06 Resignation of Administrative Agent .

(a) Notice . The Administrative Agent may at any time give notice of its resignation to the Lenders, the L/C Issuers and the Borrower. Upon receipt of any such notice of resignation, the Required Lenders shall have the right, in consultation with the Borrower, to appoint a successor, which shall be a bank with an office in the United States, or an Affiliate of any such bank with an office in the United States. If no such successor shall have been so appointed by the Required Lenders and shall have accepted such appointment within thirty (30) days after the retiring Administrative Agent gives notice of its resignation (or such earlier day as shall be agreed by the Required Lenders) (the " Resignation Effective Date "), then the retiring Administrative Agent may (but shall not be obligated to) on behalf of the Lenders and the L/C Issuers, appoint a successor Administrative Agent meeting the qualifications set forth above; provided that in no event shall any successor Administrative Agent be a Defaulting Lender or a Disqualified Institution. Whether or not a successor has been appointed, such resignation shall become effective in accordance with such notice on the Resignation Effective Date.

(b) Defaulting Lender . If the Person serving as Administrative Agent is a Defaulting Lender pursuant to clause (d) of the definition thereof, the Required Lenders may, to the extent permitted by applicable Law, by notice in writing to the Borrower and such Person remove such Person as Administrative Agent and, in consultation with the Borrower, appoint a successor. If no such successor shall have been so appointed by the Required Lenders and shall have accepted such appointment within thirty (30) days (or such earlier day as shall be agreed by the Required Lenders) (the " Removal Effective Date "), then such removal shall nonetheless become effective in accordance with such notice on the Removal Effective Date.

(c) Effect of Resignation or Removal . With effect from the Resignation Effective Date or the Removal Effective Date (as applicable) (i) the retiring or removed Administrative Agent shall be discharged from its duties and obligations hereunder and under the other Loan Documents (except that in the case of any collateral security held by the Administrative Agent on behalf of the Lenders or the L/C Issuers under any of the Loan Documents, the retiring or removed Administrative Agent shall continue to hold such collateral security until such time as a successor Administrative Agent is appointed) and (ii) except for any indemnity payments or other amounts then owed to the retiring or removed Administrative Agent, all payments, communications and determinations provided to be made by, to or through the Administrative Agent shall instead be made by or to each Lender and each L/C Issuer directly, until such time, if any, as the Required Lenders appoint a successor Administrative Agent as provided for above. Upon the acceptance of a successor's appointment as Administrative

Agent hereunder, such successor shall succeed to and become vested with all of the rights, powers, privileges and duties of the retiring (or removed) Administrative Agent (other than as provided in Section 3.01(g) and other than any rights to indemnity payments or other amounts owed to the retiring or removed Administrative Agent as of the Resignation Effective Date or the Removal Effective Date, as applicable), and the retiring or removed Administrative Agent shall be discharged from all of its duties and obligations hereunder or under the other Loan Documents (if not already discharged therefrom as provided above in this Section). The fees payable by the Borrower to a successor Administrative Agent shall be the same as those payable to its predecessor unless otherwise agreed between the Borrower and such successor. After the retiring or removed Administrative Agent's resignation or removal hereunder and under the other Loan Documents, the provisions of this Article and Section 11.04 shall continue in effect for the benefit of such retiring or removed Administrative Agent, its sub agents and their respective Related Parties in respect of any actions taken or omitted to be taken by any of them (i) while the retiring or removed Administrative Agent was acting as Administrative Agent and (ii) after such resignation or removal for as long as any of them continues to act in any capacity hereunder or under the other Loan Documents, including , without limitation , (A) acting as collateral agent or otherwise holding any collateral security on behalf of any of the Secured Parties and (B) in respect of any actions taken in connection with transferring the agency to any successor Administrative Agent.

(d) L/C Issuer and Swingline Lender . Any resignation or removal by Bank of America as Administrative Agent pursuant to this Section shall also constitute its resignation as L/C Issuer and Swingline Lender. If Bank of America resigns as an L/C Issuer, it shall retain all the rights, powers, privileges and duties of the L/C Issuers hereunder with respect to all Letters of Credit issued by it outstanding as of the effective date of its resignation as L/C Issuer and all L/C Obligations with respect thereto, including the right to require the Lenders to make Base Rate Loans or fund risk participations in Unreimbursed Amounts pursuant to Section 2.03(c). If Bank of America resigns as Swingline Lender, it shall retain all the rights of the Swingline Lender provided for hereunder with respect to Swingline Loans made by it and outstanding as of the effective date of such resignation, including the right to require the Lenders to make Base Rate Loans or fund risk participations in outstanding Swingline Loans pursuant to Section 2.04(c). Upon the appointment by the Borrower of a successor L/C Issuer or Swingline Lender hereunder (which successor shall in all cases be a Lender other than a Defaulting Lender), (i) such successor shall succeed to and become vested with all of the rights, powers, privileges and duties of the retiring L/C Issuer or Swingline Lender, as applicable, (ii) the retiring L/C Issuer and Swingline Lender shall be discharged from all of their respective duties and obligations hereunder or under the other Loan Documents, and (iii) the successor L/C Issuer shall issue letters of credit in substitution for the Letters of Credit, if any, outstanding at the time of such succession or make other arrangements satisfactory to Bank of America to effectively assume the obligations of Bank of America with respect to such Letters of Credit.

9.07 Non-Reliance on Administrative Agent and Other Lenders .

Each Lender and each L/C Issuer acknowledges that it has, independently and without reliance upon the Administrative Agent or any other Lender or any of their Related Parties and based on such documents and information as it has deemed appropriate, made its own credit analysis and decision to enter into this Agreement. Each Lender and each L/C Issuer also acknowledges that it will, independently and without reliance upon the Administrative Agent or any other Lender or any of their Related Parties and based on such documents and information as it shall from time to time deem appropriate, continue to make its own decisions in taking or not taking action under or based upon this Agreement, any other Loan Document or any related agreement or any document furnished hereunder or thereunder.

9.08 No Other Duties, Etc .

Anything herein to the contrary notwithstanding, none of the titles listed on the cover page hereof shall have any powers, duties or responsibilities under this Agreement or any of the other Loan Documents, except in its capacity, as applicable, as the Administrative Agent, an Arranger, a Lender or an L/C Issuer hereunder.

9.09 Administrative Agent May File Proofs of Claim; Credit Bidding .

In case of the pendency of any proceeding under any Debtor Relief Law or any other judicial proceeding relative to any Loan Party, the Administrative Agent (irrespective of whether the principal of any Loan or L/C Obligation shall then be due and payable as herein expressed or by declaration or otherwise and irrespective of whether the Administrative Agent shall have made any demand on the Borrower) shall be entitled and empowered, by intervention in such proceeding or otherwise:

(a) to file and prove a claim for the whole amount of the principal and interest owing and unpaid in respect of the Loans, L/C Obligations and all other Secured Obligations that are owing and unpaid and to file such other documents as may be necessary or advisable in order to have the claims of the Lenders, the L/C Issuers and the Administrative Agent (including any claim for the reasonable compensation, expenses, disbursements and advances of the Lenders, the L/C Issuers and the Administrative Agent and their respective agents and counsel and all other amounts due the Lenders, the L/C Issuers and the Administrative Agent under Sections 2.03(h) and (i), 2.09, 2.10(b) and 11.04) allowed in such judicial proceeding; and

(b) to collect and receive any monies or other property payable or deliverable on any such claims and to distribute the same;

and any custodian, receiver, assignee, trustee, liquidator, sequestrator or other similar official in any such judicial proceeding is hereby authorized by each Lender and each L/C Issuer to make such payments to the Administrative Agent and, in the event that the Administrative Agent shall consent to the making of such payments directly to the Lenders and the L/C Issuers, to pay to the Administrative Agent any amount due for the reasonable compensation, expenses, disbursements and advances of the Administrative Agent and its agents and counsel, and any other amounts due the Administrative Agent under Sections 2.09, 2.10(b) and 11.04.

Nothing contained herein shall be deemed to authorize the Administrative Agent to authorize or consent to or accept or adopt on behalf of any Lender or any L/C Issuer any plan of reorganization, arrangement, adjustment or composition affecting the Secured Obligations or the rights of any Lender or any L/C Issuer to authorize the Administrative Agent to vote in respect of the claim of any Lender or any L/C Issuer or in any such proceeding.

The Secured Parties hereby irrevocably authorize the Administrative Agent, at the direction of the Required Lenders, to credit bid all or any portion of the Secured Obligations (including accepting some or all of the Collateral in satisfaction of some or all of the Secured Obligations pursuant to a deed in lieu of foreclosure or otherwise) and in such manner purchase (either directly or through one or more acquisition vehicles) all or any portion of the Collateral (a) at any sale thereof conducted under the provisions of the Bankruptcy Code of the United States, including under Sections 363, 1123 or 1129 of the Bankruptcy Code of the United States, or any similar Laws in any other jurisdictions to which a Loan Party is subject, (b) at any other sale or foreclosure or acceptance of collateral in lieu of debt conducted by (or with the consent or at the direction of) the Administrative Agent (whether by judicial action or otherwise) in accordance with any applicable Law. In connection with any such credit bid and purchase, the Secured Obligations owed to the Secured Parties shall be entitled to be, and shall be, credit bid on a ratable basis (with Secured Obligations with respect to contingent or unliquidated claims receiving contingent interests in the acquired assets on a ratable basis that would vest upon the liquidation of such claims in an amount proportional to the liquidated portion of the contingent claim amount used in allocating the contingent interests) in the asset or assets so purchased (or in the Equity Interests or debt instruments of the acquisition vehicle or vehicles that are used to consummate such purchase). In connection with any such bid (i) the Administrative Agent shall be authorized to form one or more acquisition vehicles to make a bid, (ii) to adopt documents providing for the governance of the acquisition vehicle or vehicles (provided that any actions by the Administrative Agent with respect to such acquisition vehicle or vehicles, including any disposition of the assets or Equity Interests thereof shall be governed, directly or indirectly, by the vote of the Required Lenders, irrespective of the termination of this Agreement and without giving effect to the limitations on actions by the Required Lenders contained in clauses (a) through (j) of Section 11.01 of this Agreement, and (iii) to the extent that Secured Obligations that are assigned to an acquisition vehicle are not used to acquire Collateral for any reason (as a result of another bid being higher or better, because the amount of Secured Obligations assigned to the acquisition vehicle exceeds the amount of debt credit bid by the acquisition vehicle or otherwise), such Secured Obligations shall automatically be reassigned to the Lenders pro rata and the Equity Interests and/or debt instruments issued by any acquisition vehicle on account of the Secured Obligations that had been assigned to the acquisition vehicle shall automatically be cancelled, without the need for any Secured Party or any acquisition vehicle to take any further action.

9.10 Collateral and Guaranty Matters .

Each of the Lenders (including in its capacities as a potential Cash Management Bank and a potential Hedge Bank) and each of the L/C Issuers irrevocably authorize the Administrative Agent, at its option and in its discretion,

(a) to release any Lien on any property granted to or held by the Administrative Agent under any Loan Document (i) upon the Facility Termination Date, (ii) that is sold or otherwise disposed of or to be sold or otherwise disposed of as part of or in connection with any sale or other disposition permitted hereunder or under any other Loan Document, or (iii) if approved, authorized or ratified in writing by the Required Lenders in accordance with Section 11.01;

(b) to subordinate any Lien on any property granted to or held by the Administrative Agent under any Loan Document to the holder of any Lien on such property that is permitted by Section 7.01(i); and

(c) to release any Guarantor from its obligations under the Guaranty if (i) such Person ceases to be a Subsidiary or a Loan Party as a result of a transaction permitted under the Loan Documents or (ii) such Person is designated as an Unrestricted Subsidiary hereunder.

Upon request by the Administrative Agent at any time, the Required Lenders will confirm in writing the Administrative Agent's authority to release or subordinate its interest in particular types or items of property, or to release any Guarantor from its obligations under the Guaranty pursuant to this Section 9.10. In each case as specified in this Section 9.10, the Administrative Agent will promptly, at the Borrower's expense, execute and deliver to the applicable Loan Party such documents as such Loan Party may reasonably request to evidence the release of such item of Collateral from the assignment and security interest granted under the Collateral Documents or to subordinate its interest in such item, or to release such Guarantor from its obligations under the Guaranty, in each case in accordance with the terms of the Loan Documents and this Section 9.10. The Administrative Agent shall have no liability whatsoever to any Secured Party as the result of effectuating or executing any document evidencing any release of Collateral or Loan Party by it as permitted (or which the Administrative Agent in good faith believes to be permitted) by this Section 9.10 and any execution and delivery of documents pursuant to this Section 9.10 shall be without recourse or warranty by the Administrative Agent.

The Administrative Agent shall not be responsible for or have a duty to ascertain or inquire into any representation or warranty regarding the existence, value or collectability of the Collateral, the existence, priority or perfection of the Administrative Agent's Lien thereon, or any certificate prepared by any Loan Party in connection therewith, nor shall the Administrative Agent be responsible or liable to the Lenders for any failure to monitor or maintain any portion of the Collateral.

9.11 Secured Cash Management Agreements and Secured Hedge Agreements .

Except as otherwise expressly set forth herein, no Cash Management Bank or Hedge Bank that obtains the benefit of the provisions of Section 8.03, the Guaranty or any Collateral by virtue of the provisions hereof or any Collateral Document shall have any right to notice of any action or to consent to, direct or object to any action hereunder or under any other Loan Document or otherwise in respect of the Collateral (including the release or impairment of any Collateral) (or to notice of or to consent to any amendment, waiver or modification of the provisions hereof or of the Guaranty

or any Collateral Document) other than in its capacity as a Lender and, in such case, only to the extent expressly provided in the Loan Documents. Notwithstanding any other provision of this Article IX to the contrary, the Administrative Agent shall not be required to verify the payment of, or that other satisfactory arrangements have been made with respect to, Secured Obligations arising under Secured Cash Management Agreements and Secured Hedge Agreements except to the extent expressly provided herein and unless the Administrative Agent has received a Secured Party Designation Notice of such Secured Obligations, together with such supporting documentation as the Administrative Agent may request, from the applicable Cash Management Bank or Hedge Bank, as the case may be. The Administrative Agent shall not be required to verify the payment of, or that other satisfactory arrangements have been made with respect to, Secured Obligations arising under Secured Cash Management Agreements and Secured Hedge Agreements in the case of a Facility Termination Date. Each Lender hereby acknowledges and agrees (including on behalf of any of its Affiliates that may be a Cash Management Bank or a potential Hedge Bank) that (x) obligations of the Borrower or any of its Subsidiaries under any Secured Cash Management Agreement or Secured Hedge Agreement shall be secured and guaranteed pursuant to the Collateral Documents to the extent that, and for so long as, the other Obligations are so secured and guaranteed and (y) any release of Collateral or Guarantors effected in a manner permitted by this Agreement shall not require the consent of holders of obligations under Secured Cash Management Agreements or Secured Hedge Agreements.

ARTICLE X

CONTINUING GUARANTY

10.01 Guaranty .

Each Guarantor hereby absolutely and unconditionally, jointly and severally guarantees, as primary obligor and as a guaranty of payment and performance and not merely as a guaranty of collection, prompt payment when due, whether at stated maturity, by required prepayment, upon acceleration, demand or otherwise, and at all times thereafter, of any and all Secured Obligations (for each Guarantor, subject to the proviso in this sentence, its " Guaranteed Obligations "); provided that (a) the Guaranteed Obligations of a Guarantor shall exclude any Excluded Swap Obligations with respect to such Guarantor and (b) the liability of each Guarantor individually with respect to this Guaranty shall be limited to an aggregate amount equal to the largest amount that would not render its obligations hereunder subject to avoidance under Section 548 of the Bankruptcy Code of the United States or any comparable provisions of any applicable state law or other applicable Law. Without limiting the generality of the foregoing, the Guaranteed Obligations shall include any such indebtedness, obligations, and liabilities with respect to Secured Obligations, or portion thereof, which may be or hereafter become unenforceable or compromised or shall be an allowed or disallowed claim under any proceeding or case commenced by or against any Debtor under any Debtor Relief Laws. The Administrative Agent's books and records showing the amount of the Obligations shall be admissible in evidence in any action or proceeding, and shall be binding upon each Guarantor, and conclusive for the purpose of establishing the amount of the Secured Obligations absent manifest error. This Guaranty shall not be affected by the genuineness, validity, regularity or enforceability of the Secured Obligations or any instrument or agreement evidencing any Secured

Obligations, or by the existence, validity, enforceability, perfection, non-perfection or extent of any collateral therefor, or by any fact or circumstance relating to the Secured Obligations which might otherwise constitute a defense to the obligations of the Guarantors, or any of them, under this Guaranty, and each Guarantor hereby irrevocably waives any defenses it may now have or hereafter acquire in any way relating to any or all of the foregoing.

10.02 Rights of Lenders .

Each Guarantor consents and agrees that the Secured Parties may, at any time and from time to time, without notice or demand, and without affecting the enforceability or continuing effectiveness hereof: (a) amend, extend, renew, compromise, discharge, accelerate or otherwise change the time for payment or the terms of the Secured Obligations or any part thereof; (b) take, hold, exchange, enforce, waive, release, fail to perfect, sell, or otherwise dispose of any security for the payment of this Guaranty or any Secured Obligations; (c) apply such security and direct the order or manner of sale thereof as the Administrative Agent, the L/C Issuers and the Lenders in their sole discretion may determine; and (d) release or substitute one or more of any endorsers or other guarantors of any of the Secured Obligations. Without limiting the generality of the foregoing, each Guarantor consents to the taking of, or failure to take, any action which might in any manner or to any extent vary the risks of such Guarantor under this Guaranty or which, but for this provision, might operate as a discharge of such Guarantor.

10.03 Certain Waivers .

Each Guarantor waives (a) any defense arising by reason of any disability or other defense of the Borrower or any other guarantor, or the cessation from any cause whatsoever (including any act or omission of any Secured Party) of the liability of the Borrower or any other Loan Party; (b) any defense based on any claim that such Guarantor's obligations exceed or are more burdensome than those of the Borrower or any other Loan Party; (c) the benefit of any statute of limitations affecting any Guarantor's liability hereunder; (d) any right to proceed against the Borrower or any other Loan Party, proceed against or exhaust any security for the Secured Obligations, or pursue any other remedy in the power of any Secured Party whatsoever; (e) any benefit of and any right to participate in any security now or hereafter held by any Secured Party; and (f) to the fullest extent permitted by law, any and all other defenses or benefits that may be derived from or afforded by applicable Law limiting the liability of or exonerating guarantors or sureties. Each Guarantor expressly waives all setoffs and counterclaims and all presentments, demands for payment or performance, notices of nonpayment or nonperformance, protests, notices of protest, notices of dishonor and all other notices or demands of any kind or nature whatsoever with respect to the Secured Obligations, and all notices of acceptance of this Guaranty or of the existence, creation or incurrence of new or additional Secured Obligations.

10.04 Obligations Independent .

The obligations of each Guarantor hereunder are those of primary obligor, and not merely as surety, and are independent of the Secured Obligations and the obligations of any other guarantor, and a separate action may be brought against each Guarantor to enforce this Guaranty whether or not the Borrower or any other person or entity is joined as a party.

10.05 Subrogation .

No Guarantor shall exercise any right of subrogation, contribution, indemnity, reimbursement or similar rights with respect to any payments it makes under this Guaranty until all of the Secured Obligations and any amounts payable under this Guaranty have been indefeasibly paid and performed in full and the Revolving Commitments and the Revolving Facility are terminated. If any amounts are paid to a Guarantor in violation of the foregoing limitation, then such amounts shall be held in trust for the benefit of the Secured Parties and shall forthwith be paid to the Secured Parties to reduce the amount of the Secured Obligations, whether matured or unmatured.

10.06 Termination; Reinstatement .

This Guaranty is a continuing and irrevocable guaranty of all Secured Obligations now or hereafter existing and shall remain in full force and effect until the Facility Termination Date. Notwithstanding the foregoing, this Guaranty shall continue in full force and effect or be revived, as the case may be, if any payment by or on behalf of the Borrower or a Guarantor is made, or any of the Secured Parties exercises its right of setoff, in respect of the Secured Obligations and such payment or the proceeds of such setoff or any part thereof is subsequently invalidated, declared to be fraudulent or preferential, set aside or required (including pursuant to any settlement entered into by any of the Secured Parties in their discretion) to be repaid to a trustee, receiver or any other party, in connection with any proceeding under any Debtor Relief Laws or otherwise, all as if such payment had not been made or such setoff had not occurred and whether or not the Secured Parties are in possession of or have released this Guaranty and regardless of any prior revocation, rescission, termination or reduction. The obligations of each Guarantor under this paragraph shall survive termination of this Guaranty.

10.07 Stay of Acceleration .

If acceleration of the time for payment of any of the Secured Obligations is stayed, in connection with any case commenced by or against a Guarantor or the Borrower under any Debtor Relief Laws, or otherwise, all such amounts shall nonetheless be payable by each Guarantor, jointly and severally, immediately upon demand by the Secured Parties.

10.08 Condition of Borrower .

Each Guarantor acknowledges and agrees that it has the sole responsibility for, and has adequate means of, obtaining from the Borrower and any other guarantor such information concerning the financial condition, business and operations of the Borrower and any such other guarantor as such Guarantor requires, and that none of the Secured Parties has any duty, and such Guarantor is not relying on the Secured Parties at any time, to disclose to it any information relating to the business, operations or financial condition of the Borrower or any other guarantor (each Guarantor waiving any duty on the part of the Secured Parties to disclose such information and any defense relating to the failure to provide the same).

10.09 Appointment of Borrower .

Each of the Loan Parties hereby appoints the Borrower to act as its agent for all purposes of this Agreement, the other Loan Documents and all other documents and electronic platforms entered into in connection herewith and agrees that (a) the Borrower may execute such documents and provide such authorizations on behalf of such Loan Parties as the Borrower deems appropriate in its sole discretion and each Loan Party shall be obligated by all of the terms of any such document and/or authorization executed on its behalf, (b) any notice or communication delivered by the Administrative Agent, an L/C Issuer or a Lender to the Borrower shall be deemed delivered to each Loan Party and (c) the Administrative Agent, the L/C Issuers or the Lenders may accept, and be permitted to rely on, any document, authorization, instrument or agreement executed by the Borrower on behalf of each of the Loan Parties.

10.10 Right of Contribution .

The Guarantors agree among themselves that, in connection with payments made hereunder, each Guarantor shall have contribution rights against the other Guarantors as permitted under applicable Law.

10.11 Keepwell .

Each Loan Party that is a Qualified ECP Guarantor at the time the Guaranty or the grant of a Lien under the Loan Documents, in each case, by any Specified Loan Party becomes effective with respect to any Swap Obligation, hereby jointly and severally, absolutely, unconditionally and irrevocably undertakes to provide such funds or other support to each Specified Loan Party with respect to such Swap Obligation as may be needed by such Specified Loan Party from time to time to honor all of its obligations under the Loan Documents in respect of such Swap Obligation (but, in each case, only up to the maximum amount of such liability that can be hereby incurred without rendering such Qualified ECP Guarantor's obligations and undertakings under this Article X voidable under applicable law relating to fraudulent conveyance or fraudulent transfer, and not for any greater amount). The obligations and undertakings of each Qualified ECP Guarantor under this Section shall remain in full force and effect until the Secured Obligations have been indefeasibly paid and performed in full. Each Loan Party intends this Section to constitute, and this Section shall be deemed to constitute, a guarantee of the obligations of, and a "keepwell, support, or other agreement" for the benefit of, each Specified Loan Party for all purposes of the Commodity Exchange Act.

ARTICLE XI

MISCELLANEOUS

11.01 Amendments, Etc .

No amendment or waiver of any provision of this Agreement or any other Loan Document, and no consent to any departure by the Borrower or any other Loan Party therefrom, shall be effective unless in writing signed by the Required Lenders (or by the Administrative Agent with the consent of the Required Lenders) and the Borrower or the applicable Loan Party, as the case may be, and acknowledged by the Administrative Agent, and each such waiver or consent shall be effective only

in the specific instance and for the specific purpose for which given; provided , however , that no such amendment, waiver or consent shall:

(a) waive any condition set forth in Section 4.01, or, in the case of the initial Credit Extension, Section 4.02, in each case, except as expressly provided therein, without the written consent of each Lender;

(b) without limiting the generality of clause (a) above, waive any condition set forth in Section 4.02 without the written consent of the Required Lenders;

(c) extend or increase the Revolving Commitment of any Lender (or reinstate any Revolving Commitment terminated pursuant to Section 8.02) without the written consent of such Lender (it being understood and agreed that a waiver (or amendment to the terms of) of any condition precedent in Section 4.02 or of any Default or Event of Default or a mandatory reduction in Revolving Commitments shall not constitute an extension or increase in Revolving Commitments of any Lender);

(d) postpone any date fixed by this Agreement or any other Loan Document for any payment (excluding mandatory prepayments) of principal, interest, fees or other amounts due to the Lenders (or any of them) hereunder or under such other Loan Document without the written consent of each Lender directly and adversely affected thereby, provided , however , that only the consent of the Required Lenders shall be necessary to waive any obligation of the Borrower to pay interest or Letter of Credit Fees at the Default Rate;

(e) reduce the principal of, or the rate of interest specified herein on, any Loan or L/C Borrowing, or (subject to clause (iv) of the second proviso to this Section 11.01) any fees or other amounts payable hereunder or under any other Loan Document without the written consent of each Lender directly and adversely affected thereby; provided , however , that only the consent of the Required Lenders shall be necessary (i) to amend the definition of "Default Rate" or to waive any obligation of the Borrower to pay interest or Letter of Credit Fees at the Default Rate or (ii) to amend any financial covenant hereunder (or any defined term used therein) even if the effect of such amendment would be to reduce the rate of interest on any Loan or L/C Borrowing or to reduce any fee payable hereunder;

(f) change Section 8.03, or Section 2.13 in a manner that would alter the pro rata sharing of payments required thereby without the written consent of each Lender or (ii) 2.12(f) in a manner that would alter the pro rata application required thereby without the written consent of each Lender directly affected thereby;

(g) change (i) any provision of this Section 11.01 or the definition of "Required Lenders" or any other provision of any Loan Document specifying the number or percentage of Lenders required to amend, waive or otherwise modify any rights hereunder or thereunder or make any determination or grant any consent hereunder, without the written consent of each Lender;

(h) release all or substantially all of the Collateral in any transaction or series of related transactions, without the written consent of each Lender;

(i) release all or substantially all of the value of the Guaranty, without the written consent of each Lender, except to the extent the release of any Subsidiary from the Guaranty is permitted pursuant to Section 9.10 (in which case such release may be made by the Administrative Agent acting alone); or

(j) release the Borrower or permit the Borrower to assign or transfer any of its rights or obligations under this Agreement or the other Loan Documents without the consent of each Lender;

and provided , further , that (i) no amendment, waiver or consent shall, unless in writing and signed by the applicable L/C Issuer in addition to the Lenders required above, affect the rights or duties of such L/C Issuer under this Agreement or any Issuer Document relating to any Letter of Credit issued or to be issued by it; (ii) no amendment, waiver or consent shall, unless in writing and signed by the Swingline Lender in addition to the Lenders required above, affect the rights or duties of the Swingline Lender under this Agreement; (iii) no amendment, waiver or consent shall, unless in writing and signed by the Administrative Agent in addition to the Lenders required above, affect the rights or duties of the Administrative Agent under this Agreement or any other Loan Document; (iv) each Fee Letter may be amended, or rights or privileges thereunder waived, in a writing executed only by the parties thereto. Notwithstanding anything to the contrary herein, (A) no Defaulting Lender shall have any right to approve or disapprove any amendment, waiver or consent hereunder (and any amendment, waiver or consent which by its terms requires the consent of all Lenders or each affected Lender, may be effected with the consent of the applicable Lenders other than Defaulting Lenders), except that (1) the Revolving Commitment of any Defaulting Lender may not be increased or extended without the consent of such Lender and (2) any waiver, amendment or modification requiring the consent of all Lenders or each affected Lender, that by its terms affects any Defaulting Lender disproportionately adversely relative to other affected Lenders shall require the consent of such Defaulting Lender; (B) each Lender is entitled to vote as such Lender sees fit on any bankruptcy reorganization plan that affects the Loans, and each Lender acknowledges that the provisions of Section 1126(c) of the Bankruptcy Code of the United States supersedes the unanimous consent provisions set forth herein and (C) the Required Lenders shall determine whether or not to allow a Loan Party to use cash collateral in the context of a bankruptcy or insolvency proceeding and such determination shall be binding on all of the Lenders.

Notwithstanding anything to the contrary herein (including the other provisions of this Section 11.01) (a) the Administrative Agent may, with the prior written consent of the Borrower only, amend, modify or supplement this Agreement or any of the other Loan Documents to cure any omission, mistake, defect or inconsistency, and (b) this Agreement may be amended, amended and restated or otherwise supplemented or modified without the consent of any Lender (but with the consent of Borrower and the Administrative Agent) if, upon giving effect to such amendment, amendment and restatement or other supplement or modification, such Lender shall no longer be a party to this Agreement (as so amended, amended and restated or otherwise supplemented or modified), the Revolving Commitments of such Lender shall have terminated (but such Lender

shall be entitled to the benefits of the provisions of this Agreement which expressly survive the termination of such Lender's Revolving Commitments), such Lender shall have no other obligation to provide additional Credit Extensions to the Borrower under this Agreement and such Lender shall have been paid in full all Obligations (other than (i) contingent indemnification and expense reimbursement obligations as to which no claim has been asserted and (ii) for the avoidance of any doubt, any Additional Secured Obligations) owing to it or accrued for its account under this Agreement.

The Lenders hereby authorize the Administrative Agent to enter into amendments to this Agreement and the other Loan Documents with the Borrower as may be necessary or appropriate in the reasonable opinion of the Administrative Agent and the Borrower in order to give effect to, and the reflect the existence of, any Incremental Revolving Facility pursuant to Section 2.16.

If any Lender does not consent to a proposed amendment, waiver, consent or release with respect to any Loan Document that requires the consent of each Lender and that has been approved by the Required Lenders, the Borrower may replace such Non-Consenting Lender in accordance with Section 11.13; provided that such amendment, waiver, consent or release can be effected as a result of the assignment contemplated by such Section (together with all other such assignments required by the Borrower to be made pursuant to this paragraph).

11.02 Notices; Effectiveness; Electronic Communications .

(a) Notices Generally . Except in the case of notices and other communications expressly permitted to be given by telephone (and except as provided in subsection (b) below), all notices and other communications provided for herein shall be in writing and shall be delivered by hand or overnight courier service, mailed by certified or registered mail or sent by fax transmission or e-mail transmission as follows, and all notices and other communications expressly permitted hereunder to be given by telephone shall be made to the applicable telephone number, as follows:

(i) if to the Borrower or any other Loan Party, the Administrative Agent, Bank of America as an L/C Issuer, or the Swingline Lender, to the address, fax number, e-mail address or telephone number specified for such Person on Schedule 1.01(a) ; and

(ii) if to any other Lender or any other L/C Issuer, to the address, fax number, e-mail address or telephone number specified in its Administrative Questionnaire (including, as appropriate, notices delivered solely to the Person designated by a Lender on its Administrative Questionnaire then in effect for the delivery of notices that may contain material non-public information relating to the Borrower).

Notices and other communications sent by hand or overnight courier service, or mailed by certified or registered mail, shall be deemed to have been given when received; notices and other communications sent by fax transmission shall be deemed to have been given when sent (except that, if not given during normal business hours for the recipient,

shall be deemed to have been given at the opening of business on the next Business Day for the recipient). Notices and other communications delivered through electronic communications to the extent provided in subsection (b) below shall be effective as provided in such subsection (b).

(b) Electronic Communications . Notices and other communications to the Administrative Agent, the Lenders, the Swingline Lender and the L/C Issuers hereunder may be delivered or furnished by electronic communication (including e-mail, FPML messaging and Internet or intranet websites) pursuant to procedures approved by the Administrative Agent; provided that the foregoing shall not apply to notices to any Lender, the Swingline Lender or any L/C Issuer pursuant to Article II if such Lender, Swingline Lender or such L/C Issuer, as applicable, has notified the Administrative Agent that it is incapable of receiving notices under such Article by electronic communication. The Administrative Agent, the Swingline Lender, any L/C Issuer or the Borrower may each, in its discretion, agree to accept notices and other communications to it hereunder by electronic communications pursuant to procedures approved by it, provided that approval of such procedures may be limited to particular notices or communications.

Unless the Administrative Agent otherwise prescribes, (i) notices and other communications sent to an e-mail address shall be deemed received upon the sender's receipt of an acknowledgment from the intended recipient (such as by the "return receipt requested" function, as available, return e-mail or other written acknowledgement) and (ii) notices and other communications posted to an Internet or intranet website shall be deemed received by the intended recipient upon the sender's receipt of an acknowledgement from the intended recipient (such as by the "return receipt requested" function, as available, return e-mail address or other written acknowledgement) indicating that such notice or communication is available and identifying the website address therefor; provided that for both clauses (i) and (ii), if such notice or other communication is not sent during the normal business hours of the recipient, such notice, email or communication shall be deemed to have been sent at the opening of business on the next Business Day for the recipient.

(c) The Platform . THE PLATFORM IS PROVIDED "AS IS" AND "AS AVAILABLE." THE AGENT PARTIES (AS DEFINED BELOW) DO NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE BORROWER MATERIALS OR THE ADEQUACY OF THE PLATFORM, AND EXPRESSLY DISCLAIM LIABILITY FOR ERRORS IN OR OMISSIONS FROM THE BORROWER MATERIALS. NO WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OF THIRD PARTY RIGHTS OR FREEDOM FROM VIRUSES OR OTHER CODE DEFECTS, IS MADE BY ANY AGENT PARTY IN CONNECTION WITH THE BORROWER MATERIALS OR THE PLATFORM. In no event shall the Administrative Agent or any of its Related Parties (collectively, the " Agent Parties ") have any liability to the Borrower, any Lender, any L/C Issuer or any other Person for losses, claims, damages, liabilities or expenses of any kind (whether in tort, contract or otherwise) arising out of the Borrower's, any Loan Party's or the Administrative Agent's

transmission of Borrower Materials or notices through the Platform, any other electronic platform or electronic messaging service, or through the Internet, except with respect to such losses, claims, damages, liabilities or expenses of the Borrower only that are determined by a court of competent jurisdiction by a final and nonappealable judgment to have resulted from the gross negligence or willful misconduct of such Agent Party with respect to any such transmission of Borrower Materials or notices through the Platform by such Agent Party.

(d) Change of Address, Etc. Each of the Borrower, the Administrative Agent, the L/C Issuers and the Swingline Lender may change its address, fax number or telephone number or e-mail address for notices and other communications hereunder by notice to the other parties hereto. Each other Lender may change its address, fax number or telephone number or e-mail address for notices and other communications hereunder by notice to the Borrower, the Administrative Agent, the L/C Issuers and the Swingline Lender. In addition, each Lender agrees to notify the Administrative Agent from time to time to ensure that the Administrative Agent has on record (i) an effective address, contact name, telephone number, fax number and e-mail address to which notices and other communications may be sent and (ii) accurate wire instructions for such Lender. Furthermore, each Public Lender agrees to cause at least one (1) individual at or on behalf of such Public Lender to at all times have selected the "Private Side Information" or similar designation on the content declaration screen of the Platform in order to enable such Public Lender or its delegate, in accordance with such Public Lender's compliance procedures and applicable Law, including United States federal and state securities Laws, to make reference to Borrower Materials that are not made available through the "Public Side Information" portion of the Platform and that may contain material non-public information with respect to the Borrower or its securities for purposes of United States federal or state securities laws.

(e) Reliance by Administrative Agent, L/C Issuers and Lenders . The Administrative Agent, the L/C Issuers and the Lenders shall be entitled to rely and act upon any notices (including, without limitation, telephonic or electronic notices, Loan Notices, Letter of Credit Applications, Notice of Loan Prepayment and Swingline Loan Notices) purportedly given by or on behalf of any Loan Party even if (i) such notices were not made in a manner specified herein, were incomplete or were not preceded or followed by any other form of notice specified herein, or (ii) the terms thereof, as understood by the recipient, varied from any confirmation thereof. The Loan Parties shall indemnify the Administrative Agent, each L/C Issuer, each Lender and the Related Parties of each of them from all losses, costs, expenses and liabilities resulting from the reliance by such Person on each notice purportedly given by or on behalf of a Loan Party. All telephonic notices to and other telephonic communications with the Administrative Agent may be recorded by the Administrative Agent, and each of the parties hereto hereby consents to such recording.

11.03 No Waiver; Cumulative Remedies; Enforcement .

No failure by any Lender, any L/C Issuer or the Administrative Agent to exercise, and no delay by any such Person in exercising, any right, remedy, power or privilege hereunder or under

any other Loan Document shall operate as a waiver thereof; nor shall any single or partial exercise of any right, remedy, power or privilege hereunder or under any other Loan Document preclude any other or further exercise thereof or the exercise of any other right, remedy, power or privilege. The rights, remedies, powers and privileges herein provided, and provided under each other Loan Document, are cumulative and not exclusive of any rights, remedies, powers and privileges provided by law.

Notwithstanding anything to the contrary contained herein or in any other Loan Document, the authority to enforce rights and remedies hereunder and under the other Loan Documents against the Loan Parties or any of them shall be vested exclusively in, and all actions and proceedings at law in connection with such enforcement shall be instituted and maintained exclusively by, the Administrative Agent in accordance with Section 8.02 for the benefit of all the Lenders and the L/C Issuers; provided , however , that the foregoing shall not prohibit (a) the Administrative Agent from exercising on its own behalf the rights and remedies that inure to its benefit (solely in its capacity as Administrative Agent) hereunder and under the other Loan Documents, (b) any L/C Issuer or the Swingline Lender from exercising the rights and remedies that inure to its benefit (solely in its capacity as L/C Issuer or Swingline Lender, as the case may be) hereunder and under the other Loan Documents, (c) any Lender from exercising setoff rights in accordance with Section 11.08 (subject to the terms of Section 2.13), or (d) any Lender from filing proofs of claim or appearing and filing pleadings on its own behalf during the pendency of a proceeding relative to any Loan Party under any Debtor Relief Law; and provided , further , that if at any time there is no Person acting as Administrative Agent hereunder and under the other Loan Documents, then (i) the Required Lenders shall have the rights otherwise ascribed to the Administrative Agent pursuant to Section 8.02 and (ii) in addition to the matters set forth in clauses (b), (c) and (d) of the preceding proviso and subject to Section 2.13, any Lender may, with the consent of the Required Lenders, enforce any rights and remedies available to it and as authorized by the Required Lenders.

11.04 Expenses; Indemnity; Damage Waiver .

(a) Costs and Expenses . The Loan Parties shall pay (i) all reasonable and documented or invoiced out-of-pocket expenses incurred by the Administrative Agent and its Affiliates (including the reasonable and documented or invoiced fees, charges and disbursements of one primary counsel for the Administrative Agent and the Arrangers, taken as a whole, and, after consultation with the Borrower, one local counsel as necessary in each appropriate jurisdiction for the Administrative Agent and the Arrangers, taken as a whole), in connection with the syndication of the credit facilities provided for herein, the preparation, due diligence, negotiation, execution, delivery, closing and administration of this Agreement and the other Loan Documents or any amendments, modifications or waivers of the provisions hereof or thereof (whether or not the transactions contemplated hereby or thereby shall be consummated), (ii) all reasonable and documented or invoiced out-of-pocket expenses incurred by each L/C Issuer in connection with the issuance, amendment, renewal or extension of any Letter of Credit or any demand for payment thereunder and (iii) all out-of-pocket expenses incurred by the Administrative Agent, any Lender or any L/C Issuer (including reasonable and invoiced out-of-pocket fees, charges and disbursements of (x) one primary counsel for the Administrative Agent, the Lenders and the L/C Issuers, (y) to

the extent deemed reasonably necessary by the Administrative Agent, the Lenders and the L/C Issuers, one local counsel as reasonably necessary in each appropriate jurisdiction for the Administrative Agent, the Lenders and the L/C Issuers, taken as a whole, and, (x) solely in the event of a conflict of interest where the Administrative Agent, Lender or applicable L/C Issuer informs the Borrower of such conflict, one additional counsel in each relevant jurisdiction to each group of similarly situated parties, taken as a whole), in connection with the enforcement or protection of its rights (A) in connection with this Agreement and the other Loan Documents, including its rights under this Section, or (B) in connection with Loans made or Letters of Credit issued hereunder, including all such out-of-pocket expenses incurred during any workout, restructuring or negotiations in respect of such Loans or Letters of Credit.

(b) Indemnification by the Loan Parties . The Loan Parties shall indemnify the Administrative Agent (and any sub-agent thereof), the Arrangers, each Lender, the Swingline Lender and each L/C Issuer, and each Related Party of any of the foregoing Persons (each such Person being called an " Indemnitee ") against, and hold each Indemnitee harmless from, any and all losses, claims, damages, liabilities and related expenses (including the reasonable and invoiced out-of-pocket fees, charges and disbursements of one primary counsel for the Indemnitees and one local counsel as necessary in each appropriate jurisdiction for the Indemnitees, taken as a whole, and, solely in the event of a conflict of interest (where the indemnitees inform the Borrower of such conflict), one additional counsel in each relevant jurisdiction to each group of similarly situated Indemnitees, taken as a whole, and settlement costs), incurred by any Indemnitee or asserted against any Indemnitee by any Person (including the Borrower or any other Loan Party) arising out of, in connection with, or as a result of (i) the execution or delivery of this Agreement, any other Loan Document or any agreement or instrument contemplated hereby or thereby, the performance by the parties hereto of their respective obligations hereunder or thereunder or the consummation of the transactions contemplated hereby or thereby, or, in the case of the Administrative Agent (and any sub-agent thereof) and its Related Parties only, the administration of this Agreement and the other Loan Documents (including in respect of any matters addressed in Section 3.01), (ii) any Loan or Letter of Credit or the use or proposed use of the proceeds therefrom (including any refusal by any L/C Issuer to honor a demand for payment under a Letter of Credit if the documents presented in connection with such demand do not strictly comply with the terms of such Letter of Credit), (iii) any actual or alleged presence or release of Hazardous Materials on or from any property owned or operated by a Loan Party or any of its Subsidiaries, or any Environmental Liability related in any way to a Loan Party or any of its Subsidiaries to the extent such losses, claims, damages, liabilities or related expenses of any Indemnitee result (directly or indirectly) from (or is incidental to) the Indemnitees relationship with the Loan Parties and their Subsidiaries under the Loan Documents and the transactions contemplated hereunder, or (iv) any actual or prospective claim, litigation, investigation or proceeding relating to any of the foregoing, whether based on contract, tort or any other theory, whether brought by a third party or by the Borrower or any other Loan Party or any of the Borrower's or such Loan Party's directors, shareholders or creditors, and regardless of whether any Indemnitee is a party thereto **, IN ALL CASES, WHETHER OR NOT CAUSED BY OR ARISING, IN WHOLE OR IN PART, OUT OF THE**

COMPARATIVE, CONTRIBUTORY OR SOLE NEGLIGENCE OF THE INDEMNITEE ; provided that such indemnity shall not, as to any Indemnitee, be available to the extent that such losses, claims, damages, liabilities or related expenses (x) are determined by a court of competent jurisdiction by final and nonappealable judgment to have resulted from the gross negligence, willful misconduct or bad faith of such Indemnitee, (y) result from a claim brought by the Borrower or any other Loan Party against an Indemnitee for a material breach of such Indemnitee's material obligations hereunder or under any other Loan Document, if the Borrower or such Loan Party has obtained a final and nonappealable judgment in its favor on such claim as determined by a court of competent jurisdiction or (z) arise from a dispute solely among Indemnitees that does not involve, result from, or relate to, directly or indirectly, any act or omission by the Loan Parties or their respective Affiliates (other than a Claim against a party hereto solely in its capacity as Swingline Lender, an L/C Issuer, Arranger or Administrative Agent or any other Person performing a similar role under the Loan Documents). Without limiting the provisions of Section 3.01(c), this Section 11.04(b) shall not apply with respect to Taxes other than any Taxes that represent losses, claims, damages, etc. arising from any non-Tax claim.

(c) Reimbursement by Lenders . To the extent that the Loan Parties for any reason fail to indefeasibly pay any amount required under subsection (a) or (b) of this Section to be paid by it to the Administrative Agent (or any sub-agent thereof), each L/C Issuer, the Swingline Lender or any Related Party of any of the foregoing, each Lender severally agrees to pay to the Administrative Agent (or any such sub-agent), each L/C Issuer, the Swingline Lender or such Related Party, as the case may be, such Lender's pro rata share (determined as of the time that the applicable unreimbursed expense or indemnity payment is sought based on each Lender's share of the Total Revolving Credit Exposure at such time) of such unpaid amount (including any such unpaid amount in respect of a claim asserted by such Lender), such payment to be made severally among them based on such Lender's Applicable Percentage (determined as of the time that the applicable unreimbursed expense or indemnity payment is sought), provided , further that, the unreimbursed expense or indemnified loss, claim, damage, liability or related expense, as the case may be, was incurred by or asserted against the Administrative Agent (or any such sub-agent), each L/C Issuer or the Swingline Lender in its capacity as such, or against any Related Party of any of the foregoing acting for the Administrative Agent (or any such sub-agent), each L/C Issuer or the Swingline Lender in connection with such capacity. The obligations of the Lenders under this subsection (c) are subject to the provisions of Section 2.12(d).

(d) Waiver of Consequential Damages, Etc. To the fullest extent permitted by applicable Law, no Loan Party shall assert, and each Loan Party hereby waives, and acknowledges that no other Person shall have, any claim against any Indemnitee, on any theory of liability, for special, indirect, consequential or punitive damages (as opposed to direct or actual damages) arising out of, in connection with, or as a result of, this Agreement, any other Loan Document or any agreement or instrument contemplated hereby, the transactions contemplated hereby or thereby, any Loan or Letter of Credit or the use of the proceeds thereof. No Indemnitee referred to in subsection (b) above shall be liable for any damages arising from the use by unintended recipients of any information or other materials

distributed to such unintended recipients by such Indemnitee through telecommunications, electronic or other information transmission systems in connection with this Agreement or the other Loan Documents or the transactions contemplated hereby or thereby.

(e) Payments . All amounts due under this Section shall be payable not later than ten (10) Business Days after demand therefor.

(f) Survival . The agreements in this Section and the indemnity provisions of Section 11.02(e) shall survive the resignation of the Administrative Agent, each L/C Issuer and the Swingline Lender, the replacement of any Lender, the termination of the Aggregate Revolving Commitments and the repayment, satisfaction or discharge of all the other Secured Obligations.

11.05 Payments Set Aside .

To the extent that any payment by or on behalf of the Borrower is made to the Administrative Agent, any L/C Issuer or any Lender, or the Administrative Agent, any L/C Issuer or any Lender exercises its right of setoff, and such payment or the proceeds of such setoff or any part thereof is subsequently invalidated, declared to be fraudulent or preferential, set aside or required (including pursuant to any settlement entered into by the Administrative Agent, such L/C Issuer or such Lender in its discretion) to be repaid to a trustee, receiver or any other party, in connection with any proceeding under any Debtor Relief Law or otherwise, then (a) to the extent of such recovery, the obligation or part thereof originally intended to be satisfied shall be revived and continued in full force and effect as if such payment had not been made or such setoff had not occurred, and (b) each Lender and each L/C Issuer severally agrees to pay to the Administrative Agent upon demand its applicable share (without duplication) of any amount so recovered from or repaid by the Administrative Agent, plus interest thereon from the date of such demand to the date such payment is made at a rate per annum equal to the Federal Funds Rate from time to time in effect. The obligations of the Lenders and the L/C Issuers under clause (b) of the preceding sentence shall survive the payment in full of the Obligations and the termination of this Agreement.

11.06 Successors and Assigns .

(a) Successors and Assigns Generally . The provisions of this Agreement and the other Loan Documents shall be binding upon and inure to the benefit of the parties hereto and thereto and their respective successors and assigns permitted hereby, except neither the Borrower nor any other Loan Party may assign or otherwise transfer any of its rights or obligations hereunder without the prior written consent of the Administrative Agent and each Lender and no Lender may assign or otherwise transfer any of its rights or obligations hereunder except (i) to an assignee in accordance with the provisions of subsection (b) of this Section, (ii) by way of participation in accordance with the provisions of subsection (d) of this Section, or (iii) by way of pledge or assignment of a security interest subject to the restrictions of subsection (e) of this Section 11.06 (and any other attempted assignment or transfer by any party hereto shall be null and void). Nothing in this Agreement, expressed or implied, shall be construed to confer upon any Person (other than the parties hereto, their respective successors and assigns permitted hereby, Participants to the extent provided in

subsection (d) of this Section and, to the extent expressly contemplated hereby, the Related Parties of each of the Administrative Agent, the L/C Issuers and the Lenders) any legal or equitable right, remedy or claim under or by reason of this Agreement.

(b) Assignments by Lenders . Any Lender may at any time assign to one or more assignees all or a portion of its rights and obligations under this Agreement and the other Loan Documents (including all or a portion of its Revolving Commitment and the Loans (including for purposes of this subsection (b), participations in L/C Obligations and in Swingline Loans) at the time owing to it); provided that any such assignment shall be subject to the following conditions:

(i) Minimum Amounts .

(A) in the case of an assignment of the entire remaining amount of the assigning Lender's Revolving Commitment and/or the Loans at the time owing to it or contemporaneous assignments to related Approved Funds (determined after giving effect to such Assignments) that equal at least the amount specified in paragraph (b)(i)(B) of this Section in the aggregate or in the case of an assignment to a Lender, an Affiliate of a Lender or an Approved Fund, no minimum amount need be assigned; and

(B) in any case not described in subsection (b)(i)(A) of this Section, the aggregate amount of the Revolving Commitment (which for this purpose includes Loans outstanding thereunder) or, if the Revolving Commitment is not then in effect, the principal outstanding balance of the Loans of the assigning Lender subject to each such assignment, determined as of the date the Assignment and Assumption with respect to such assignment is delivered to the Administrative Agent or, if "Trade Date" is specified in the Assignment and Assumption, as of the Trade Date, shall not be less than $5,000,000, unless each of the Administrative Agent and, so long as no Event of Default has occurred and is continuing, the Borrower otherwise consents (each such consent not to be unreasonably withheld or delayed).

(ii) Proportionate Amounts . Each partial assignment shall be made as an assignment of a proportionate part of all the assigning Lender's rights and obligations under this Agreement and the other Loan Documents with respect to the Loans and/or the Revolving Commitment assigned, except that this clause (ii) shall not apply to the Swingline Lender's rights and obligations in respect of Swingline Loans.

(iii) Required Consents . No consent shall be required for any assignment except to the extent required by subsection (b)(i)(B) of this Section and, in addition:

(A) the consent of the Borrower (such consent not to be unreasonably withheld or delayed) shall be required unless (1) an Event of Default has occurred and is continuing at the time of such assignment or (2)

such assignment is to a Lender, an Affiliate of a Lender or an Approved Fund; provided that the Borrower shall be deemed to have consented to any such assignment unless it shall object thereto by written notice to the Administrative Agent within ten (10) Business Days after having received notice thereof;

(B) the consent of the Administrative Agent (such consent not to be unreasonably withheld or delayed) shall be required for assignments in respect of any Revolving Commitment if such assignment is to a Person that is not a Lender, an Affiliate of such Lender or an Approved Fund with respect to such Lender; and

(C) the consent of the L/C Issuers and the Swingline Lender shall be required for any assignment in respect of the Revolving Facility.

(iv) Assignment and Assumption . The parties to each assignment shall execute and deliver to the Administrative Agent an Assignment and Assumption, together with a processing and recordation fee in the amount of $3,500; provided , however , that the Administrative Agent may, in its sole discretion, elect to waive such processing and recordation fee in the case of any assignment. The assignee, if it is not a Lender, shall deliver to the Administrative Agent an Administrative Questionnaire.

(v) No Assignment to Certain Persons . No such assignment shall be made (A) to the Borrower or any of the Borrower's Affiliates or Subsidiaries, (B) to any Defaulting Lender or any of its Subsidiaries, or any Person who, upon becoming a Lender hereunder, would constitute any of the foregoing Persons described in this clause (B), (C) to a natural Person (or a holding company, investment vehicle or trust for, or owned and operated for the primary benefit of a natural person) or (D) any holder of subordinated Indebtedness.

(vi) Certain Additional Payments . In connection with any assignment of rights and obligations of any Defaulting Lender hereunder, no such assignment shall be effective unless and until, in addition to the other conditions thereto set forth herein, the parties to the assignment shall make such additional payments to the Administrative Agent in an aggregate amount sufficient, upon distribution thereof as appropriate (which may be outright payment, purchases by the assignee of participations or subparticipations, or other compensating actions, including funding, with the consent of the Borrower and the Administrative Agent, the applicable pro rata share of Loans previously requested but not funded by the Defaulting Lender, to each of which the applicable assignee and assignor hereby irrevocably consent), to (A) pay and satisfy in full all payment liabilities then owed by such Defaulting Lender to the Administrative Agent, any L/C Issuer or any Lender hereunder (and interest accrued thereon) and (B) acquire (and fund as appropriate) its full pro rata share of all Loans and participations in Letters of Credit and Swingline Loans in accordance with its Applicable Percentage. Notwithstanding the foregoing,

in the event that any assignment of rights and obligations of any Defaulting Lender hereunder shall become effective under applicable Law without compliance with the provisions of this paragraph, then the assignee of such interest shall be deemed to be a Defaulting Lender for all purposes of this Agreement until such compliance occurs.

Subject to acceptance and recording thereof by the Administrative Agent pursuant to subsection (c) of this Section, from and after the effective date specified in each Assignment and Assumption, the assignee thereunder shall be a party to this Agreement and, to the extent of the interest assigned by such Assignment and Assumption, have the rights and obligations of a Lender under this Agreement, and the assigning Lender thereunder shall, to the extent of the interest assigned by such Assignment and Assumption, be released from its obligations under this Agreement (and, in the case of an Assignment and Assumption covering all of the assigning Lender's rights and obligations under this Agreement, such Lender shall cease to be a party hereto but shall continue to be entitled to the benefits of Sections 3.01, 3.04, 3.05 and 11.04 with respect to facts and circumstances occurring prior to the effective date of such assignment); provided , that except to the extent otherwise expressly agreed by the affected parties, no assignment by a Defaulting Lender will constitute a waiver or release of any claim of any party hereunder arising from that Lender's having been a Defaulting Lender. Upon request, the Borrower (at its expense) shall execute and deliver a Revolving Note to the assignee Lender. Any assignment or transfer by a Lender of rights or obligations under this Agreement that does not comply with this subsection shall be treated for purposes of this Agreement as a sale by such Lender of a participation in such rights and obligations in accordance with subsection (d) of this Section.

(c) Register . The Administrative Agent, acting solely for this purpose as a non-fiduciary agent of the Borrower (and such agency being solely for tax purposes), shall maintain at the Administrative Agent's Office a copy of each Assignment and Assumption delivered to it (or the equivalent thereof in electronic form) and a register for the recordation of the names and addresses of the Lenders, and the Revolving Commitments of, and principal amounts (and stated interest) of the Loans and L/C Obligations owing to, each Lender pursuant to the terms hereof from time to time (the " Register "). The entries in the Register shall be conclusive, absent manifest error, and the Borrower, the Administrative Agent and the Lenders shall treat each Person whose name is recorded in the Register pursuant to the terms hereof as a Lender hereunder for all purposes of this Agreement. The Register shall be available for inspection by the Borrower and any Lender, at any reasonable time and from time to time upon reasonable prior notice.

(d) Participations . Any Lender may at any time, without the consent of, or notice to, the Borrower or the Administrative Agent, sell participations to any Person (other than a natural Person, or a holding company, investment vehicle or trust for, or owned and operated for the primary benefit of a natural Person, a Defaulting Lender or the Borrower or any of the Borrower's Affiliates or Subsidiaries) (each, a " Participant ") in all or a portion of such Lender's rights and/or obligations under this Agreement (including all or a portion of its Revolving Commitment and/or the Loans (including such Lender's participations in L/C Obligations and/or Swingline Loans) owing to it); provided that (i) such Lender's obligations

under this Agreement shall remain unchanged, (ii) such Lender shall remain solely responsible to the other parties hereto for the performance of such obligations and (iii) the Borrower, the Administrative Agent, the Lenders and the L/C Issuers shall continue to deal solely and directly with such Lender in connection with such Lender's rights and obligations under this Agreement. For the avoidance of doubt, each Lender shall be responsible for the indemnity under Section 11.04(c) without regard to the existence of any participations.

Any agreement or instrument pursuant to which a Lender sells such a participation shall provide that such Lender shall retain the sole right to enforce this Agreement and to approve any amendment, modification or waiver of any provision of this Agreement; provided that such agreement or instrument may provide that such Lender will not, without the consent of the Participant, agree to any amendment, waiver or other modification described in the first proviso to Section 11.01 that affects such Participant. The Borrower agrees that each Participant shall be entitled to the benefits of Sections 3.01, 3.04 and 3.05 (subject to the requirements and limitations therein, including the requirements under Section 3.01(e) (it being understood that the documentation required under Section 3.01(e) shall be delivered to the Lender who sells the participation)) to the same extent as if it were a Lender and had acquired its interest by assignment pursuant to paragraph (b) of this Section; provided that such Participant (A) agrees to be subject to the provisions of Sections 3.06 and 11.13 as if it were an assignee under paragraph (b) of this Section and (B) shall not be entitled to receive any greater payment under Sections 3.01 or 3.04, with respect to any participation, than the Lender from whom it acquired the applicable participation would have been entitled to receive, except to the extent such entitlement to receive a greater payment results from a Change in Law that occurs after the Participant acquired the applicable participation. Each Lender that sells a participation agrees, at the Borrower's request and expense, to use reasonable efforts to cooperate with the Borrower to effectuate the provisions of Section 3.06 with respect to any Participant. To the extent permitted by law, each Participant also shall be entitled to the benefits of Section 11.08 as though it were a Lender; provided that such Participant agrees to be subject to Section 2.13 as though it were a Lender. Each Lender that sells a participation shall, acting solely for this purpose as a non-fiduciary agent of the Borrower, maintain a register on which it enters the name and address of each Participant and the principal amounts (and stated interest) of each Participant's interest in the Loans or other obligations under the Loan Documents (the " Participant Register "); provided that no Lender shall have any obligation to disclose all or any portion of the Participant Register (including the identity of any Participant or any information relating to a Participant's interest in any commitments, loans, letters of credit or its other obligations under any Loan Document) to any Person except to the extent that such disclosure is necessary to establish that such commitment, loan, letter of credit or other obligation is in registered form under Section 5f.103-1(c) of the United States Treasury Regulations. The entries in the Participant Register shall be conclusive absent manifest error, and such Lender shall treat each Person whose name is recorded in the Participant Register as the owner of such participation for all purposes of this Agreement notwithstanding any notice to the contrary. For the avoidance of doubt, the Administrative Agent (in its capacity as Administrative Agent) shall have no responsibility for maintaining a Participant Register.

(e) Certain Pledges . Any Lender may at any time pledge or assign a security interest in all or any portion of its rights under this Agreement (including under its Revolving Note or Revolving Notes, if any) to secure obligations of such Lender, including any pledge or assignment to secure obligations to a Federal Reserve Bank; provided that no such pledge or assignment shall release such Lender from any of its obligations hereunder or substitute any such pledgee or assignee for such Lender as a party hereto.

(f) Resignation as L/C Issuer or Swingline Lender after Assignment . Notwithstanding anything to the contrary contained herein, if at any time Bank of America assigns all of its Revolving Commitment and Revolving Loans pursuant to subsection (b) above, Bank of America may, (i) upon thirty (30) days' notice to the Borrower and the Lenders, resign as L/C Issuer and/or (ii) upon thirty (30) days' notice to the Borrower, resign as Swingline Lender. In the event of any such resignation as L/C Issuer or Swingline Lender, the Borrower shall be entitled to appoint from among the Lenders a successor L/C Issuer or Swingline Lender hereunder; provided , however , that no failure by the Borrower to appoint any such successor shall affect the resignation of Bank of America as L/C Issuer or Swingline Lender, as the case may be. If Bank of America resigns as L/C Issuer, it shall retain all the rights, powers, privileges and duties of the L/C Issuer hereunder with respect to all Letters of Credit outstanding as of the effective date of its resignation as L/C Issuer and all L/C Obligations with respect thereto (including the right to require the Lenders to make Base Rate Loans or fund risk participations in Unreimbursed Amounts pursuant to Section 2.03(c)). If Bank of America resigns as Swingline Lender, it shall retain all the rights of the Swingline Lender provided for hereunder with respect to Swingline Loans made by it and outstanding as of the effective date of such resignation, including the right to require the Lenders to make Base Rate Loans or fund risk participations in outstanding Swingline Loans pursuant to Section 2.04(c). Upon the appointment of a successor L/C Issuer and/or Swingline Lender, (A) such successor shall succeed to and become vested with all of the rights, powers, privileges and duties of the retiring L/C Issuer or Swingline Lender, as the case may be, and (B) the successor L/C Issuer shall issue letters of credit in substitution for the Letters of Credit, if any, outstanding at the time of such succession or make other arrangements satisfactory to Bank of America to effectively assume the obligations of Bank of America with respect to such Letters of Credit.

(g) Assignments by MLPF&S . Notwithstanding anything to the contrary contained herein, the parties hereby agree that Merrill Lynch, Pierce, Fenner & Smith Incorporated (" MLPF&S ") may, without notice to any Loan Party, assign its rights and obligations under this Agreement to any other registered broker-dealer wholly-owned by Bank of America Corporation to which all or substantially all of Bank of America Corporation's or any of its Subsidiaries' investment banking, commercial lending services or related businesses may be transferred following the date of this Agreement.

(h) Disqualified Institutions .

(i) No assignment shall be made to any Person that was a Disqualified Institution as of the "Trade Date" on which the applicable Lender entered into a

binding agreement to sell and assign all or a portion of its rights and obligations under this Agreement to such Person (unless the Borrower has consented to such assignment as otherwise contemplated by this Section 11.06, in which case such Person will not be considered a Disqualified Institution for the purpose of such assignment). For the avoidance of doubt, with respect to any assignee that becomes a Disqualified Institution after the applicable Trade Date (including as a result of the delivery of a notice pursuant to, and/or the expiration of the notice period referred to in, the definition of " Disqualified Institution "), such assignee shall not retroactively be considered a Disqualified Institution. Any assignment in violation of this clause (h)(i) shall not be void, but the other provisions of this clause (h) shall apply.

(ii) If any assignment is made to any Disqualified Institution without the Borrower's prior consent in violation of clause (i) above, the Borrower may, at its effort and the sole expense of the assigning institution, upon notice to the applicable Disqualified Institution and the Administrative Agent, (A) terminate any Revolving Commitment of such Disqualified Institution and repay all obligations of the Borrower owing to such Disqualified Institution in connection with such Revolving Commitment, and/or (B) require such Disqualified Institution to assign and delegate, without recourse (in accordance with and subject to the restrictions contained in this Section 11.06), all of its interest, rights and obligations under this Agreement and related Loan Documents to an Eligible Assignee that shall assume such obligations at the lesser of (x) the principal amount thereof and (y) the amount that such Disqualified Institution paid to acquire such interests, rights and obligations, in each case plus accrued interest, accrued fees and all other amounts (other than principal amounts) payable to it hereunder and other the other Loan Documents; provided that such assignment does not conflict with applicable Laws.

(iii) Notwithstanding anything to the contrary contained in this Agreement, Disqualified Institutions (A) will not (x) have the right to receive information, reports or other materials provided to Lenders by the Borrower, the Administrative Agent or any other Lender, (y) attend or participate in meetings attended by the Lenders and the Administrative Agent, or (z) access any electronic site established for the Lenders or confidential communications from counsel to or financial advisors of the Administrative Agent or the Lenders and (B) (x) for purposes of any consent to any amendment, waiver or modification of, or any action under, and for the purpose of any direction to the Administrative Agent or any Lender to undertake any action (or refrain from taking any action) under this Agreement or any other Loan Document, each Disqualified Institution will be deemed to have consented in the same proportion as the Lenders that are not Disqualified Institutions consented to such matter, and (y) for purposes of voting on any plan of reorganization or plan of liquidation pursuant to any Debtor Relief Laws (" Plan of Reorganization "), each Disqualified Institution party hereto hereby agrees (1) not to vote on such Plan of Reorganization, (2) if such Disqualified Institution does vote on such Plan of Reorganization notwithstanding the restriction in the foregoing clause (1), such vote

will be deemed not to be in good faith and shall be "designated" pursuant to Section 1126(e) of the Bankruptcy Code (or any similar provision in any other Debtor Relief Laws), and such vote shall not be counted in determining whether the applicable class has accepted or rejected such Plan of Reorganization in accordance with Section 1126(c) of the Bankruptcy Code (or any similar provision in any other Debtor Relief Laws) and (3) not to contest any request by any party for a determination by the Bankruptcy Court (or other applicable court of competent jurisdiction) effectuating the foregoing clause (2).

(iv) The Administrative Agent shall, and the Borrower hereby expressly authorizes the Administrative Agent, to (A) post the list of Disqualified Institutions provided by the Borrower and any updates thereto from time to time (collectively, the " DQ List ") on the Platform, including that portion of the Platform that is designated for "public side" Lenders or (B) provide the DQ List to each Lender requesting the same.

11.07 Treatment of Certain Information; Confidentiality .

(a) Treatment of Certain Information . Each of the Administrative Agent, the Lenders and the L/C Issuers agrees to maintain the confidentiality of the Information (as defined below), except that Information may be disclosed (i) to its Affiliates, auditors and to its Related Parties (it being understood that the Persons to whom such disclosure is made will be informed of the confidential nature of such Information and instructed to keep such Information confidential), (ii) to the extent required or requested by any regulatory authority purporting to have jurisdiction over such Person or its Related Parties (including any self-regulatory authority, such as the National Association of Insurance Commissioners), (iii) to the extent required by applicable Laws or regulations or by any subpoena or similar legal process, (iv) to any other party hereto, (v) in connection with the exercise of any remedies hereunder or under any other Loan Document or any action or proceeding relating to this Agreement or any other Loan Document or the enforcement of rights hereunder or thereunder, (vi) subject to an agreement containing provisions substantially the same as those of this Section, to (A) any assignee of or Participant in, or any prospective assignee of or Participant in, any of its rights and obligations under this Agreement or any Eligible Assignee invited to be a Lender pursuant to Section 2.16 or Section 11.01 or (B) any actual or prospective party (or its Related Parties) to any swap, derivative or other transaction under which payments are to be made by reference to the Borrower and its obligations, this Agreement or payments hereunder (it being understood that the DQ List may be disclosed to any assignee , or prospective assignee, in reliance on this clause (vi), (vii) on a confidential basis to (A) any rating agency in connection with rating the Borrower or its Subsidiaries or the credit facilities provided hereunder or (B) the provider of any Platform or other electronic delivery service used by the Administrative Agent, any L/C Issuer and/or the Swingline Lender to deliver Borrower Materials or notices to the Lenders or (C) the CUSIP Service Bureau or any similar agency in connection with the issuance and monitoring of CUSIP numbers or other market identifiers with respect to the credit facilities provided hereunder, or (viii) with the consent of the Borrower or to the extent such Information (1) becomes

publicly available other than as a result of a breach of this Section or (2) becomes available to the Administrative Agent, any Lender, any L/C Issuer or any of their respective Affiliates on a nonconfidential basis from a source other than the Borrower. For purposes of this Section, " Information " means all information received from the Borrower or any Subsidiary relating to the Borrower or any Subsidiary or any of their respective businesses, other than any such information that is available to the Administrative Agent, any Lender or any L/C Issuer on a nonconfidential basis prior to disclosure by the Borrower or any Subsidiary, provided that, in the case of information received from the Borrower or any Subsidiary after the date hereof, such information is clearly identified at the time of delivery as confidential. Any Person required to maintain the confidentiality of Information as provided in this Section shall be considered to have complied with its obligation to do so if such Person has exercised the same degree of care to maintain the confidentiality of such Information as such Person would accord to its own confidential information. In addition, the Administrative Agent and the Lenders may disclose the existence of this Agreement and information about this Agreement to market data collectors, similar service providers to the lending industry and service providers to the Agents and the Lenders in connection with the administration of this Agreement, the other Loan Documents and the Revolving Commitments.

(b) Non-Public Information . Each of the Administrative Agent, the Lenders and the L/C Issuers acknowledges that (i) the Information may include material non-public information concerning a Loan Party or a Subsidiary, as the case may be, (ii) it has developed compliance procedures regarding the use of material non-public information and (iii) it will handle such material non-public information in accordance with applicable Law, including United States federal and state securities Laws.

(c) Press Releases . The Loan Parties and their Affiliates agree that they will not in the future issue any press releases or other public disclosure using the name of the Administrative Agent or any Lender or their respective Affiliates or referring to this Agreement or any of the Loan Documents without the prior written consent of the Administrative Agent, unless (and only to the extent that) the Loan Parties or such Affiliate is required to do so under law and then, in any event the Loan Parties or such Affiliate will consult with such Person before issuing such press release or other public disclosure.

11.08 Right of Setoff .

If an Event of Default shall have occurred and be continuing, each Lender, each L/C Issuer and each of their respective Affiliates is hereby authorized at any time and from time to time, to the fullest extent permitted by applicable Law, to set off and apply any and all deposits (general or special, time or demand, provisional or final, in whatever currency) at any time held and other obligations (in whatever currency) at any time owing by such Lender, such L/C Issuer or any such Affiliate to or for the credit or the account of the Borrower or any other Loan Party against any and all of the obligations of the Borrower or such Loan Party now or hereafter existing under this Agreement or any other Loan Document to such Lender or such L/C Issuer or their respective Affiliates, irrespective of whether or not such Lender, such L/C Issuer or Affiliate shall have made any demand under this Agreement or any other Loan Document and although such obligations of

the Borrower or such Loan Party may be contingent or unmatured, secured or unsecured, or are owed to a branch, office or Affiliate of such Lender or such L/C Issuer different from the branch, office or Affiliate holding such deposit or obligated on such indebtedness; provided that in the event that any Defaulting Lender shall exercise any such right of setoff, (a) all amounts so set off shall be paid over immediately to the Administrative Agent for further application in accordance with the provisions of Section 2.15 and, pending such payment, shall be segregated by such Defaulting Lender from its other funds and deemed held in trust for the benefit of the Administrative Agent, the L/C Issuers and the Lenders, and (b) the Defaulting Lender shall provide promptly to the Administrative Agent a statement describing in reasonable detail the Secured Obligations owing to such Defaulting Lender as to which it exercised such right of setoff. The rights of each Lender, each L/C Issuer and their respective Affiliates under this Section are in addition to other rights and remedies (including other rights of setoff) that such Lender, such L/C Issuer or their respective Affiliates may have. Each Lender and each L/C Issuer agrees to notify the Borrower and the Administrative Agent promptly after any such setoff and application, provided that the failure to give such notice shall not affect the validity of such setoff and application. Notwithstanding the provisions of this Section 11.08, if at any time any Lender, any L/C Issuer or any of their respective Affiliates maintains one or more deposit accounts for the Borrower or any other Loan Party into which Medicare and/or Medicaid receivables are deposited, such Person shall waive the right of setoff set forth herein.

11.09 Interest Rate Limitation .

Notwithstanding anything to the contrary contained in any Loan Document, the interest paid or agreed to be paid under the Loan Documents shall not exceed the maximum rate of non-usurious interest permitted by applicable Law (the " Maximum Rate "). If the Administrative Agent or any Lender shall receive interest in an amount that exceeds the Maximum Rate, the excess interest shall be applied to the principal of the Loans or, if it exceeds such unpaid principal, refunded to the Borrower. In determining whether the interest contracted for, charged, or received by the Administrative Agent or a Lender exceeds the Maximum Rate, such Person may, to the extent permitted by applicable Law, (a) characterize any payment that is not principal as an expense, fee, or premium rather than interest, (b) exclude voluntary prepayments and the effects thereof, and (c) amortize, prorate, allocate, and spread in equal or unequal parts the total amount of interest throughout the contemplated term of the Obligations hereunder.

11.10 Counterparts; Integration; Effectiveness .

This Agreement and each of the other Loan Documents may be executed in counterparts (and by different parties hereto in different counterparts), each of which shall constitute an original, but all of which when taken together shall constitute a single contract. This Agreement, the other Loan Documents, and any separate letter agreements with respect to fees payable to the Administrative Agent or any L/C Issuer, constitute the entire contract among the parties relating to the subject matter hereof and supersede any and all previous agreements and understandings, oral or written, relating to the subject matter hereof. Except as provided in Section 4.01, this Agreement shall become effective when it shall have been executed by the Administrative Agent and when the Administrative Agent shall have received counterparts hereof that, when taken together, bear the

signatures of each of the other parties hereto. Delivery of an executed counterpart of a signature page of this Agreement or any other Loan Document, or any certificate delivered thereunder, by fax transmission or e-mail transmission (e.g. "pdf" or "tif") shall be effective as delivery of a manually executed counterpart of this Agreement or such other Loan Document or certificate. Without limiting the foregoing, to the extent a manually executed counterpart is not specifically required to be delivered under the terms of any Loan Document, upon the request of any party, such fax transmission or e-mail transmission shall be promptly followed by such manually executed counterpart.

11.11 Survival of Representations and Warranties .

All representations and warranties made hereunder and in any other Loan Document or other document delivered pursuant hereto or thereto or in connection herewith or therewith shall survive the execution and delivery hereof and thereof. Such representations and warranties have been or will be relied upon by the Administrative Agent and each Lender, regardless of any investigation made by the Administrative Agent or any Lender or on their behalf and notwithstanding that the Administrative Agent or any Lender may have had notice or knowledge of any Default at the time of any Credit Extension, and shall continue in full force and effect as long as any Loan or any other Obligation hereunder shall remain unpaid or unsatisfied or any Letter of Credit shall remain outstanding.

11.12 Severability .

If any provision of this Agreement or the other Loan Documents is held to be illegal, invalid or unenforceable, (a) the legality, validity and enforceability of the remaining provisions of this Agreement and the other Loan Documents shall not be affected or impaired thereby and (b) the parties shall endeavor in good faith negotiations to replace the illegal, invalid or unenforceable provisions with valid provisions the economic effect of which comes as close as possible to that of the illegal, invalid or unenforceable provisions. The invalidity of a provision in a particular jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction. Without limiting the foregoing provisions of this Section, if and to the extent that the enforceability of any provisions in this Agreement relating to Defaulting Lenders shall be limited by Debtor Relief Laws, as determined in good faith by the Administrative Agent, the L/C Issuers or the Swingline Lender, as applicable, then such provisions shall be deemed to be in effect only to the extent not so limited.

11.13 Replacement of Lenders .

If the Borrower is entitled to replace a Lender pursuant to the provisions of Section 3.06, or if any Lender is a Defaulting Lender or a Non-Consenting Lender or if any other circumstance exists hereunder that gives the Borrower the right to replace a Lender as a party hereto, then the Borrower may, at its sole expense and effort, upon notice to such Lender and the Administrative Agent, require such Lender to assign and delegate, without recourse (in accordance with and subject to the restrictions contained in, and consents required by, Section 11.06), all of its interests, rights (other than its existing rights to payments pursuant to Sections 3.01 and 3.04) and obligations under this Agreement and the related Loan Documents to an Eligible Assignee that shall assume such

obligations (which assignee may be another Lender, if a Lender accepts such assignment), provided that:

(a) the Borrower shall have paid to the Administrative Agent the assignment fee (if any) specified in Section 11.06(b);

(b) such Lender shall have received payment of an amount equal to 100% of the outstanding principal of its Loans and L/C Advances, accrued interest thereon, accrued fees and all other amounts payable to it hereunder and under the other Loan Documents (including any amounts under Section 3.05) from the assignee (to the extent of such outstanding principal and accrued interest and fees) or the Borrower (in the case of all other amounts);

(c) in the case of any such assignment resulting from a claim for compensation under Section 3.04 or payments required to be made pursuant to Section 3.01, such assignment will result in a reduction in such compensation or payments thereafter;

(d) such assignment does not conflict with applicable Laws; and

(e) in the case of an assignment resulting from a Lender becoming a Non-Consenting Lender, the applicable assignee shall have consented to the applicable amendment, waiver or consent.

A Lender shall not be required to make any such assignment or delegation if, prior thereto, as a result of a waiver by such Lender or otherwise, the circumstances entitling the Borrower to require such assignment and delegation cease to apply.

11.14 Governing Law; Jurisdiction; Etc .

(a) GOVERNING LAW . THIS AGREEMENT AND THE OTHER LOAN DOCUMENTS (EXCEPT, AS TO ANY OTHER LOAN DOCUMENT, AS EXPRESSLY SET FORTH THEREIN) AND ANY CLAIMS, CONTROVERSY, DISPUTE OR CAUSE OF ACTION (WHETHER IN CONTRACT OR TORT OR OTHERWISE) BASED UPON, ARISING OUT OF OR RELATING TO THIS AGREEMENT OR ANY OTHER LOAN DOCUMENT (EXCEPT, AS TO ANY OTHER LOAN DOCUMENT, AS EXPRESSLY SET FORTH THEREIN) AND THE TRANSACTIONS CONTEMPLATED HEREBY AND THEREBY SHALL BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAW OF THE STATE OF NEW YORK.

(b) SUBMISSION TO JURISDICTION . THE BORROWER AND EACH OTHER LOAN PARTY IRREVOCABLY AND UNCONDITIONALLY AGREES THAT IT WILL NOT COMMENCE ANY ACTION, LITIGATION OR PROCEEDING OF ANY KIND OR DESCRIPTION, WHETHER IN LAW OR EQUITY, WHETHER IN CONTRACT OR IN TORT OR OTHERWISE, AGAINST THE ADMINISTRATIVE AGENT, ANY LENDER, ANY L/C ISSUER, OR ANY RELATED PARTY OF THE FOREGOING IN ANY WAY RELATING TO THIS AGREEMENT OR ANY OTHER LOAN DOCUMENT OR THE TRANSACTIONS RELATING HERETO OR THERETO,

IN ANY FORUM OTHER THAN THE COURTS OF THE STATE OF NEW YORK SITTING IN NEW YORK COUNTY AND OF THE UNITED STATES DISTRICT COURT OF THE SOUTHERN DISTRICT OF NEW YORK, AND ANY APPELLATE COURT FROM ANY THEREOF, AND EACH OF THE PARTIES HERETO IRREVOCABLY AND UNCONDITIONALLY SUBMITS TO THE JURISDICTION OF SUCH COURTS AND AGREES THAT ALL CLAIMS IN RESPECT OF ANY SUCH ACTION, LITIGATION OR PROCEEDING MAY BE HEARD AND DETERMINED IN SUCH NEW YORK STATE COURT OR, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, IN SUCH FEDERAL COURT. EACH OF THE PARTIES HERETO AGREES THAT A FINAL JUDGMENT IN ANY SUCH ACTION, LITIGATION OR PROCEEDING SHALL BE CONCLUSIVE AND MAY BE ENFORCED IN OTHER JURISDICTIONS BY SUIT ON THE JUDGMENT OR IN ANY OTHER MANNER PROVIDED BY LAW. NOTHING IN THIS AGREEMENT OR IN ANY OTHER LOAN DOCUMENT SHALL AFFECT ANY RIGHT THAT THE ADMINISTRATIVE AGENT, ANY LENDER OR ANY L/C ISSUER MAY OTHERWISE HAVE TO BRING ANY ACTION OR PROCEEDING RELATING TO THIS AGREEMENT OR ANY OTHER LOAN DOCUMENT AGAINST THE BORROWER OR ANY OTHER LOAN PARTY OR ITS PROPERTIES IN THE COURTS OF ANY JURISDICTION.

(c) WAIVER OF VENUE . THE BORROWER AND EACH OTHER LOAN PARTY IRREVOCABLY AND UNCONDITIONALLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY OBJECTION THAT IT MAY NOW OR HEREAFTER HAVE TO THE LAYING OF VENUE OF ANY ACTION OR PROCEEDING ARISING OUT OF OR RELATING TO THIS AGREEMENT OR ANY OTHER LOAN DOCUMENT IN ANY COURT REFERRED TO IN PARAGRAPH (B) OF THIS SECTION. THE BORROWER AND EACH OTHER LOAN PARTY IRREVOCABLY AND UNCONDITIONALLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, THE DEFENSE OF AN INCONVENIENT FORUM TO THE MAINTENANCE OF SUCH ACTION OR PROCEEDING IN ANY SUCH COURT.

(d) SERVICE OF PROCESS . EACH PARTY HERETO IRREVOCABLY CONSENTS TO SERVICE OF PROCESS IN THE MANNER PROVIDED FOR NOTICES IN SECTION 11.02. NOTHING IN THIS AGREEMENT WILL AFFECT THE RIGHT OF ANY PARTY HERETO TO SERVE PROCESS IN ANY OTHER MANNER PERMITTED BY APPLICABLE LAW.

11.15 Waiver of Jury Trial .

EACH PARTY HERETO HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN ANY LEGAL PROCEEDING DIRECTLY OR INDIRECTLY ARISING OUT OF OR RELATING TO THIS AGREEMENT OR ANY OTHER LOAN DOCUMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY (WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY). EACH PARTY HERETO (a)

CERTIFIES THAT NO REPRESENTATIVE, AGENT OR ATTORNEY OF ANY OTHER PERSON HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PERSON WOULD NOT, IN THE EVENT OF LITIGATION, SEEK TO ENFORCE THE FOREGOING WAIVER AND (b) ACKNOWLEDGES THAT IT AND THE OTHER PARTIES HERETO HAVE BEEN INDUCED TO ENTER INTO THIS AGREEMENT AND THE OTHER LOAN DOCUMENTS BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS IN THIS SECTION.

11.16 Subordination .

Each Loan Party (a " Subordinating Loan Party ") hereby subordinates the payment of all obligations and indebtedness of any other Loan Party owing to it, whether now existing or hereafter arising, including but not limited to any obligation of any such other Loan Party to the Subordinating Loan Party as subrogee of the Secured Parties or resulting from such Subordinating Loan Party's performance under Article X, to the indefeasible payment in full in cash of all Obligations. If the Secured Parties so request, any such obligation or indebtedness of any such other Loan Party to the Subordinating Loan Party shall be enforced and performance received by the Subordinating Loan Party as trustee for the Secured Parties and the proceeds thereof shall be paid over to the Secured Parties on account of the Secured Obligations, but without reducing or affecting in any manner the liability of the Subordinating Loan Party under this Agreement. Without limitation of the foregoing, so long as no Event of Default has occurred and is continuing, the Loan Parties may make and receive payments with respect to Intercompany Debt; provided , that in the event that any Loan Party receives any payment of any Intercompany Debt at a time when such payment is prohibited by this Section, such payment shall be held by such Loan Party, in trust for the benefit of, and shall be paid forthwith over and delivered, upon written request, to the Administrative Agent.

11.17 No Advisory or Fiduciary Responsibility .

In connection with all aspects of each transaction contemplated hereby (including in connection with any amendment, waiver or other modification hereof or of any other Loan Document), the Borrower and each other Loan Party acknowledges and agrees, and acknowledges its Affiliates' understanding, that: (a) (i) the arranging and other services regarding this Agreement provided by the Administrative Agent and any Affiliate thereof, the Arrangers and the Lenders are arm's-length commercial transactions between the Borrower, each other Loan Party and their respective Affiliates, on the one hand, and the Administrative Agent and, as applicable, its Affiliates (including any Affiliate that is an Arranger) and the Lenders and their Affiliates (including any Affiliate that is an Arranger) (collectively, solely for purposes of this Section, the " Lenders "), on the other hand, (ii) each of the Borrower and the other Loan Parties has consulted its own legal, accounting, regulatory and tax advisors to the extent it has deemed appropriate, and (iii) the Borrower and each other Loan Party is capable of evaluating, and understands and accepts, the terms, risks and conditions of the transactions contemplated hereby and by the other Loan Documents; (b) (i) the Administrative Agent and its Affiliates (including any Affiliate that is an Arranger) and each Lender each is and has been acting solely as a principal and, except as expressly agreed in writing by the relevant parties, has not been, is not, and will not be acting as an advisor, agent or fiduciary, for Borrower, any other Loan Party or any of their respective Affiliates, or any other Person and

(ii) neither the Administrative Agent, any of its Affiliates (including any Affiliate that is an Arranger) nor any Lender has any obligation to the Borrower, any other Loan Party or any of their respective Affiliates with respect to the transactions contemplated hereby except those obligations expressly set forth herein and in the other Loan Documents; and (c) the Administrative Agent and its Affiliates (including any Affiliate that is an Arranger) and the Lenders may be engaged in a broad range of transactions that involve interests that differ from those of the Borrower, the other Loan Parties and their respective Affiliates, and neither the Administrative Agent, any of its Affiliates (including any Affiliate that is an Arranger) nor any Lender has any obligation to disclose any of such interests to the Borrower, any other Loan Party or any of their respective Affiliates. To the fullest extent permitted by law, each of the Borrower and each other Loan Party hereby waives and releases any claims that it may have against the Administrative Agent, any of its Affiliates (including any Affiliate that is an Arranger) or any Lender with respect to any breach or alleged breach of agency or fiduciary duty in connection with any aspect of any transactions contemplated hereby.

11.18 Electronic Execution .

The words "delivery," "execute," "execution," "signed," "signature," and words of like import in any Loan Document or any other document executed in connection herewith (including without limitation Assignment and Assumptions, amendments or other Loan Notices, Swingline Loan Notices, waivers and consents) shall be deemed to include electronic signatures, the electronic matching of assignment terms and contract formations on electronic platforms approved by the Administrative Agent, or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature, physical delivery thereof or the use of a paper-based recordkeeping system, as the case may be, to the extent and as provided for in any applicable Law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act, or any other similar state laws based on the Uniform Electronic Transactions Act; ***provided that notwithstanding anything contained herein to the contrary the Administrative Agent is under no obligation to agree to accept electronic signatures in any form or in any format unless expressly agreed to by the Administrative Agent pursuant to procedures approved by it; provided further without limiting the foregoing, upon the request of the Administrative Agent, any electronic signature shall be promptly followed by such manually executed counterpart.***

11.19 USA PATRIOT Act Notice .

Each Lender that is subject to the Act (as hereinafter defined) and the Administrative Agent (for itself and not on behalf of any Lender) hereby notifies the Borrower and the other Loan Parties that pursuant to the requirements of the USA PATRIOT Act (Title III of Pub. L. 107-56 (signed into law October 26, 2001)) (the " Act "), it is required to obtain, verify and record information that identifies each Loan Party, which information includes the name and address of each Loan Party and other information that will allow such Lender or the Administrative Agent, as applicable, to identify each Loan Party in accordance with the Act. The Borrower and the Loan Parties agree to, promptly following a request by the Administrative Agent or any Lender, provide all such other documentation and information that the Administrative Agent or such Lender requests in order to

comply with its ongoing obligations under applicable "know your customer" and anti-money laundering rules and regulations, including the Act.

11.20 Acknowledgement and Consent to Bail-In of EEA Financial Institutions .

Solely to the extent any Lender or any L/C Issuer that is an EEA Financial Institution is a party to this Agreement and notwithstanding anything to the contrary in any Loan Document or in any other agreement, arrangement or understanding among any such parties, each party hereto acknowledges that any liability of any Lender or any L/C Issuer that is an EEA Financial Institution arising under any Loan Document, to the extent such liability is unsecured, may be subject to the write-down and conversion powers of an EEA Resolution Authority and agrees and consents to, and acknowledges and agrees to be bound by:

(a) the application of any Write-Down and Conversion Powers by an EEA Resolution Authority to any such liabilities arising hereunder which may be payable to it by any Lender or any L/C Issuer that is an EEA Financial Institution; and

(b) the effects of any Bail-In Action on any such liability, including, if applicable:

(i) a reduction in full or in part or cancellation of any such liability;

(ii) a conversion of all, or a portion of, such liability into shares or other instruments of ownership in such EEA Financial Institution, its parent undertaking, or a bridge institution that may be issued to it or otherwise conferred on it, and that such shares or other instruments of ownership will be accepted by it in lieu of any rights with respect to any such liability under this Agreement or any other Loan Document; or

(iii) the variation of the terms of such liability in connection with the exercise of the write-down and conversion powers of any EEA Resolution Authority.

11.21 Judgment Currency .

If, for the purposes of obtaining judgment in any court, it is necessary to convert a sum due hereunder or any other Loan Document in one currency into another currency, the rate of exchange used shall be that at which in accordance with normal banking procedures the Administrative Agent could purchase the first currency with such other currency on the Business Day preceding that on which final judgment is given. The obligation of each Loan Party in respect of any such sum due from it to the Administrative Agent or any Lender hereunder or under the other Loan Documents shall, notwithstanding any judgment in a currency (the " Judgment Currency ") other than that in which such sum is denominated in accordance with the applicable provisions of this Agreement (the " Agreement Currency "), be discharged only to the extent that on the Business Day following receipt by the Administrative Agent or such Lender, as the case may be, of any sum adjudged to be so due in the Judgment Currency, the Administrative Agent or such Lender, as the case may be, may in accordance with normal banking procedures purchase the Agreement Currency with the

Judgment Currency. If the amount of the Agreement Currency so purchased is less than the sum originally due to the Administrative Agent or any Lender from any Loan Party in the Agreement Currency, such Loan Party agrees, as a separate obligation and notwithstanding any such judgment, to indemnify the Administrative Agent or such Lender, as the case may be, against such loss. If the amount of the Agreement Currency so purchased is greater than the sum originally due to the Administrative Agent or any Lender in such currency, the Administrative Agent or such Lender, as the case may be, agrees to return the amount of any excess to such Loan Party (or to any other Person who may be entitled thereto under applicable law).

11.22 ENTIRE AGREEMENT .

THIS AGREEMENT AND THE OTHER LOAN DOCUMENTS REPRESENT THE FINAL AGREEMENT AMONG THE PARTIES AND MAY NOT BE CONTRADICTED BY EVIDENCE OF PRIOR, CONTEMPORANEOUS, OR SUBSEQUENT ORAL AGREEMENTS OF THE PARTIES. THERE ARE NO UNWRITTEN ORAL AGREEMENTS AMONG THE PARTIES.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK.]

IN WITNESS WHEREOF , the parties hereto have caused this Agreement to be duly executed as of the date first above written.

BORROWER :

VERTEX PHARMACEUTICALS INCORPORATED

By:	/s/	Jeffrey Leiden
Name:		Jeffrey Leiden
Title:		Chief Executive Officer and President
By:	/s/	Ian Smith
Name:		Ian Smith
Title:		Executive Vice President, Chief Financial Officer and Treasurer

SUBSIDIARY GUARANTORS :

VERTEX PHARMACEUTICALS (SAN DIEGO) LLC

By:	/s/	Ian Smith
Name:		Ian Smith
Title:		Treasurer

VERTEX HOLDINGS, INC.

By:	/s/	Ian Smith
Name:		Ian Smith
Title:		Treasurer

VERTEX PHARMACEUTICALS (DISTRIBUTION) INCORPORATED

By:	/s/	Ian Smith
Name:		Ian Smith
Title:		Treasurer

VERTEX PHARMACEUTICALS (DELAWARE) LLC

By:	/s/	Ian Smith
Name:		Ian Smith
Title:		Treasurer

VERTEX PHARMACEUTICALS (PUERTO RICO) LLC

By:	/s/	Ian Smith
Name:		Ian Smith
Title:		Treasurer

ADMINISTRATIVE AGENT :

BANK OF AMERICA, N.A.,
as Administrative Agent

By:	/s/	Angela M. Larkin
Name:		Angela M. Larkin
Title:		Assistant Vice President

LENDERS :

BANK OF AMERICA, N.A., as a Lender, a L/C Issuer and Swingline Lender

By:	/s/	Linda E. Alto
Name:		Linda E. Alto
Title:		Senior Vice President

SUNTRUST BANK , as a Lender

By: /s/ Ben Cumming

Name: Ben Cumming

Title: Director

CITIZENS BANK N.A. , as a Lender

By: /s/ R. Scott Haskell

Name: R. Scott Haskell

Title: Managing Director

THE BANK OF TOKYO - MITSUBISHI UFJ LTD. , as a Lender

By:	/s/	Teuta Ghilaga
Name:		Teuta Ghilaga
Title:		Director

CITIBANK, N.A. , as a Lender

/s/ Laura Fogarty

Laura Fogarty
Vice President

KEYBANK NATIONAL ASSOCIATION , as a Lender

By:	/s/	Raymond T. Kelley
Name:		Raymond T. Kelley
Title:		Senior Vice President

HSBC BANK USA NATIONAL ASSOCIATION , as a Lender

By:	/s/	Zhiyan Zeng
Name:		Zhiyan Zeng
Title:		Vice President

FIRST AMENDMENT TO CREDIT AGREEMENT

This **FIRST AMENDMENT TO CREDIT AGREEMENT** , dated as of February 9, 2017 (this " Amendment "), modifies that certain Credit Agreement, dated as of October 13, 2016 (as amended, restated, amended and restated, extended, supplemented or otherwise modified in writing from time to time, the " Credit Agreement "), among **VERTEX PHARMACEUTICALS INCORPORATED** , a Massachusetts corporation (the " Borrower "), certain Subsidiaries of the Borrower party thereto from time to time as Subsidiary Guarantors, the Lenders party thereto from time to time, and Bank of America, N.A., as Administrative Agent, Swingline Lender and an L/C Issuer. Capitalized terms used herein and not defined shall have the meaning assigned to such terms in the Credit Agreement.

RECITALS

WHEREAS , the Borrower has requested that the Administrative Agent and the Lenders agree to amend certain of the terms and provisions of the Credit Agreement, as specifically set forth in this Amendment to account for certain unanticipated accounting treatment resulting from the Financial Accounting Standards Board (FASB) Accounting Standards Codification Topic 730; and

WHEREAS , the undersigned Lenders and the Administrative Agent are prepared to amend the Credit Agreement on the terms, subject to the conditions and in reliance on the representations set forth herein.

NOW THEREFORE , in consideration of the premises and other good and valuable consideration, the parties hereto hereby agree as follows:

Section 1.Amendments to Credit Agreement .

(a) Section 1.01 (Defined Terms) of the Credit Agreement is hereby amended by adding the following new defined terms in the appropriate alphabetical order:

" " CFFT " means Cystic Fibrosis Foundation Therapeutics Incorporated"

" " CFFT Amendment " means that certain Amendment #7 to the CFFT R&D Agreement, dated as of October 13, 2016, by and among the Borrower and CFFT, and any agreements ancillary thereto.

" " CFFT R&D Agreement " means that certain Research, Development and Commercialization Agreement dated May 24, 2004 between the Borrower and CFFT, as amended."

" " CFFT Royalty Payments " means royalty payments paid pursuant to the CFFT R&D Agreement (as amended by the CFFT Amendment) by the Borrower to CFFT, if any, on net sales of compounds."

" " Quarterly Reimbursement Payments " means non-refundable quarterly reimbursements of certain of the Borrower's research and development expenses."

" " Specified CFFT Payments " means the following amounts paid or payable by CFFT to the Borrower pursuant to the CFFT Amendment: (i) the $75 million non-refundable upfront payment and (ii) Quarterly Reimbursement Payments."

(b) Section 1.01 (Defined Terms) of the Credit Agreement is hereby amended by amending the definition of Consolidated Funded Indebtedness by inserting the following new sentence immediate following the last period (".") of such definition:

"To the extent Specified CFFT Payments qualify as Consolidated Funded Indebtedness, such Specified CFFT Payments shall nonetheless be excluded from Consolidated Funded Indebtedness in an aggregate amount up to $75,000,000."

(c) Section 1.01 (Defined Terms) of the Credit Agreement is hereby amended by amending the last paragraph of the definition of "Consolidated EBITDA" by (i) deleting the "and" between subclauses (I) and (II) of clause (1) thereof, (ii) and inserting the following new subclause (III) immediately following the text ", and" appearing at the end of subclause (II) thereof:

"(III) notwithstanding any accounting principles or standards to the contrary, including Accounting Standards Codification Topic 730 and related pronouncements, for the purposes of calculating Consolidated EBITDA, the (a) CFFT Royalty Payments shall be characterized as a royalty expense and (b) Quarterly Reimbursement Payments shall be characterized as a reduction to research and development expense, and"

Section 2. Condition Precedent . This Amendment shall become effective as of the date first written above (the " Effective Date ") upon the satisfaction of the following conditions precedent:

(a) Documentation . Administrative Agent shall have received all of the following, in form and substance satisfactory to Administrative Agent:

(i) a fully-executed Amendment by the Borrower, the Subsidiary Guarantors, the Administrative Agent and the Required Lenders; and

(iii) such additional documents, instruments and information as Administrative Agent may reasonably request to effect the transactions contemplated hereby.

(b) No Default . On the Effective Date and after giving effect to this Amendment, no event shall have occurred and be continuing that would constitute a Default or an Event of Default.

Section 3. Representations and Warranties; Reaffirmation of Grant . Each Loan Party hereby represents and warrants to the Administrative Agent and the Lenders that, as of the

date hereof and immediately after giving effect to this Amendment, (a) the representations and warranties of the Borrower and each other Loan Party contained in Article V of the Credit Agreement are (i) with respect to representations and warranties that contain a materiality qualification, true and correct on and as of the date hereof and (ii) with respect to representations and warranties that do not contain a materiality qualification, true and correct in all material respects on and as of the date hereof, except that for purposes of hereof, the representations and warranties contained in Section 5.05(b) of the Credit Agreement shall be deemed to refer to the most recent statements furnished pursuant to Section 6.01(b) of the Credit Agreement, (b) no Default or Event of Default has occurred and is continuing, (c) the Credit Agreement (as amended by this Amendment) and all other Loan Documents are and remain legally valid and binding obligation of such Loan Party, enforceable against each Loan Party that is party thereto in accordance with its terms, subject to applicable bankruptcy, insolvency, reorganization, moratorium or other laws affecting creditors' rights generally and subject to general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law) and (d) except as expressly contemplated under any Loan Document, the provisions of the Collateral Documents to which such Loan Party is a party are effective to create in favor of the Administrative Agent, for the benefit of the Secured Parties, a legal, valid and enforceable first priority Lien (subject to Permitted Liens) on all right, title and interest of the respective Loan Parties in the Collateral described therein to the extent required to be perfected therein, except as to enforcement, as may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or other laws affecting creditors' rights generally and subject to general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law). Each Loan Party that is a party to the Security Agreement or any of the other Collateral Documents hereby reaffirms its grant of a security interest in the Collateral to the Administrative Agent for the ratable benefit of the Secured Parties, as collateral security for the prompt and complete payment and performance when due of the Secured Obligations, as set forth therein.

Section 4. Survival of Representations and Warranties . All representations and warranties made in this Amendment shall survive the execution and delivery of this Amendment, and no investigation by the Administrative Agent or the Lenders shall affect the representations and warranties or the right of the Administrative Agent and the Lenders to rely upon them.

Section 5. Amendment as Loan Document . This Amendment constitutes a "Loan Document" under the Credit Agreement.

Section 6. Costs and Expenses . The Borrower shall pay on demand all reasonable out-of-pocket expenses incurred by the Administrative Agent (including the reasonable fees, charges and disbursements of counsel for the Administrative Agent) incurred in connection with the preparation, negotiation, execution and delivery of this Amendment, in each case, in accordance with Section 11.04(a) of the Credit Agreement.

Section 7. Governing Law . THIS AMENDMENT AND THE RIGHTS AND OBLIGATIONS OF THE PARTIES HEREUNDER SHALL BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAW OF THE STATE OF NEW YORK

(WITHOUT GIVING EFFECT TO ANY CHOICE OR CONFLICT OF LAW PROVISION OR RULE THAT WOULD CAUSE THE APPLICATION OF THE DOMESTIC SUBSTANTIVE LAWS OF ANY OTHER STATE).

Section 8. Execution . This Amendment may be executed in any number of counterparts and by different parties hereto in separate counterparts, each of which when so executed shall be deemed to be an original and all of which taken together shall constitute one and the same agreement. Delivery of an executed counterpart of a signature page to this Amendment by telecopier (or electronic mail (including in PDF format)) shall be effective as delivery of a manually executed counterpart of this Amendment.

Section 9. Limited Effect . This Amendment relates only to the specific matters expressly covered herein, shall not be considered to be an amendment or waiver of any rights or remedies that the Administrative Agent or any Lender may have under the Credit Agreement, under any other Loan Document (except as expressly set forth herein) or under Law, and shall not be considered to create a course of dealing or to otherwise obligate in any respect the Administrative Agent or any Lender to execute similar or other amendments or waivers or grant any amendments or waivers under the same or similar or other circumstances in the future.

Section 10. Ratification by Subsidiary Guarantors . Each of the Guarantors acknowledges that its consent to this Amendment is not required, but each of the undersigned nevertheless does hereby agree and consent to this Amendment and to the documents and agreements referred to herein. Each of the Guarantors agrees and acknowledges that (i) notwithstanding the effectiveness of this Amendment, such Guarantor's Guaranty shall remain in full force and effect without modification thereto and (ii) nothing herein shall in any way limit any of the terms or provisions of such Guarantor's Guaranty or any other Loan Document executed by such Guarantor (as the same may be amended from time to time), all of which are hereby ratified, confirmed and affirmed in all respects. Each of the Guarantors hereby agrees and acknowledges that no other agreement, instrument, consent or document shall be required to give effect to this Section 10 . Each of the Guarantors hereby further acknowledges that the Borrower, the Administrative Agent and any Lender may from time to time enter into any further amendments, modifications, terminations and/or amendments of any provisions of the Loan Documents without notice to or consent from such Guarantor and without affecting the validity or enforceability of such Guarantor's Guaranty or giving rise to any reduction, limitation, impairment, discharge or termination of such Guarantor's Guaranty.

[Remainder of page intentionally blank. **]**

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be executed and delivered as of the date first above written.

BORROWER :

VERTEX PHARMACEUTICALS INCORPORATED

By: **/s/ Ian Smith**
Name: **Ian Smith**
Title: **Executive Vice President, COO & CFO**

SUBSIDIARY GUARANTORS :

By: **/s/ Ian Smith**
Name: **Ian Smith**
Title: **Director**

VERTEX HOLDINGS, INC.

By: **/s/ Ian Smith**
Name: **Ian Smith**
Title: **Director**

VERTEX PHARMACEUTICALS (DISTRIBUTION) INCORPORATED

By: **/s/ Ian Smith**
Name: **Ian Smith**
Title: **Director**

VERTEX PHARMACEUTICALS (DELAWARE) LLC

By: **/s/ Ian Smith**
Name: **Ian Smith**
Title: **Director**

VERTEX PHARMACEUTICALS (PUERTO RICO) LLC

By: **/s/ Ian Smith**
Name: **Ian Smith**
Title: **Treasurer**

BANK OF AMERICA, N.A., as
Administrative Agent

By: **/s/ Angela Larkin**
Name: **Angela Larkin**
Title: **Assistant Vice President**

BANK OF AMERICA, N.A. , as a Lender, Swingline Lender, and an L/C Issuer

By: **/s/ Linda Alto**
Name: **Linda Alto**
Title: **Senior Vice President**

SUNTRUST BANK , as a Lender

By: **/s/ Katherine Bass**
Name: **Katherine Bass**
Title: **Director**

BARCLAYS BANK PLC , as a Lender

By: **/s/ Evan Moriarty**
Name: **Evan Moriarty**
Title: **Assistant Vice President**

CITIZENS BANK N.A. , as a Lender

By: **/s/ Prasanna Manyem**
Name: **Prasanna Manyem**
Title: **Vice President**

THE BANK OF TOKYO-MITSUBISHI UFJ, LTD. , as a Lender

By: **/s/ Teuta Ghilaga**
Name: **Teuta Ghilaga**
Title: **Director**

CITIBANK, N.A. , as a Lender

By: **/s/ Laura Fogarty**
Name: **Laura Fogarty**
Title: **Vice President**

KEYBANK NATIONAL ASSOCIATION , as a Lender

By: **/s/ Neil Buitening**
Name: **Neil Buitening**
Title: **Senior Vice President**

HSBC BANK USA, NATIONAL ASSOCIATION, as a Lender

By: **/s/ Elise M. Russo**
Name: **Elise M. Russo**
Title: **Senior Vice President**

EMPLOYMENT AGREEMENT

This Employment Agreement (this " Agreement ") is made and entered into as of this 14th day of November, 2015, by and between Vertex Pharmaceuticals Incorporated, a Massachusetts corporation (together with its successors and assigns, the " Company "), and Michael Parini (the " Executive ").

W I T N E S S E T H

WHEREAS, the Company is employing the Executive as the Company's Executive Vice President, Chief Legal Officer; and

WHEREAS, the Executive has been designated as a member of the Executive and Management Committees of the Company;

NOW, THEREFORE, in consideration of the premises and mutual covenants contained herein and for other good and valuable consideration, the receipt of which mutually is acknowledged, the Company and the Executive (each individually a " Party ", and together the " Parties ") agree as follows:

1. DEFINITIONS.

" Base Salary " shall mean the Executive's base salary in accordance with Section 4 below.

" Board " shall mean the Board of Directors of the Company.

" Cause " shall mean (i) the Executive is convicted of a crime involving moral turpitude, (ii) the Executive commits a material breach of any provision of this Agreement not involving the performance or nonperformance of duties, or (iii) the Executive, in carrying out the Executive's duties, acts or fails to act in a manner that is determined, in the sole discretion of the Board, after written notice of any such act or failure to act and a reasonable opportunity to cure the deficiency has been provided to the Executive, to be (A) willful gross neglect or (B) willful gross misconduct resulting, in either case, in material harm to the Company unless such act, or failure to act, was believed by the Executive, in good faith, to be in the best interests of the Company.

" Change of Control " shall have the meaning set forth in the Change of Control Agreement.

" Change of Control Agreement " shall mean the Change of Control letter agreement between the Company and the Executive of even date herewith.

" Code " shall mean the Internal Revenue Code of 1986, as amended.

" Common Stock " shall mean the common stock of the Company.

" Disability " or " Disabled " shall mean a disability as determined under the Company's long-term disability plan or program in effect at the time the disability first occurs, or if no such plan or program exists at the time of disability, then a "disability" as defined under Section 22(e)(3) of the Code.

" Effective Date " shall mean January 4, 2015.

" Good Reason " shall mean that, without the Executive's consent, one or more of the following events occurs:

(i) the Executive's duties are materially diminished to an extent that results in either (A) the Executive no longer being an "officer," as such term is defined in Rule 16a-1(f) promulgated under the Securities Exchange Act of 1934; or (B) the Executive ceases to be a member of the executive management team of the Company; or

(ii) the Executive's Base Salary is decreased unless such reduction is part of an across-the-board proportionate reduction in the salaries of the Company's senior management team; or

(iii) the office to which the Executive is assigned is relocated to a place 35 or more miles away and such relocation is not at the Executive's request or with the Executive's prior agreement (and other than, for Executives assigned to the Company's principal executive offices, in connection with a change in location of the Company's principal executive offices);

provided that Good Reason shall not exist unless and until within 30 days after the event giving rise to Good Reason under either (i) or (ii) above has occurred, the Executive delivers a written termination notice to the Company stating that an event giving rise to Good Reason has occurred and identifying with reasonable detail the event that the Executive asserts constitutes Good Reason under either (i) or (ii) above and the Company fails or refuses to cure or eliminate the event giving rise to Good Reason on or within 30 days after receiving such notice. To avoid doubt, the termination of the Executive's employment would become effective at the close of business on the thirtieth day after the Company receives the Executive's termination notice, unless the Company cures or eliminates the event giving rise to Good Reason prior to such time.

" Severance Payment " shall mean an amount equal to the sum of the Base Salary in effect on the date of termination of Executive's employment, plus the amount of the Target Bonus for the Executive for the year in which the Executive's employment is terminated; provided, however, that if the Executive terminates the Executive's employment for Good Reason based on a reduction in Base Salary, then the Base Salary to be used in calculating the Severance Payment shall be the Base Salary in effect immediately prior to such reduction in Base Salary.

" Target Bonus " shall mean the target cash bonus for which the Executive is eligible on an annual basis, at a level consistent with the Executive's title and responsibilities, under the Company's bonus program then in effect and applicable to the Company's senior executives generally.

2. TERM OF EMPLOYMENT.

The Company hereby employs the Executive, and the Executive hereby accepts such employment, continuing until termination in accordance with the terms of this Agreement. The period during which the Executive is employed hereunder is referred to in this Agreement as the " term of employment. "

3. POSITION.

On the Effective Date, the Executive is employed as the Company's Executive Vice President, Chief Legal Officer, reporting to the Company's President & Chief Executive Officer.

4. BASE SALARY.

The Executive's annualized Base Salary as of the date of this Agreement is $500,000, payable in accordance with the regular payroll practices of the Company. The Base Salary shall be reviewed no less frequently than annually, and any changes thereto (which shall thereafter be deemed the Executive's Base Salary) shall be solely within the discretion of the Board.

5. TARGET BONUS PROGRAM.

During the term of employment, the Executive shall be eligible to participate in the Company's Target Bonus program (and other cash incentive compensation programs) applicable to the Company's senior executives, as any such programs are established and modified from time to time by the Board in its sole discretion, and in accordance with the terms of such program.

6. INCENTIVE COMPENSATION PROGRAMS/SIGN-ON AWARDS.

(a) During the term of employment, the Executive shall be eligible to participate in the Company's incentive compensation programs applicable to the Company's senior executives, as such programs may be established and modified from time to time by the Board in its sole discretion.

(b) **Sign-On Cash Bonus** : The Executive shall receive a sign-on cash bonus in the amount of $250,000 payable (with appropriate deductions as required by law) to the Executive at the first regular pay date applicable to the Executive after the Effective Date. If the Executive terminates this Agreement without Good Reason, and other than as a result of death or Disability, during the period commencing on the Effective Date and ending on the first anniversary of the

Effective Date, the Executive shall repay the sign-on cash bonus to the Company within 30 days of such termination.

(c) **Sign-On Restricted Stock Grant** : The Executive will purchase, in accordance with the terms of a Restricted Stock Award agreement executed and delivered to the Company by the Executive on the Effective Date (the " Grant Date "), 13,800 shares of the Company's Common Stock, at a purchase price per share of $0.01. This grant, including but not limited to the vesting schedule and the Company's right to repurchase these shares, shall be subject to the other terms and conditions specified in a separate Restricted Stock Award agreement attached hereto as Exhibit A .

(d) **Sign-On Stock Option Grant** : The Executive shall be granted a stock option under the Company's 2013 Stock and Option Plan (the " Stock Plan ") to purchase 68,000 shares of the Company's common stock at a price equal to the Fair Market Value of Vertex's shares, as defined in the Stock Plan, on the Effective Date. The option will vest and become exercisable as to equal numbers of shares quarterly in arrears over the four year period commencing on the Effective Date, and as otherwise specified herein and in the Stock Plan, and shall be subject to the other terms and conditions specified in a separate agreement attached hereto as Exhibit B .

7. EMPLOYEE BENEFIT PROGRAMS.

During the term of employment, the Executive shall be entitled to participate in all employee welfare and pension benefit plans, programs and/or arrangements offered by the Company to its senior executives, as such plans, programs and arrangements may be amended from time to time, to the same extent and on the same terms applicable to other senior executives. Nothing in this section shall preclude the Company from amending or terminating any of its employee benefit plans, programs or arrangements.

8. VACATION.

During the term of employment, the Executive shall be entitled to paid vacation days each calendar year in accordance with the Company's vacation policy then in effect.

9. TERMINATION OF EMPLOYMENT.

(a) **Termination in Connection with a Change of Control** . To the extent the Executive is entitled, in connection with the Executive's termination of employment, to severance or other benefits under the Change of Control Agreement, the Executive shall not be entitled to corresponding benefits under this Section 9.

(b) **Termination by the Company for Cause; or Termination by the Executive without Good Reason.** If the Company terminates the Executive's employment for Cause, or if the Executive voluntarily terminates the Executive's employment, other than for Good Reason,

death or Disability, the term of employment shall end as of the date specified below, and the Executive shall be entitled to the following:

(i) Base Salary earned by Executive but not paid through the date of termination of Executive's employment under this Section 9(b); and

(ii) any amounts earned, accrued or owing to the Executive but not yet paid under Sections 5, 6, or 7 above.

Termination by Company for Cause shall be effective as of the date noticed by the Company. Voluntary termination by Executive other than for Good Reason, death or Disability shall be effective upon 90 days' prior written notice to the Company and shall not be deemed a breach of this Agreement.

(c) **Termination by the Company Without Cause; or Termination by the Executive for Good Reason.** If the Executive's employment is terminated by the Company without Cause (other than due to death or Disability), or is terminated by the Executive for Good Reason (in accordance with the notice and cure provisions set forth in the definition of "Good Reason" above), the Executive shall be entitled to the following (provided that, with respect to (iii) and (v) such amounts shall be subject to and in exchange for a general release of all claims against the Company, its subsidiaries, and their officers, directors, agents and representatives, which is executed by Executive and becomes enforceable and non-revocable within 60 days of the date of termination):

(i) Base Salary earned by Executive but not paid through the date of termination of Executive's employment under this Section 9(c);

(ii) all incentive compensation awards earned by Executive but not paid prior to the date of termination of Executive's employment under this Section 9(c);

(iii) a cash payment to the Executive in an amount equal to the Severance Payment, payable within ten days after the execution of a general release and expiration, without revocation, of any applicable revocation periods under the general release provided that if the 60-day period during which the release is required to become effective and irrevocable begins in one calendar year and ends in another calendar year, the Severance Payment shall not be made before the first day of the second calendar year;

(iv) any amounts earned, accrued or owing to the Executive but not yet paid under Sections 5, 6 or 7 above;

(v) if COBRA coverage is elected by the Executive, the Company shall pay the cost of insurance continuation premiums on the Executive's behalf (whether or not covered by COBRA) to continue standard medical, dental and life insurance

coverage for the Executive (or the cash equivalent of same in the event the Executive is ineligible for continued coverage) until the earlier of:

(A) the date 12 months after the date the Executive's employment is terminated; or

(B) the date, or dates, on which the Executive receives equivalent coverage and benefits under the plans, programs and/or arrangements of a subsequent employer (such coverage and benefits to be determined on a coverage-by-coverage or benefit-by-benefit basis).

If Executive is a "specified employee" under Section 409A(a)(2)(B)(i) of the Code, any payment of "nonqualified deferred compensation" (as defined under Section 409A of the Code and related guidance) attributable to a "separation from service" (as defined under Section 409A of the Code and related guidance) shall not commence until the first full business day that is more than six months after the applicable separation from service (" Deferred Payment Date "). Any payments that would otherwise have been made between the separation from service and the Deferred Payment Date, but for this paragraph, shall be made in a lump sum on the Deferred Payment Date. Payments that, in any case, are scheduled to be made after the Deferred Payment Date shall continue according to the applicable payment schedule. To the extent that the termination of the Executive's employment does not constitute a separation of service under Section 409A(a)(2)(A)(i) of the Code (as the result of further services that reasonably are anticipated to be provided by the Executive to the Company at the time the Executive's employment is terminated), the payment of any nonqualified deferred compensation will be further delayed until the date that is the first full business day that is more than six months after the date of a subsequent event constituting a separation of service under Section 409A(a)(2)(A)(i) of the Code.

10. ASSIGNABILITY; BINDING NATURE.

This Agreement shall be binding upon and inure to the benefit of the Parties and their respective successors, heirs (in the case of the Executive) and assigns. No rights or obligations of the Company under this Agreement may be assigned or transferred by the Company except that such rights or obligations may be assigned or transferred pursuant to a merger or consolidation in which the Company is not the continuing entity, or the sale or liquidation of all or substantially all of the assets of the Company; provided , however , that the assignee or transferee is the successor to all or substantially all of the assets of the Company and such assignee or transferee assumes the liabilities, obligations and duties of the Company, as contained in this Agreement, either contractually or as a matter of law.

11. REPRESENTATIONS.

The Company represents and warrants that it is fully authorized and empowered to enter into this Agreement, and that the performance of its obligations under this Agreement will not

violate any agreement between it and any other person, firm or organization. The Executive represents and warrants that no agreement exists between her and any other person, firm or organization that would be violated by the performance of the Executive's obligations under this Agreement.

12. INDEMNIFICATION; INSURANCE.

The Executive shall at all times be indemnified and eligible for advancement of expenses on the same basis as is provided for the Company's other executive officers and in accordance with the provisions of the Company's charter and by-laws then in effect. The Executive shall also be covered under all of the Company's policies of liability insurance maintained for the benefit of its directors and officers on the same basis as is provided for its other executive officers.

13. ENTIRE AGREEMENT; TERMINATION.

This Agreement, the agreements referenced herein and the Employee Non-Disclosure, Non-Competition & Inventions Agreement between the Executive and the Company contain the entire understanding and agreement between the Parties concerning the subject matter hereof and supersedes all prior agreements, understandings, discussions, negotiations and undertakings, whether written or oral, between the Parties with respect thereto. Subject to the terms of this Agreement, the Company shall be entitled to terminate the Executive's employment at any time, and the Executive may terminate the Executive's employment by the Company, at any time subject to the provisions of Section 9(b) of this Agreement, in each case by written notice provided in accordance with Section 20 of this Agreement.

14. AMENDMENT OR WAIVER.

No provision in this Agreement may be amended unless such amendment is agreed to in writing and signed by the Executive and an authorized officer of the Company provided that the Company may, without the Executive's consent, unilaterally adopt amendments that may be required so that this Agreement continues to comply with applicable law or regulations, including without limitation Section 409A of the Code, provided such amendments do not adversely affect the benefits to the Executive under this Agreement. No waiver by either Party of any breach by the other Party of any condition or provision contained in this Agreement to be performed by such other Party shall be deemed a waiver of a similar or dissimilar condition or provision at the same or any prior or subsequent time. Any waiver must be in writing and signed by the Executive or an authorized officer of the Company, as the case may be.

15. SEVERABILITY.

If any provision or portion of this Agreement shall be determined to be invalid or unenforceable for any reason, in whole or in part, the remaining provisions of this Agreement

shall be unaffected thereby and shall remain in full force and effect to the fullest extent permitted by law.

16. SURVIVORSHIP.

The respective rights and obligations of the Parties hereunder shall survive any termination of the Executive's employment to the extent necessary to the intended preservation of such rights and obligations.

17. BENEFICIARIES/REFERENCES.

The Executive shall be entitled, to the extent permitted under any applicable law, to select and change a beneficiary or beneficiaries to receive any compensation or benefit payable hereunder following the Executive's death by giving the Company written notice thereof. In the event of the Executive's death or a judicial determination of the Executive's incompetence, reference in this Agreement to the Executive shall be deemed, where appropriate, to refer to the Executive's beneficiary, estate or other legal representative.

18. GOVERNING LAW/JURISDICTION.

This Agreement shall be governed by and construed and interpreted in accordance with the laws of The Commonwealth of Massachusetts without reference to principles of conflict of laws.

19. RESOLUTION OF DISPUTES.

Any disputes arising under or in connection with this Agreement may, at the election of the Executive or the Company, be resolved by binding arbitration, to be held in Massachusetts in accordance with the Rules and Procedures of the American Arbitration Association. If arbitration is elected, the Executive and the Company shall mutually select the arbitrator. If the Executive and the Company cannot agree on the selection of an arbitrator, each Party shall select an arbitrator and the two arbitrators shall select a third arbitrator, and the three arbitrators shall form an arbitration panel that shall resolve the dispute by majority vote. Judgment upon the award rendered by the arbitrator or arbitrators may be entered in any court having jurisdiction thereof. Costs of the arbitrator or arbitrators and other similar costs in connection with an arbitration shall be shared equally by the Parties; all other costs, such as attorneys' fees incurred by each Party, shall be borne by the Party incurring such costs.

20. NOTICES.

All notices that are required or permitted hereunder shall be in writing and sufficient if delivered personally, sent by facsimile (and promptly confirmed by personal delivery, registered or certified mail or overnight courier), sent by nationally-recognized overnight courier or sent by registered or certified mail, postage prepaid, addressed as follows:

If to the Company: Vertex Pharmaceuticals Incorporated
50 Northern Avenue
Boston, MA 02210
Attn: Chief Executive Officer

If to the Executive: at the Executive's home address listed in the Company records.

Any such notice shall be deemed to have been given: (a) when delivered if personally delivered or sent by facsimile on a business day; (b) on the business day after dispatch if sent by nationally-recognized overnight courier; and/or (c) on the fifth business day following the date of mailing if sent by mail.

21. HEADINGS.

The headings of the sections contained in this Agreement are for convenience only and shall not be deemed to control or affect the meaning or construction of any provision of this Agreement.

22. COUNTERPARTS.

This Agreement may be executed in two or more counterparts.

23. SECTION 409A COMPLIANCE.

It is the intention of the Company and the Executive that this Agreement and the payments provided for herein meet the requirements of Section 409A of the Code, to the extent applicable to this Agreement and such payments. The Company and the Executive agree to cooperate in good faith in preparing and executing, at such time as sufficient guidance is available under Section 409A and from time to time thereafter, such amendments to this Agreement, if any, as the Executive may reasonably request solely for the purpose of assuring that this Agreement and the payments provided hereunder meet the requirements of Section 409A. Nothing in this Section 23 shall require the Company to increase the Executive's compensation or make the Executive whole for any requested changes.

24. TAX WITHHOLDING; NO GUARANTEE OF ANY TAX CONSEQUENCES.

All payments hereunder shall be subject to all applicable withholding for any federal, state or local income taxes including any excise taxes under the Code. Notwithstanding any

other provision of this Agreement to the contrary or other representation, the Company does not in any way guarantee the tax consequences of any payment or compensation under this Agreement including, without limitation, under Section 409A of the Code.

IN WITNESS WHEREOF, the undersigned have executed this Agreement as of the date first written above.

Vertex Pharmaceuticals Incorporated

/s/ Jeffrey M. Leiden

Jeffrey M. Leiden, M.D., Ph.D.
Chairman, President & Chief Executive Officer

Executive

/s/ Michael Parini

Michael Parini

November 9, 2015

Michael J. Parini
586 Hunt Lane
Manhasset, NY 11030

RE: Change of Control Agreement

Dear Michael:

You are a key member of the senior management team of Vertex Pharmaceuticals Incorporated (the " Company "). As a result, the Company would like to provide you with the following "change of control" benefits to help ensure that if the Company becomes involved in a "change of control" transaction, there will be no distraction from your attention to the needs of the Company.

I. *Definitions* . For the purposes of this Amended and Restated Change of Control Agreement (this " Agreement "), capitalized terms shall have the following meanings:

1. " Cause " shall mean:

   (a) your conviction of a crime involving moral turpitude;

   (b) your willful refusal or failure to follow a lawful directive or instruction of the Company's Board of Directors or the individual(s) to whom you report, provided that you receive prior written notice of the directive(s) or instruction(s) that you failed to follow, and provided further that the Company, in good faith, gives you 30 days to correct such failure and further provided that if you correct the failure(s), any termination of your employment on account of such failure shall not be treated for purposes of this Agreement as a termination of employment for "Cause";

   (c) in carrying out your duties you commit (i) willful gross negligence, or (ii) willful gross misconduct, resulting in either case in material harm to the Company, unless such act, or failure to act, was believed by you, in good faith, to be in the best interests of the Company; or

   (d) your violation of the Company's policies made known to you regarding confidentiality, securities trading or inside information.

2. " Change of Control " shall mean that:

   (a) any "person" or "group" as such terms are used in Sections 13(d) and 14(d)(2) of the Securities Exchange Act of 1934 (the " Act "), becomes a beneficial owner, as such term is used in Rule 13d-3 promulgated under the Act, of securities of the Company

representing more than 50% of the combined voting power of the outstanding securities of the Company having the right to vote in the election of directors;

(b) all or substantially all the business or assets of the Company are sold or disposed of, or the Company or a subsidiary of the Company combines with another company pursuant to a merger, consolidation, or other similar transaction, other than (i) a transaction solely for the purpose of reincorporating the Company or one of its subsidiaries in a different jurisdiction or recapitalizing or reclassifying the Company's stock; or (ii) a merger or consolidation in which the shareholders of the Company immediately prior to such merger or consolidation continue to own at least a majority of the outstanding voting securities of the Company or the surviving entity immediately after the merger or consolidation.

3. " Code " shall mean the Internal Revenue Code of 1986, as amended.

4. " Disability " shall mean a disability as determined under the Company's long-term disability plan or program in effect at the time the disability first occurs, or if no such plan or program exists at the time of disability, then a "disability" as defined Section 22(e)(3) of the Code.

5. " Good Reason " shall mean one of the following events has occurred without your consent:

(a) You suffer a material reduction in the authorities, duties or job title and responsibilities associated with your position as Executive Vice President, Chief Legal Officer for the Company as of the date hereof;

(b) your annual base salary is decreased;

(c) the office to which you are assigned is relocated to a place 35 or more miles away; or

(d) following a Change of Control, the Company's successor fails to assume the Company's rights and obligations under this Agreement;

provided that Good Reason shall not exist unless and until within 30 days after the event giving rise to Good Reason under (a), (b), (c) or (d) above has occurred, you deliver a written termination notice to the Company stating that an event giving rise to Good Reason has occurred and identifying with reasonable detail the event that you assert constitutes Good Reason under (a), (b), (c) or (d) above and the Company fails or refuses to cure or eliminate the event giving rise to Good Reason on or within 30 days after receiving your notice. To avoid doubt, the termination of your employment would become effective at the close of business on the thirtieth day after the Company receives your termination notice, unless the Company cures or eliminates the event giving rise to Good Reason prior to such time.

6. " Termination Date " shall mean the last day of your employment with the Company.

II. *Severance Benefits upon Change of Control* . If:

(A) your employment is terminated by the Company (except for termination for Cause or due to a Disability) and the Termination Date is within 90 days prior to a Change of Control or within 12 months after a Change of Control; or

(B) you, of your own initiative, (i) terminate your employment for Good Reason (in accordance with the notice and cure provisions set forth in Section I.5 above) and (ii) the event giving rise to Good Reason occurs within 90 days prior to a Change of Control or within 12 months after a Change of Control;

then, you shall receive the following benefits:

1. *Severance Payment* . In exchange for your execution within 60 days of the Termination Date of a general release, in a form satisfactory to the Company, of all claims against the Company, its subsidiaries, and its and their officers, directors and representatives, that becomes enforceable and irrevocable within such 60-day period, the Company shall make a cash payment (the " Severance Payment ") to you in an amount equal to:

(a) (i) your annual base salary (provided, however, that if you terminate your employment for Good Reason based on a reduction in your annual base salary, then the annual base salary to be used in calculating the Severance Payment shall be your annual base salary in effect immediately prior to such reduction in annual base salary) plus your target bonus under any bonus program applicable to you for the year in which the Termination Date occurs; plus

(b) a prorata portion of your target bonus for the portion of the year in which the Termination Date occurs under any bonus program applicable to you; plus

(c) all cash incentive compensation awards earned by you but not paid prior to the Termination Date; provided that, if a fiscal year has been completed and the incentive award for such fiscal year has not been determined, the incentive compensation for such completed fiscal year shall equal the target bonus for such fiscal year.

Except with respect to any portion of the Severance Payment that is delayed as set forth in this paragraph, the Severance Payment shall be made in cash within ten days after the execution by you of the general release referred to above and expiration without revocation of any applicable revocation periods under such general release (or, if the Change of Control resulting in your becoming entitled to such benefits occurs after such execution and expiration, within ten days after the Change of Control), provided that, if the 60-day period during which the general release is required to become effective and irrevocable begins in one calendar year and ends in another calendar year, the Severance Payment shall not be

made before the first day of the second calendar year. The Severance Payment shall be divided into two portions, consisting of a portion that does not constitute "nonqualified deferred compensation" within the meaning of Section 409A of the Code and a portion, if any, that does constitute nonqualified deferred compensation. If you are a "specified employee" as defined in Section 409A(a)(2)(B)(i) of the Code, the commencement of the delivery of any such payments that constitute nonqualified deferred compensation payable upon a "separation from service" under Section 409A(a)(2)(A)(i) of the Code will be delayed until the first business day that is more than six months after your Termination Date. The determination of whether, and the extent to which, any of the payments to be made to you hereunder are nonqualified deferred compensation shall be made after the application of all applicable exclusions, including those set forth under Treasury Reg. § 1.409A-1(b)(9). Any payments that are intended to qualify for the exclusion for separation pay due to involuntary separation from service set forth in Reg. §1.409A-1(b)(9)(iii) must be paid no later than the last day of the second taxable year following the taxable year in which the Termination Date occurs. To the extent that the termination of your employment does not constitute a separation of service under Section 409A(a)(2)(A)(i) of the Code (as the result of further services that are reasonably anticipated to be provided by you to the Company at the time your employment is terminated), the payment of any non-qualified deferred compensation will be further delayed until the first business day that is more than six months after the date of a subsequent event constituting a separation of service under Section 409A(a)(2)(A)(i) of the Code.

2. *Accelerated Vesting.*

(a) On the Termination Date, stock options for the purchase of the Company's securities held by you as of the Termination Date and not then exercisable shall immediately become exercisable in full. The options to which this accelerated vesting applies shall remain exercisable until the earlier of (a) the end of the 90-day period immediately following the later of (i) the Termination Date or (ii) the date of the Change of Control and (b) the date the stock option(s) would otherwise expire; and

(b) On the Termination Date, the Company's lapsing repurchase right with respect to shares of restricted stock held by you shall lapse in full (subject to your making satisfactory arrangements with the Company providing for the payment to the Company of all required withholding taxes).

Notwithstanding anything to the contrary in this Agreement, the terms of any option agreement or restricted stock agreement shall govern the acceleration, if any, of vesting or lapsing of the Company's repurchase rights and period of exercisability of such awards, as applicable, except to the extent that the terms of this Agreement are more favorable to you.

3. *Continued Insurance Coverage* . If COBRA coverage is elected by you, the Company shall pay the cost of insurance continuation premiums on your behalf (whether or not covered by COBRA) to continue standard medical, dental and life insurance coverage for you (or the cash equivalent of same if you are ineligible for continued coverage) until the earlier of (i)

the date 12 months after the Termination Date or (ii) the date you begin receiving substantially equivalent coverage and benefits through a subsequent employer.

4. *No Mitigation.* You shall not be required to mitigate the amount of the Severance Payment or any other benefit provided under this Agreement by seeking other employment or otherwise, nor shall the amount of any payment or benefit provided for in this Agreement be reduced (except as provided in Article II Section 3(ii)) by any compensation earned by you as the result of other employment, by retirement benefits, or be offset against any amount claimed to be owed by you to the Company or otherwise (except for any required withholding taxes); provided, that if the Company makes any other severance payments to you under any other program or agreement, such amounts shall be offset against the payments the Company is obligated to make pursuant to this Agreement.

III. *Miscellaneous* .

1. *Employee's Obligations* . Upon the termination of employment, you shall promptly deliver to the Company all property of the Company and all material documents, statistics, account records, programs and other similar tangible items which may by in your possession or under your control and which relate in a material way to the business or affairs of the Company or its subsidiaries, and no copies of any such documents or any part thereof shall be retained by you.

2. *Entire Agreement* . This Agreement and the " *Employee Non-Disclosure, Non-Competition & Inventions Agreement* " previously executed by you covers the entire understanding of the parties as to the subject matter hereof, superseding all prior understandings and agreements related hereto, including the previous Change of Control Agreement between you and the Company. No modification or amendment of the terms and conditions of this Agreement shall be effective unless in writing and signed by the parties or their respective duly authorized agents, provided, however, that the Company may, without your consent, unilaterally adopt amendments that may be required so that this Agreement continues to comply with applicable law or regulation, including without limitation Section 409A of the Code, provided such amendments do not adversely affect the benefits to be provided to you under Section II of this Agreement.

3. *Governing Law* . This Agreement shall be governed by the laws of The Commonwealth of Massachusetts, as applied to contracts entered into and performed entirely in Massachusetts by Massachusetts residents.

4. *Successors and Assigns* . This Agreement may be assigned by the Company upon a sale, transfer or reorganization of the Company. Upon a Change of Control, the Company shall require the successor to assume the Company's rights and obligations under this Agreement. The Company's failure to do so shall constitute a material breach of this Agreement. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their successors, permitted assigns, legal representatives and heirs.

Kindly indicate your acceptance of the foregoing by signing and dating this Agreement as noted below, and returning one fully executed original to my attention.

Very truly yours,

Vertex Pharmaceuticals Incorporated

By: /s/ Jeffrey M. Leiden

Jeffrey M. Leiden, M.D., Ph.D.

Chairman, President & Chief Executive Officer

ACCEPTED AND AGREED:

/s/ Michael J. Parini

Michael J. Parini

THIRD AMENDED AND RESTATED EMPLOYMENT AGREEMENT

This Third Amended and Restated Employment Agreement (this " Agreement ") amends and restates, effective as of this 26th day of February, 2013, that certain Second Amended and Restated Employment Agreement made and entered into as of the 15th day of November, 2012, (the " Original Agreement ") by and between Vertex Pharmaceuticals Incorporated, a Massachusetts corporation (together with its successors and assigns, the " Company "), and Amit Sachdev (the " Executive ").

W I T N E S S E T H

WHEREAS, the Company is employing the Executive as the Company's Senior Vice President, Global Government Strategy, Market Access and Value; and

WHEREAS, the Company and the Executive desire to amend the Original Agreement.

NOW, THEREFORE, in consideration of the premises and mutual covenants contained herein and for other good and valuable consideration, the receipt of which mutually is acknowledged, the Company and the Executive (each individually a " Party ", and together the " Parties ") agree as follows:

1. DEFINITIONS.

" Base Salary " shall mean the Executive's base salary in accordance with Section 4 below.

" Board " shall mean the Board of Directors of the Company.

" Cause " shall mean (i) the Executive is convicted of a crime of moral turpitude, (ii) the Executive willfully refuses or fails to follow a lawful directive or instruction of the Board or the individual to whom the Executive reports, provided that the Executive receives prior written notice of the directive(s) or instruction(s) that the Executive failed to follow and provided further that the Company, in good faith, gives the Executive thirty (30) days to correct any problems and further provided that the Executive shall not have corrected the problem(s) within such 30 day period, or (iii) the Executive, in carrying out the Executive's duties, commits (A) willful gross negligence or (B) willful gross misconduct resulting, in either case, in material harm to the Company unless such act, or failure to act, was believed by the Executive, in good faith, to be in the best interests of the Company, or (iv) the Executive violates the Company's policies made known to him regarding confidentiality, securities trading or inside information.

" Change of Control " shall have the meaning set forth in the Change of Control Agreement.

" Change of Control Agreement " shall mean the Third Amended and Restated Change of Control letter agreement between the Company and the Executive of even date herewith.

" Code " shall mean the Internal Revenue Code of 1986, as amended.

" Common Stock " shall mean the common stock of the Company.

" Disability " or " Disabled " shall mean a disability as determined under the Company's long-term disability plan or program in effect at the time the disability first occurs, or if no such plan or program exists at the time of disability, then a "disability" as defined under Section 22(e)(3) of the Code.

" Effective Date " shall mean February 26, 2013.

" Good Reason " shall mean that, without the Executive's consent, one or more of the following events occurs:

(i) the Executive is assigned to any duties or responsibilities that are inconsistent, in any significant respect, with the scope of duties and responsibilities customarily associated with the position and office of Senior Vice President, Global Government Strategy, Market Access and Value, or other position at the level of at least Senior Vice President and Member of the Executive Team, provided that such reassignment of duties or responsibilities is not due to the Executive's Disability or performance, nor is at the Executive's request; or

(ii) the Executive suffers a reduction in the authorities, duties, and responsibilities associated with the Executive's position as Senior Vice President, Global Government Strategy, Market Access and Value, provided that any modification to the Executive's authorities, duties and responsibilities that do not result in the Executive ceasing to be a member of the executive management team of the Company at a level at least equivalent to Senior Vice President shall not for purposes of this Agreement be a reduction in the authorities duties and responsibilities associated with Executive's position as Senior Vice President Global Government Strategy, Market Access and Value, and further provided that such reassignment of duties or responsibilities is not due to the Executive's Disability or the Executive's performance, and is not at the Executive's request or with the Executive's prior agreement; or

(iii) the Executive's Base Salary is decreased below Base Salary, other than a reduction that is part of an across-the-board proportionate reduction in the salaries of the senior management team; or

(iv) the Executive's office is relocated thirty-five (35) or more miles from Washington, D.C. (other than in connection with relocation of the Company's offices);

provided that Good Reason shall not exist unless and until within 30 days after the event giving rise to Good Reason under any of (i) through (iv) above has occurred, the Executive delivers a written termination notice to the Company stating that an event giving rise to Good Reason has occurred and identifying with reasonable detail the event that the Executive asserts constitutes Good Reason under any of (i) through (iv) above and the Company fails or refuses to cure or eliminate the event giving rise to Good Reason on or within 30 days after receiving such notice. To avoid doubt, the termination of the Executive's employment would become effective at the close of business on the thirtieth day after the Company receives the Executive's termination notice, unless the Company cures or eliminates the event giving rise to Good Reason prior to such time.

" Pro-Rata Share of Restricted Stock " shall mean, for any grant of restricted stock as to which the Company's repurchase right lapses ratably over a specified period (e.g. in equal annual increments over four years), that number of shares as to which the Company's repurchase right with respect to those shares would have lapsed if the Executive's employment by the Company had continued for an additional 18 months. For any other shares of restricted stock, "Pro-Rata Share of Restricted Stock" shall mean, as to any shares of restricted stock which were granted on the same date and as to which the Company's repurchase right lapses on the same date, that portion of such shares calculated by multiplying the number of shares by a fraction, the numerator of which is the number of days that have passed since the date of grant (until the employment termination date), plus the number of days in the 18 months after the employment termination date, and the denominator of which is the total number of days from the date of the grant until the date (without regard to any provisions for earlier vesting upon achievement of a specified goal) on which the Company's repurchase right would lapse under the terms of the grant.

" Severance Payment " shall mean an amount equal to the sum of the Base Salary in effect on the date of termination of Executive's employment, plus the amount of the Target Bonus for the Executive for the year in which the Executive's employment is terminated; provided, however, that if the Executive terminates the Executive's employment for Good Reason based on a reduction in Base Salary, then the Base Salary to be used in calculating the Severance Payment shall be the Base Salary in effect immediately prior to such reduction in Base Salary.

" Target Bonus " shall mean the target cash bonus for which the Executive is eligible on an annual basis, at a level consistent with the Executive's title and responsibilities, under the Company's bonus program then in effect and applicable to the Company's senior executives generally.

2. TERM OF EMPLOYMENT.

The Company hereby employs the Executive, and the Executive hereby accepts such employment, continuing until termination in accordance with the terms of this Agreement. The period during which the Executive is employed hereunder is referred to in this Agreement as the " term of employment. "

3. POSITION.

As of the Effective Date, the Executive is employed as the Company's Senior Vice President, Public Policy and Government Affairs.

4. BASE SALARY.

The Executive's annualized Base Salary as of the date of this Agreement is $424,360.00, payable in accordance with the regular payroll practices of the Company. The Base Salary shall be reviewed no less frequently than annually, and any changes thereto (which shall thereafter be deemed the Executive's Base Salary) shall be solely within the discretion of the Board.

5. TARGET BONUS PROGRAM.

During the term of employment, the Executive shall be eligible to participate in the Company's Target Bonus program (and other cash incentive compensation programs) applicable to the Company's senior executives, as any such programs are established and modified from time to time by the Board in its sole discretion, and in accordance with the terms of such program.

6. INCENTIVE COMPENSATION PROGRAMS.

During the term of employment, the Executive shall be eligible to participate in the Company's incentive compensation programs applicable to the Company's senior executives, as such programs may be established and modified from time to time by the Board in its sole discretion.

7. EMPLOYEE BENEFIT PROGRAMS.

During the term of employment, the Executive shall be entitled to participate in all employee welfare and pension benefit plans, programs and/or arrangements offered by the Company to its senior executives, as such plans, programs and arrangements may be amended from time to time, to the same extent and on the same terms applicable to other senior executives. Nothing in this section shall preclude the Company from amending or terminating any of its employee benefit plans, programs or arrangements.

8. VACATION.

During the term of employment, the Executive shall be entitled to at least 4 weeks of paid vacation days each calendar year in accordance with the Company's vacation policy then in effect.

9. TERMINATION OF EMPLOYMENT.

(a) **Termination in Connection with a Change of Control** . To the extent the Executive is entitled, in connection with the Executive's termination of employment, to severance or other benefits under the Change of Control Agreement, the Executive shall not be entitled to corresponding benefits under this Section 9.

(b) **Termination by the Company for Cause; or Termination by the Executive without Good Reason.** If the Company terminates the Executive's employment for Cause, or if the Executive voluntarily terminates the Executive's employment, other than for Good Reason, death or Disability, the term of employment shall end as of the date specified below, and the Executive shall be entitled to the following:

(i) Base Salary earned by Executive but not paid through the date of termination of Executive's employment under this Section 9(b); and

(ii) any amounts earned, accrued or owing to the Executive but not yet paid under Sections 5, 6, or 7 above.

Termination by Company for Cause shall be effective as of the date noticed by the Company. Voluntary termination by Executive other than for Good Reason, death or Disability shall be effective upon 90 days' prior written notice to the Company and shall not be deemed a breach of this Agreement.

(c) **Termination by the Company Without Cause; or Termination by the Executive for Good Reason.** If the Executive's employment is terminated by the Company without Cause (other than due to death or Disability), or is terminated by the Executive for Good Reason (in accordance with the notice and cure provisions set forth in the definition of "Good Reason" above), the Executive shall be entitled to the following (provided that, with respect to (iii) and (v) such amounts shall be subject to and in exchange for a general release of all claims against the Company, its subsidiaries, and their officers, directors, agents and representatives, which is executed by Executive and becomes enforceable and non-revocable within 60 days of the date of termination):

(i) Base Salary earned by Executive but not paid through the date of termination of Executive's employment under this Section 9(c);

(ii) all incentive compensation awards earned by Executive but not paid prior to the date of termination of Executive's employment under this Section 9(c);

(iii) a cash payment to the Executive in an amount equal to the Severance Payment, payable within ten days after the execution of a general release and expiration, without revocation,

of any applicable revocation periods under the general release, provided that if the 60-day period during which the release is required to become effective and irrevocable begins in one calendar year and ends in another calendar year, the Severance Payment shall not be made before the first day of the second calendar year;

(iv) any amounts earned, accrued or owing to the Executive but not yet paid under Sections 5, 6 or 7 above;

(v) if COBRA coverage is elected by the Executive, the Company shall pay the cost of insurance continuation premiums on the Executive's behalf (whether or not covered by COBRA) to continue standard medical, dental and life insurance coverage for the Executive (or the cash equivalent of same in the event the Executive is ineligible for continued coverage) until the earlier of:

(A) the date 12 months after the date the Executive's employment is terminated; or

(B) the date, or dates, on which the Executive receives equivalent coverage and benefits under the plans, programs and/or arrangements of a subsequent employer (such coverage and benefits to be determined on a coverage-by-coverage or benefit-by-benefit basis).

(vi) all stock options held by the Executive as of the date of the termination under this Section 9(c) that are not exercisable as of that date shall be deemed to have been held by the Executive for an additional 18 months, for purposes of vesting and exercise rights, and any options that become exercisable shall remain exercisable until the earlier of (1) the end of the 90-day period following the date of termination of employment or (2) the date the stock option would otherwise expire; and

(vii) the Company's lapsing repurchase right shall lapse with respect to the Pro-Rata Share of Restricted Stock.

If Executive is a "specified employee" under Section 409A(a)(2)(B)(i) of the Code, any payment of "nonqualified deferred compensation" (as defined under Section 409A of the Code and related guidance) attributable to a "separation from service" (as defined under Section 409A of the Code and related guidance) shall not commence until the first full business day that is more than 6 months after the applicable separation from service (" Deferred Payment Date "). Any payments that would otherwise have been made between the separation from service and the Deferred Payment Date, but for this paragraph, shall be made in a lump sum on the Deferred Payment Date. Payments that, in any case, are scheduled to be made after the Deferred Payment Date shall continue according to the applicable payment schedule. To the extent that the termination of the Executive's employment does not constitute a separation of service under Section 409A(a)(2)(A)(i) of the Code (as the result of further services that reasonably are anticipated to be provided by the Executive to the Company at the time the Executive's employment is terminated), the payment of any nonqualified deferred compensation will be further delayed until the date that is the first full business day that is more than 6 months after the date of a subsequent event constituting a separation of service under Section 409A(a)(2)(A)(i) of the Code.

10. ASSIGNABILITY; BINDING NATURE.

This Agreement shall be binding upon and inure to the benefit of the Parties and their respective successors, heirs (in the case of the Executive) and assigns. No rights or obligations of the Company under this Agreement may be assigned or transferred by the Company except that such rights or obligations may be assigned or transferred pursuant to a merger or consolidation in which the Company is

not the continuing entity, or the sale or liquidation of all or substantially all of the assets of the Company; provided , however , that the assignee or transferee is the successor to all or substantially all of the assets of the Company and such assignee or transferee assumes the liabilities, obligations and duties of the Company, as contained in this Agreement, either contractually or as a matter of law.

11. REPRESENTATIONS.

The Company represents and warrants that it is fully authorized and empowered to enter into this Agreement, and that the performance of its obligations under this Agreement will not violate any agreement between it and any other person, firm or organization. The Executive represents and warrants that no agreement exists between him and any other person, firm or organization that would be violated by the performance of the Executive's obligations under this Agreement.

12. INDEMNIFICATION; INSURANCE.

The Executive shall at all times be indemnified and eligible for advancement of expenses on the same basis as is provided for the Company's other executive officers and in accordance with the provisions of the Company's charter and by-laws then in effect. The Executive shall also be covered under all of the Company's policies of liability insurance maintained for the benefit of its directors and officers on the same basis as is provided for its other executive officers.

13. ENTIRE AGREEMENT; TERMINATION.

This Agreement, the agreements referenced herein, and the Employee Non-Disclosure, Non-Competition & Inventions Agreement between the Executive and the Company, contain the entire understanding and agreement between the Parties concerning the subject matter hereof and supersedes all prior agreements, understandings, discussions, negotiations and undertakings, whether written or oral, between the Parties with respect thereto. Subject to the terms of this Agreement, the Company shall be entitled to terminate the Executive's employment at any time, subject to the provisions of Section 9(b) of this Agreement, and the Executive may terminate the Executive's employment by the Company, at any time, in each case by written notice provided in accordance with Section 20 of this Agreement.

14. AMENDMENT OR WAIVER.

No provision in this Agreement may be amended unless such amendment is agreed to in writing and signed by the Executive and an authorized officer of the Company. No waiver by either Party of any breach by the other Party of any condition or provision contained in this Agreement to be performed by such other Party shall be deemed a waiver of a similar or dissimilar condition or provision at the same or any prior or subsequent time. Any waiver must be in writing and signed by the Executive or an authorized officer of the Company, as the case may be.

15. SEVERABILITY.

If any provision or portion of this Agreement shall be determined to be invalid or unenforceable for any reason, in whole or in part, the remaining provisions of this Agreement shall be unaffected thereby and shall remain in full force and effect to the fullest extent permitted by law.

16. SURVIVORSHIP.

The respective rights and obligations of the Parties hereunder shall survive any termination of the Executive's employment to the extent necessary to the intended preservation of such rights and obligations.

17. BENEFICIARIES/REFERENCES.

The Executive shall be entitled, to the extent permitted under any applicable law, to select and change a beneficiary or beneficiaries to receive any compensation or benefit payable hereunder following the Executive's death by giving the Company written notice thereof. In the event of the Executive's death or a judicial determination of the Executive's incompetence, reference in this Agreement to the Executive shall be deemed, where appropriate, to refer to the Executive's beneficiary, estate or other legal representative.

18. GOVERNING LAW/JURISDICTION.

This Agreement shall be governed by and construed and interpreted in accordance with the laws of The Commonwealth of Massachusetts without reference to principles of conflict of laws.

19. RESOLUTION OF DISPUTES.

Any disputes arising under or in connection with this Agreement may, at the election of the Executive or the Company, be resolved by binding arbitration, to be held in Massachusetts in accordance with the Rules and Procedures of the American Arbitration Association. If arbitration is elected, the Executive and the Company shall mutually select the arbitrator. If the Executive and the Company cannot agree on the selection of an arbitrator, each Party shall select an arbitrator and the two arbitrators shall select a third arbitrator, and the three arbitrators shall form an arbitration panel that shall resolve the dispute by majority vote. Judgment upon the award rendered by the arbitrator or arbitrators may be entered in any court having jurisdiction thereof. Costs of the arbitrator or arbitrators and other similar costs in connection with an arbitration shall be shared equally by the Parties; all other costs, such as attorneys' fees incurred by each Party, shall be borne by the Party incurring such costs.

20. NOTICES.

All notices that are required or permitted hereunder shall be in writing and sufficient if delivered personally, sent by facsimile (and promptly confirmed by personal delivery, registered or certified mail or overnight courier), sent by nationally-recognized overnight courier or sent by registered or certified mail, postage prepaid, addressed as follows:

If to the Company: Vertex Pharmaceuticals Incorporated
130 Waverly Street
Cambridge, MA 02139-4242
Attn: Chief Executive Officer
with copies to:
the General Counsel

If to the Executive: at the Executive's home address listed in the Company records.

Any such notice shall be deemed to have been given: (a) when delivered if personally delivered or sent by facsimile on a business day; (b) on the business day after dispatch if sent by nationally-recognized overnight courier; and/or (c) on the fifth business day following the date of mailing if sent by mail.

21. HEADINGS.

The headings of the sections contained in this Agreement are for convenience only and shall not be deemed to control or affect the meaning or construction of any provision of this Agreement.

22. COUNTERPARTS.

This Agreement may be executed in two or more counterparts.

23. SECTION 409A COMPLIANCE.

It is the intention of the Company and the Executive that this Agreement and the payments provided for herein meet the requirements of Section 409A of the Code, to the extent applicable to this Agreement and such payments. The Company and the Executive agree to cooperate in good faith in preparing and executing, at such time as sufficient guidance is available under Section 409A and from time to time thereafter, such amendments to this Agreement, if any, as the Executive may reasonably request solely for the purpose of assuring that this Agreement and the payments provided hereunder meet the requirements of Section 409A. Nothing in this Section 23 shall require the Company to increase the Executive's compensation or make the Executive whole for any requested changes.

24. TAX WITHHOLDING; NO GUARANTEE OF ANY TAX CONSEQUENCES.

All payments hereunder shall be subject to all applicable withholding for any federal, state or local income taxes including any excise taxes under the Code. Notwithstanding any other provision of this Agreement to the contrary or other representation, the Company does not in any way guarantee the tax consequences of any payment or compensation under this Agreement including, without limitation, under Section 409A of the Code.

IN WITNESS WHEREOF, the undersigned have executed this Agreement as of the date first written above.

Vertex Pharmaceuticals Incorporated

/s/ Jeffrey M. Leiden_____
Jeffrey M. Leiden, President, Chairman,
and Chief Executive Officer

Executive

/s/ Amit Sachdev_____
Amit Sachdev

Exhibit 10.43

February 26, 2013

Amit Sachdev
5218 Loughboro Road NW
Washington, DC 20016

RE: Third Amended and Restated Change of Control Agreement

Dear Amit:

You are a key member of the senior management team of Vertex Pharmaceuticals Incorporated (the " Company "). As a result, the Company would like to provide you with the following "change of control" benefits to help ensure that if the Company becomes involved in a "change of control" transaction, there will be no distraction from your attention to the needs of the Company. This Third Amended and Restated Change of Control Agreement (this " Agreement ") amends and restates, effective as of the date written above, that certain Amended and Restated Change of Control Agreement made and entered into as of November 15, 2012 by and between you and the Company.

I. *Definitions* . For the purposes of this Agreement, capitalized terms shall have the following meaning:

1. " Cause " shall mean:

   (a) your conviction of a crime of moral turpitude;

   (b) your willful refusal or failure to follow a lawful directive or instruction of the Company's Board of Directors or the individual(s) to whom you report, provided that you receive prior written notice of the directive(s) or instruction(s) that you failed to follow, and provided further that the Company, in good faith, gives you 30 days to correct such failure and further provided if you correct the failure(s), any termination of your employment on account of such failure shall not be treated for purposes of this Agreement as a termination of employment for "Cause;"

   (c) in carrying out your duties you commit (i) willful gross negligence, or (ii) willful gross misconduct, resulting in either case in material harm to the Company, unless such act, or failure to act, was believed by you, in good faith, to be in the best interests of the Company; or

   (d) your violation of the Company's policies made known to you regarding confidentiality, securities trading or inside information.

2. " Change of Control " shall mean that:

   (a) any "person" or "group" as such terms are used in Sections 13(d) and 14(d)(2) of the Securities Exchange Act of 1934 (the " Act "), becomes a beneficial owner, as such term is used in Rule 13d-3 promulgated under the Act, of securities of the Company representing more than 50% of the combined voting power of the outstanding securities of the Company having the right to vote in the election of directors; or

(b) all or substantially all the business or assets of the Company are sold or disposed of, or the Company or a subsidiary of the Company combines with another company pursuant to a merger, consolidation, or other similar transaction, other than (i) a transaction solely for the purpose of reincorporating the Company or one of its subsidiaries in a different jurisdiction or recapitalizing or reclassifying the Company's stock; or (ii) a merger or consolidation in which the shareholders of the Company immediately prior to such merger or consolidation continue to own at least a majority of the outstanding voting securities of the Company or the surviving entity immediately after the merger or consolidation.

3. " Code " shall mean the Internal Revenue Code of 1986, as amended.

4. " Disability " shall mean a disability as determined under the Company's long-term disability plan or program in effect at the time the disability first occurs, or if no such plan or program exists at the time of disability, then a "disability" as defined Section 22(e)(3) of the Code.

5. " Good Reason " shall mean one of the following events has occurred without your consent:

(a) you are assigned to any duties or responsibilities that are inconsistent, in any significant respect, with the scope of duties and responsibilities customarily associated with the position and office of Senior Vice President, Global Government Strategy, Market Access and Value, provided that such reassignment of duties or responsibilities is not due to your Disability or performance, nor is at your request;

(b) you suffer a reduction in the authorities, duties, and responsibilities customarily associated with your position as Senior Vice President, Global Government Strategy, Market Access and Value, provided that such reassignment of authorities, duties and responsibilities is not due to your Disability or your performance, and is not at your request or with your prior agreement;

(c) your annual base salary is decreased;

(d) the office to which you are assigned (currently Washington, D.C.) is relocated to a place 35 or more miles away; or

(e) following a Change of Control, the Company's successor fails to assume the Company's rights and obligations under both this Agreement and the Employment Agreement, as it may be amended from time to time;

provided that Good Reason shall not exist unless and until within 30 days after the event giving rise to Good Reason under any of (a) through (e) above has occurred, you deliver a written termination notice to the Company stating that an event giving rise to Good Reason has occurred and identifying with reasonable detail the event that you assert constitutes Good Reason under any of (a) through (e) above and the Company fails or refuses to cure or eliminate the event giving rise to Good Reason on or within 30 days after receiving your notice. To avoid doubt, the termination of your employment would become effective at the close of business on the thirtieth day after the Company receives your termination notice, unless the Company cures or eliminates the event giving rise to Good Reason prior to such time.

6. " Termination Date " shall mean the last day of your employment with the Company.

II. *Severance Benefits upon Change of Control* . If:

(A) your employment is terminated by the Company (except for termination for Cause or due to a Disability) and the Termination Date is within 90 days prior to a Change of Control or within 12 months after a Change of Control; or

(B) you, of your own initiative, (i) terminate your employment for Good Reason (in accordance with the notice and cure provisions set forth in Section I.5 above) and (ii) the event giving rise to Good Reason occurs within 90 days prior to a Change of Control or within 12 months after a Change of Control;

then, you shall receive the following benefits:

1. *Severance Payment* . In exchange for your execution within 60 days of the Termination Date of a general release, in a form satisfactory to the Company, of all claims against the Company, its subsidiaries, and its and their officers, directors and representatives, that becomes enforceable and irrevocable within such 60-day period, the Company shall make a cash payment (the " Severance Payment ") to you in an amount equal to

(a) your annual base salary (provided, however, that if you terminate your employment for Good Reason based on a reduction in your annual base salary, then the annual base salary to be used in calculating the Severance Payment shall be your annual base salary in effect immediately prior to such reduction in annual base salary) plus your target bonus under any bonus program applicable to you for the year in which the Termination Date occurs; plus

(b) a pro rata portion of your target bonus for the year in which the Termination Date occurs under any bonus program applicable to you; plus

(c) all cash incentive compensation awards earned by you but not paid prior to the Termination Date; provided that, if a fiscal year has been completed and the incentive award for such fiscal year has not been determined, the incentive compensation for such completed fiscal year shall equal the target bonus for such fiscal year.

Except with respect to any portion of the Severance Payment that is delayed as set forth in this paragraph, the Severance Payment shall be made in cash within ten days after the execution by you of the general release referred to above and expiration without revocation of any applicable revocation periods under such general release (or, if the Change of Control resulting in your becoming entitled to such benefits occurs after such execution and expiration, within ten days after the Change of Control), provided that, if the 60-day period during which the general release is required to become effective and irrevocable begins in one calendar year and ends in another calendar year, the Severance Payment shall not be made before the first day of the second calendar year. The Severance Payment shall

be divided into two portions, consisting of a portion that does not constitute "nonqualified deferred compensation" within the meaning of Section 409A of the Code and a portion, if any, that does constitute nonqualified deferred compensation. If you are a "specified employee" as defined in Section 409A(a)(2)(B)(i) of the Code, the commencement of the delivery of any such payments that constitute nonqualified deferred compensation payable upon a "separation from service" under Section 409A(a)(2)(A)(i) of the Code will be delayed until the first business day that is more than six months after your Termination Date. The determination of whether, and the extent to which, any of the payments to be made to you hereunder are nonqualified deferred compensation shall be made after the application of all applicable exclusions, including those set forth under Treasury Reg. § 1.409A-1(b)(9). Any payments that are intended to qualify for the exclusion for separation pay due to involuntary separation from service set forth in Reg. §1.409A-1(b)(9)(iii) must be paid no later than the last day of the second taxable year following the taxable year in which the Termination Date occurs. To the extent that the termination of your employment does not constitute a separation of service under Section 409A(a)(2)(A)(i) of the Code (as the result of further services that are reasonably anticipated to be provided by you to the Company at the time your employment is terminated), the payment of any non-qualified deferred compensation will be further delayed until the first business day that is more than six months after the date of a subsequent event constituting a separation of service under Section 409A(a)(2)(A)(i) of the Code.

2. *Accelerated Vesting.*

(a) On the Termination Date, stock options for the purchase of the Company's securities held by you as of the Termination Date and not then exercisable shall immediately become exercisable in full. The options to which this accelerated vesting applies shall remain exercisable until the earlier of (a) the end of the 90-day period immediately following the later of (i) the Termination Date or (ii) the date of the Change of Control or (b) the date the stock option(s) would otherwise expire; and

(b) On the Termination Date, the Company's lapsing repurchase right with respect to shares of restricted stock held by you shall lapse in full (subject to your making satisfactory arrangements with the Company providing for the payment to the Company of all required withholding taxes).

Notwithstanding anything to the contrary in this Agreement, the terms of any option agreement or restricted stock agreement shall govern the acceleration, if any, of vesting or lapsing of the Company's repurchase rights, as applicable, except to the extent that the terms of this Agreement are more favorable to you.

3. *Continued Insurance Coverage.* If COBRA coverage is elected by you, the Company shall pay the cost of insurance continuation premiums on your behalf (whether or not covered by COBRA) to continue standard medical, dental and life insurance coverage for you (or the cash equivalent of same if you are ineligible for continued coverage) for a maximum of 12 months after the Termination Date.

4. *No Mitigation.* You shall not be required to mitigate the amount of the Severance Payment or any other benefit provided under this Agreement by seeking other employment or otherwise, nor shall the amount of any payment or benefit provided for in this Agreement be reduced by any compensation earned by you as the result of other employment, by retirement benefits, or be offset against any amount claimed to be owed by you to the Company or otherwise (except for any required withholding taxes); provided, that if the Company makes any other severance payments to you under any other program or agreement, including any payments under the Employment Agreement, such amounts shall be offset against the payments the Company is obligated to make pursuant to this Agreement.

III. *Miscellaneous* .

1. *Employee's Obligations* . Upon the termination of employment, you shall promptly deliver to the Company all property of the Company and all material documents, statistics, account records, programs and other similar tangible items which may by in your possession or under your control and which relate in a material way to the business or affairs of the Company or its subsidiaries, and no copies of any such documents or any part thereof shall be retained by you.

2. *Entire Agreement* . This Agreement, the Employment Agreement, and the " *Employee Non-Disclosure, Non-Competition & Inventions Agreement* " previously executed by you covers the entire understanding of the parties as to the subject matter hereof, superseding all prior understandings and agreements related hereto. No modification or amendment of the terms and conditions of this Agreement shall be effective unless in writing and signed by the parties or their respective duly authorized agents.

3. *Governing Law* . This Agreement shall be governed by the laws of The Commonwealth of Massachusetts, as applied to contracts entered into and performed entirely in Massachusetts by Massachusetts residents.

4. *Successors and Assigns* . This Agreement may be assigned by the Company upon a sale, transfer or reorganization of the Company. Upon a Change of Control, the Company shall require the successor to assume the Company's rights and obligations under this Agreement. The Company's failure to do so shall constitute a material breach of this Agreement. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their successors, permitted assigns, legal representatives and heirs.

Kindly indicate your acceptance of the forgoing by signing and dating this Agreement as noted below, and returning one fully executed original to my attention.

Very truly yours,

Vertex Pharmaceuticals Incorporated

By: /s/ Matthew W. Emmens

Name: Matthew W. Emmens

Title: President, Chairman and Chief Executive Officer

ACCEPTED AND AGREED:

/s/ Amit Sachdev

Amit Sachdev

Exhibit 21.1

Subsidiaries of Vertex Pharmaceuticals Incorporated

Vertex Pharmaceuticals (San Diego) LLC, a Delaware limited liability company

Vertex Securities Corporation, a Massachusetts corporation

Vertex Pharmaceuticals (Distribution) Incorporated, a Delaware corporation

Vertex Pharmaceuticals (Cayman) Limited, a Cayman Islands company (3)

Vertex Pharmaceuticals (Cayman 509) Limited, a Cayman Islands company

Vertex Pharmaceuticals (Cayman 765) Limited, a Cayman Islands company

Vertex Pharmaceuticals (Cayman 787) Limited, a Cayman Islands company

Vertex Pharmaceuticals (Delaware) LLC, a Delaware limited liability company

Vertex Pharmaceuticals (Puerto Rico) LLC, a Delaware limited liability company

Vertex Pharmaceuticals (Canada) Incorporated, a Canadian company (1)

Vertex Pharmaceuticals (Singapore) Pte. Ltd., a Singapore company

Vertex Pharmaceuticals Technology (Shanghai) Co., Ltd. (2)

Vertex Holdings, Inc., a Delaware corporation

Vertex Pharmaceuticals (Europe) Limited, a United Kingdom company (5)

Vertex Pharmaceuticals (Switzerland) Sàrl, a Swiss company

Vertex Pharmaceuticals (Ireland) Limited, an Irish company (6)

Vertex Pharmaceuticals (U.K.) Limited, a United Kingdom company (6)

Vertex Pharmaceuticals (France) SAS, a French company

Vertex Pharmaceuticals (Germany) GmbH, a German company

Vertex Pharmaceuticals (Australia) Pty. Ltd., an Australian company

Vertex Pharmaceuticals (Spain), S.L., a Spanish company

Vertex Pharmaceuticals (Netherlands) B.V., a Dutch company

Vertex Pharmaceuticals (Italy) S.r.L., an Italian company

Vertex Farmaceutica do Brasil LTDA, a Brazilian company (4)(7)

Vertex Pharmaceuticals GmbH, an Austrian company (6)

Vertex Pharmaceuticals (Portugal), Unipessoal Lda., a Portuguese company (6)

Vertex Pharmaceuticals (CH) GmbH, a Swiss company (6)

Vertex Pharmaceuticals (Sweden) AB, a Sweden company (6)

Vertex Pharmaceuticals Single Member Societe Anonyme, a Greek company (6)

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(1) a subsidiary of Vertex Pharmaceuticals (Delaware) LLC
(2) a subsidiary of Vertex Pharmaceuticals (Singapore) Pte. Ltd.
(3) a subsidiary of Vertex Holdings, Inc.
(4) a subsidiary of Vertex Pharmaceuticals (UK) Limited
(5) a subsidiary of Vertex Pharmaceuticals (Cayman) Limited
(6) a subsidiary of Vertex Pharmaceuticals (Europe) Limited
(7) a subsidiary of Vertex Pharmaceuticals (Switzerland) Sàrl

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statement (Form S-3 No. 333-211096) of Vertex Pharmaceuticals Incorporated,
(2) Registration Statement (Form S-8 No. 333-104362) pertaining to the Vertex Pharmaceuticals Incorporated 1996 Stock and Option Plan, as amended,
(3) Registration Statement (Form S-8 Nos. 333-134482, 333-150946, 333-160442, 333-166803 and 333-184787) pertaining to the Vertex Pharmaceuticals Incorporated Amended and Restated 2006 Stock and Option Plan (formerly known as the Vertex Pharmaceuticals Incorporated 2006 Stock and Option Plan),
(4) Registration Statement (Form S-8 No. 333-184784) pertaining to the Vertex Pharmaceuticals Incorporated Employee Stock Purchase Plan, and
(5) Registration Statement (Form S-8 Nos. 333-188737, 333-197466 and 333-206075) pertaining to the Amended and Restated Vertex Pharmaceuticals Incorporated 2013 Stock and Option Plan (formerly known as the Vertex Pharmaceuticals Incorporated 2013 Stock and Option Plan);

of our reports dated February 23, 2017 , with respect to the consolidated financial statements of Vertex Pharmaceuticals Incorporated and the effectiveness of internal control over financial reporting of Vertex Pharmaceuticals Incorporated, included in this Annual Report (Form 10-K) of Vertex Pharmaceuticals Incorporated for the year ended December 31, 2016.

/s/ Ernst & Young LLP

Boston, Massachusetts
February 23, 2017

Exhibit 31.1

CERTIFICATION

I, Jeffrey M. Leiden, certify that:

1. I have reviewed this Annual Report on Form 10-K of Vertex Pharmaceuticals Incorporated;

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

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

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

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

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

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

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

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

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

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

Date: February 23, 2017

/s/ Jeffrey M. Leiden

Jeffrey M. Leiden

Chief Executive Officer and President

Exhibit 31.2

CERTIFICATION

I, Ian F. Smith, certify that:

1. I have reviewed this Annual Report on Form 10-K of Vertex Pharmaceuticals Incorporated;

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

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

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

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

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

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

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

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

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

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

Date: February 23, 2017

/s/ Ian F. Smith

Ian F. Smith

Executive Vice President, Chief Operating Officer and Chief Financial Officer

Exhibit 32.1

SECTION 906 CEO/CFO CERTIFICATION

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (Subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code) each of the undersigned officers of Vertex Pharmaceuticals Incorporated, a Massachusetts corporation (the "Company"), does hereby certify, to such officer's knowledge, that:

The Annual Report on Form 10-K for the year ended December 31, 2016 (the "Form 10-K") of the Company fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and the information contained in the Form 10-K fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 23, 2017

/s/ Jeffrey M. Leiden

Jeffrey M. Leiden

Chief Executive Officer and President

Date: February 23, 2017

/s/ Ian F. Smith

Ian F. Smith

Executive Vice President, Chief Operating Officer and Chief Financial Officer

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.