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, 2020

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	**Trading Symbol**	**Name of Each Exchange on Which Registered**
Common Stock, $0.01 Par Value Per Share	VRTX	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 every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

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

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

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

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

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant based on the closing price on June 30, 2020 (the last business day of the registrant's most recently completed second fiscal quarter of 2020) was $74.8 billion.

As of January 31, 2021, the registrant had 259,960,062 shares of common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive proxy statement for the 2021 Annual Meeting of Shareholders, which we expect to hold on May 19, 2021, 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.

"Vertex," "KALYDECO®," "ORKAMBI®," "SYMDEKO®," "SYMKEVI®" and "TRIKAFTA®" are registered trademarks of Vertex. The trademark for "KAFTRIO" is pending in the United States and registered in the European Union. Other brands, names and trademarks contained in this Annual Report on Form 10-K are the property of their respective owners.

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 cystic fibrosis development programs, we refer to our compounds by their scientific (or generic) name or VX developmental designation.

This Annual Report on Form 10-K contains forward-looking statements. Words such as "anticipates," "may," "forecasts," "expects," "intends," "plans," "potentially," "believes," "seeks," "estimates," variations of such words and similar expressions are intended to identify such forward-looking statements, although not all forward-looking statements contain these identifying words. Please refer to "Special Note Regarding Forward-Looking Statements" set forth in Part I, Item 1A, for a discussion of our forward-looking statements and the related risks and uncertainties of such statements.

PART I

ITEM 1. BUSINESS

OVERVIEW

We are a global biotechnology company that invests in scientific innovation to create transformative medicines for people with serious diseases with a focus on specialty markets.

Cystic Fibrosis

Our goal is to develop treatment regimens that will provide benefits to all people with cystic fibrosis, or CF, and will enhance the benefits currently provided to people taking our medicines. Our marketed medicines are TRIKAFTA/KAFTRIO (elexacaftor/tezacaftor/ivacaftor and ivacaftor), SYMDEKO/SYMKEVI (tezacaftor/ivacaftor and ivacaftor), ORKAMBI (lumacaftor/ivacaftor) and KALYDECO (ivacaftor). Our triple combination regimen, TRIKAFTA/KAFTRIO, was approved in 2019 in the United States, or U.S., and in 2020 in the European Union, or E.U. Collectively, our four medicines are approved to treat the majority of the approximately 83,000 people with CF in North America, Europe and Australia. We are evaluating our medicines, including our triple combination regimen, in additional patient populations, including younger children, with the goal of having small molecule treatments for up to 90% of people with CF. We are pursuing genetic therapies to address the remaining 10% of people with CF.

Research and Development

Our goal is to identify and develop innovative medicines by combining transformative advances in the understanding of human disease and in the science of therapeutics to advance human health. Our research and early development strategy includes advancing multiple compounds from each program into early clinical trials and evaluating the resulting data to inform drug discovery and development, with the goal of bringing best-in-class therapies to patients. This strategy and approach is intended to increase the likelihood of successfully bringing transformative medicines to patients.

Small Molecule Programs

Alpha-1 Antitrypsin Deficiency. We are focused on identifying and developing multiple drug candidates with the potential to increase the levels of functional alpha-1 antitrypsin, or AAT, in the blood, to address the lung and liver manifestations of AAT deficiency. Enrollment is ongoing in a Phase 2 proof-of-concept trial for VX-864, an investigational small molecule corrector for the treatment of AAT deficiency. We expect data from this clinical trial in the first half of 2021.

APOL1-Mediated Kidney Diseases. We are evaluating inhibitors of APOL1 function to reduce levels of protein in the urine, or proteinuria, in people with serious kidney diseases, including focal segmental glomerulosclerosis, or FSGS, and other APOL1-mediated kidney diseases. In 2020, we initiated a Phase 2 proof-of-concept clinical trial designed to evaluate the reduction in proteinuria in people with APOL1-mediated FSGS after treatment with VX-147. Enrollment in this clinical trial is ongoing and we expect data in 2021.

Pain. We believe that NaV1.8 inhibitors have the potential to provide an effective non-opioid treatment for pain. We are advancing a portfolio of NaV1.8 inhibitors through pre-clinical and early clinical development.

Cell and Genetic Therapies

Sickle cell disease and transfusion-dependent beta thalassemia. We are co-developing CTX001, an investigational CRISPR/Cas9-based gene-editing therapy for sickle cell disease, or SCD, and transfusion-dependent beta thalassemia, or TDT, with CRISPR Therapeutics AG, or CRISPR. Enrollment and dosing are ongoing in two Phase 1/2 clinical trials to evaluate CTX001 as a potential one-time curative therapy for people with severe SCD and TDT. In December 2020, we announced positive interim data from 10 people treated with CTX001 and that a total of thirteen people with TDT and seven people with severe SCD have been dosed with CTX001. We expect to complete enrollment in both clinical trials in 2021.

Type 1 Diabetes. In 2019, we acquired Semma Therapeutics, Inc., or Semma, and established preclinical cell therapy programs for type 1 diabetes, or T1D. We are pursuing two programs for the transplant of functional islets into patients: transplantation of islet cells alone, using immunosuppression to protect the implanted cells, and implantation of the islet cells inside a novel immunoprotective device. The FDA has cleared our Investigational New Drug Application, or IND, for

VX-880, the first program (transplantation of islet cells alone), and we expect to initiate a Phase 1/2 clinical trial evaluating VX-880 in the first half of 2021.

Duchenne muscular dystrophy, or DMD, and myotonic dystrophy type 1, or DM1. In 2019, we acquired Exonics Therapeutics, Inc., or Exonics, and expanded our collaboration with CRISPR enabling the establishment of preclinical genetic therapy programs for DMD and DM1.

We plan to continue investing in our research and development programs and fostering scientific innovation by continuing to identify additional drug candidates through our internal research efforts and investing in business development transactions to access emerging technologies, drugs and drug candidates.

CYSTIC FIBROSIS

Background

CF is a life-shortening genetic disease 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 allele is inherited from each parent. The vast majority of patients with CF carry at least one of the two 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 the cells in sufficient quantities and does not adequately transport chloride ions. The *G551D* mutation results in a defect in the CFTR protein in which the defective protein reaches the surface of a cell but does not adequately 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. CFTR potentiators such as ivacaftor and VX-561 increase the probability that the CFTR protein channels open on the cell surface, increasing the flow of salt and water into and out of the cell. Our CFTR correctors, such as lumacaftor, tezacaftor, and elexacaftor, help CFTR proteins reach the cell surface.

Our Medicines

Our medicines, TRIKAFTA/KAFTRIO, SYMDEKO/SYMKEVI, ORKAMBI and KALYDECO, are collectively approved to treat the majority of people with CF in North America, Europe and Australia. Our approved medicines, including information regarding the indication and age groups for which the medicine is approved, are set forth in the table below.

Product	Scientific Name	Region/Initial Approval	Indication	Eligible Age Group
trikafta®	elexacaftor/tezacaftor/ivacaftor and ivacaftor	U.S. (2019)	People with CF with (i) at least one *F508del* mutation, or (ii) another mutation that is responsive to elexacaftor/tezacaftor/ivacaftor and ivacaftor	12 years of age and older
kaftrio®	elexacaftor/tezacaftor/ivacaftor and ivacaftor	E.U. (2020)	People with CF with (i) at least one *F508del* mutation and one minimal function mutation, or (ii) two *F508del* mutations	12 years of age and older
symdeko®	tezacaftor/ivacaftor and ivacaftor	U.S. (2018)	People with CF (i) homozygous for the *F508del* mutation or (ii) with at least one mutation that is responsive to tezacaftor/ivacaftor	6 years of age and older
symkevi®	tezacaftor/ivacaftor	E.U. (2018)	People with CF (i) homozygous for the *F508del* mutation or (ii) with one copy of the *F508del* mutation and one copy of certain mutations that result in residual CFTR activity	6 years of age and older
ORKAMBI®	lumacaftor/ivacaftor	U.S. (2015)	People with CF homozygous for the *F508del* mutation	2 years of age and older
	lumacaftor/ivacaftor	E.U. (2015)	People with CF homozygous for the *F508del* mutation	2 years of age and older
kalydeco®	ivacaftor	U.S. (2012)	People with CF with *G551D* and other specified mutations	4 months of age and older
	ivacaftor	E.U. (2012)	People with CF with *G551D* and other specified mutations	4 months of age and older

In addition to the E.U. and the U.S., we market our products in additional countries, including the United Kingdom, Australia, Switzerland, Israel, and Canada. Currently, our medicines treat almost half of the people with CF in these geographies. We continuously seek to increase the number of patients eligible and able to receive our current medicines through label expansions, approval of new medicines and expanded reimbursement. Since the beginning of 2020, activities in support of these efforts include:

TRIKAFTA/KAFTRIO

- In August, the European Commission granted marketing authorization for KAFTRIO to treat people with CF 12 years of age and older with one *F508del* mutation and one minimal function mutation, or two *F508del* mutations.
- The FDA expanded the eligibility for TRIKAFTA to include people with CF 12 years of age and older with certain mutations that are responsive to TRIKAFTA based on *in vitro* data.
- In January 2021, the FDA accepted our supplemental New Drug Application, or sNDA, for TRIKAFTA for the treatment of children 6 to 11 years of age with at least one *F508del* mutation or have certain mutations that are responsive to TRIKAFTA based on *in vitro* data. The FDA granted Priority Review of the sNDA.

- Swissmedic, the Swiss Agency for Therapeutic Products, granted marketing authorization and a reimbursement agreement was reached for TRIKAFTA in Switzerland for the treatment of people with CF 12 years of age and older who have two copies of the *F508del* mutation, or one *F508del* mutation and one minimal function mutation.
- Health Canada accepted for Priority Review a New Drug Submission for TRIKAFTA for the treatment of people with CF 12 years of age and older.

SYMDEKO/SYMKEVI

- The European Commission approved SYMKEVI for the treatment of people with CF 6 years of age and older with two copies of the *F508del* mutation, or one *F508del* mutation and certain residual function mutations.
- The FDA approved SYMDEKO for additional responsive mutations in people with CF 6 years of age and older.

ORKAMBI

- We entered into a reimbursement agreement with the Swiss government for ORKAMBI for the treatment of people with CF 2 years of age and older, and for SYMDEKO for the treatment of people 12 years of age and older in Switzerland.

KALYDECO

- The FDA approved KALYDECO for treatment of infants with CF four months of age and older who have at least one mutation in their CFTR gene that is responsive to KALYDECO.
- The European Commission approved KALYDECO for treatment of infants with CF four months of age and older who have the *R117H* mutation or certain gating mutations.
- The FDA approved KALYDECO for treatment of infants with CF four months of age and older with additional responsive mutations.

CF PIPELINE

- VX-561, a CFTR potentiator we acquired from Concert Pharmaceuticals, Inc., and VX-121, a CFTR corrector, are being evaluated in Phase 2 clinical development.
- We continue to identify and develop additional CFTR modulators with the goal of achieving carrier levels of CFTR activity for the 90% of people with CF who respond to CFTR modulators.
- We continue to research genetic therapies, such as messenger ribonucleic acid, or mRNA, and gene-editing approaches, to treat the remaining 10% of people who do not make CFTR protein and, as a result, are not eligible for CFTR modulators.
- We extended our collaboration with Moderna, Inc., or Moderna, aimed at the discovery and development of mRNA therapeutics for the treatment of CF. In addition, we entered into a new collaboration with Moderna for the discovery and development of lipid nanoparticles and mRNAs that can deliver gene-editing therapies to lung cells for the treatment of CF.

RESEARCH AND DEVELOPMENT PROGRAMS

We invest in research and development in order to discover and develop transformative medicines for people with serious diseases with a focus on specialty markets. Our strategy is to combine transformative advances in the understanding of human disease and the science of therapeutics in order to discover and develop new medicines. Our approach to drug discovery has been validated through our success in moving novel small molecule drug candidates into clinical trials and obtaining marketing approvals for TRIKAFTA/KAFTRIO, KALYDECO, ORKAMBI and SYMDEKO/SYMKEVI for the treatment of CF and INCIVEK (telaprevir) for the treatment of hepatitis C infection. In addition, we have achieved clinical proof of concept for Nav1.8 inhibition in the treatment of three different pain models, and for gene-editing of BCL11A for the treatment of beta thalassemia and SCD.

We continue to research and develop small molecule drug candidates for the treatment of serious diseases, including CF, AAT deficiency, APOL1-mediated kidney diseases, and pain. Our research and development approach includes advancing multiple small molecules into clinical trials, pursuing multiple modalities and evaluating clinical and non-clinical data to inform drug discovery and development, with the goal of bringing best-in-class therapies to patients.

Over the last several years, we have expanded our capabilities to include additional innovative therapeutic approaches with a focus on cell and genetic therapies, which have the potential to treat, and in some cases, cure diseases by addressing the underlying cause of the disease. We have expanded our capabilities by increasing our internal investment in cell and genetic therapies, including plans to establish a new research and development site in Boston that will focus primarily on cell and genetic therapies. In addition, we have made several significant investments in external innovation, including:

- our collaboration with CRISPR to access and develop therapeutics based on the CRISPR gene-editing technology;
- our establishment of cell therapy programs for T1D through our acquisition of Semma;
- our establishment of genetic therapy programs for DMD and DM1, through our acquisition of Exonics;
- our collaboration with Moderna for the discovery and development of lipid nanoparticles and mRNAs that can deliver gene-editing therapies; and
- our collaboration with Affinia Therapeutics, Inc., or Affinia, to engineer novel adeno-associated virus (AAV) capsids to deliver gene therapies.

The experience we gained developing medicines for CF and our analysis of research and development programs conducted by other companies in our industry have shaped a disciplined strategy that guides our investments in research and development and external innovation that focuses on:

- transformative treatments for life-threatening diseases with a high unmet medical need;
- targets validated as playing a causal role in the human biology of a disease;
- innovative therapeutic approaches to addressing those targets;
- biological assays and clinical biomarkers that we believe will be predictive of clinical responses; and
- efficient clinical and regulatory paths to bring new medicines to patients.

To augment our internal programs, we plan to continue acquiring businesses and technologies and collaborating with biopharmaceutical and technology companies, leading academic research institutions, government laboratories, foundations and other organizations 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. We will continue to identify and evaluate potential acquisitions and collaborations that may be similar to or different from the transactions that we have engaged in previously.

Small Molecule Programs

Alpha-1 Antitrypsin Deficiency

AAT deficiency is caused by mutations in the SERPINA1 gene that encodes the AAT protein. People who inherit two mutant SERPINA1 alleles (one from each parent) develop AAT deficiency. Most people who develop AAT deficiency have two copies of the mutant Z allele. The mutations result in a defect in the AAT protein in which the protein does not fold correctly. This folding defect causes the AAT protein to accumulate in the liver (where it is produced at high levels), which can cause liver damage. As a result, the protein fails to reach other organs in adequate quantity and function, particularly in the lungs, where its normal role is to protect them from the digestive effects of certain proteases. The unchecked activity of these proteases can cause auto-digestion of lung tissue and may lead to emphysema or chronic pulmonary obstructive disease, and lung infections over time. Currently, there is no cure or treatment that targets the underlying cause of the disease in both the liver and the lung. Available treatments are aimed at transiently increasing levels of AAT in the blood but have no effect

in the liver. Patients living with AAT deficiency typically experience recurring hospital visits and a shortened life expectancy.

We seek to develop medicines that treat the underlying cause of AAT deficiency. In the laboratory, we have discovered multiple small molecule correctors that restore folding of the mutant AAT protein, with the potential to affect both the liver and lung diseases caused by AAT deficiency, and we are focused on identifying and developing multiple drug candidates with the potential to correct the misfolded protein. In 2020, we advanced two Phase 2 proof-of-concept clinical trials evaluating two investigational oral small molecule correctors, VX-814 and VX-864, for the treatment of people with AAT deficiency who have two copies of the Z mutation. In October 2020, we discontinued development of VX-814 based on the safety and pharmacokinetic profile observed in the clinical trial. Enrollment is ongoing in the clinical trial evaluating VX-864, and we expect data from this clinical trial in the first half of 2021. In addition, we continue to discover and develop additional molecules with the potential to correct AAT deficiency.

APOL1-Mediated Kidney Diseases

Inherited mutations in the APOL1 gene play a causal role in the biology of FSGS as well as other kidney diseases. FSGS is a rare disease that attacks the kidney's filtering units, causing leakage of protein into the urine followed by deterioration in kidney function, scarring, and, ultimately, permanent kidney damage. FSGS is a leading cause of nephrotic syndrome in children and kidney failure in adults. We are evaluating multiple novel small molecules that inhibit the function of APOL1 protein with the potential to treat APOL1-mediated FSGS. In 2020, we initiated a Phase 2 proof-of-concept clinical trial for VX-147, our first investigational oral small molecule medicine for the treatment of FSGS and other serious kidney diseases. Enrollment is ongoing in this Phase 2 clinical trial and we expect data from the trial in 2021.

Pain

Pain can develop from a variety of pathophysiological and psychological conditions. Patients with pain can suffer from acute pain (for example, following surgery or an injury), neuropathic pain (when there is damage to a nerve), and musculoskeletal pain. Current treatments may not work well and can cause significant side effects. In addition, there is the potential for addiction and the practice of over- and mis-utilization, as well as underutilization of current pain medicines.

Vertex has discovered multiple inhibitors of the voltage-gated sodium channel 1.8, or NaV1.8, as potential treatments for pain. Consistent with our research strategy, the Nav1.8 channel is a validated target for pain based both on inherited mutations that cause pain syndromes as well as our own clinical trial data. Specifically, we have obtained positive results from three separate Phase 2 clinical trials evaluating VX-150, a NaV1.8 inhibitor, in patients with three different pain conditions: acute post-surgical, chronic neuropathic and chronic musculoskeletal pain. We continue to focus our research and development efforts on discovering, developing and advancing a portfolio of multiple inhibitors of NaV1.8 as potential treatments for pain.

Cell and Genetic Therapies

Sickle Cell Disease and Beta Thalassemia

SCD and beta thalassemia are hemoglobinopathies, a group of inherited blood disorders that result from gene mutations that alter hemoglobin, a protein in red blood cells that delivers oxygen throughout the body.

SCD is caused by the change of a single amino acid in the hemoglobin gene that causes red cells to change shape in settings of low oxygen. These sickled cells block blood flow and can lead to severe pain, organ damage and shortened life span. Treatment is typically focused on relieving pain and minimizing organ damage, requiring medication and, for some patients, monthly blood transfusions and frequent hospital visits. We believe there are approximately 25,000 patients with severe SCD in the U.S. and E.U.

Beta thalassemia is caused by loss-of-function mutations in hemoglobin that lead to severe anemia in patients, which causes fatigue and shortness of breath. In infants, beta thalassemia causes failure to thrive, jaundice and feeding problems. Complications of beta thalassemia can lead to an enlarged spleen, liver and/or heart, misshapen bones and delayed puberty. Treatment for beta thalassemia varies depending on the disease severity for each patient. Patients with TDT, the most severe form of the disease, require regular blood transfusions, as frequently as every two to four weeks. Repeated blood transfusions eventually cause an unhealthy buildup of iron in the patient, leading to organ damage. We believe that there are approximately 7,000 patients with TDT in the U.S. and E.U.

In collaboration with CRISPR, we are co-developing CTX001, an investigational CRISPR/Cas9-based gene-editing therapy, for the treatment SCD and TDT. Our therapeutic approach involves isolating hematopoietic stem and progenitor cells, or HSPCs, which give rise to red blood cells, from a patient, treating those cells *ex vivo* with CRISPR/Cas9 in order to modify the erythroid-specific enhancer in the BCL11A gene, and reintroducing the edited cells back into the patient. This approach has the potential to increase levels of fetal hemoglobin in erythrocytes and reduce or eliminate symptoms associated with disease.

We and CRISPR are investigating CTX001 in two Phase 1/2 open-label clinical trials designed to assess the safety and efficacy of a single dose of CTX001 in patients ages 12 to 35 with TDT (CLIMB THAL-111) and severe SCD (CLIMB SCD-121), respectively. Patients enrolled in the clinical trial first undergo a treatment which mobilizes a population of HSPCs from the bone marrow into the bloodstream. Blood cells are collected from the patient's bloodstream and sent to a manufacturing facility where the HSPCs are purified and CRISPR/Cas9 gene-editing is performed. Following manufacturing, the edited cells, now called CTX001, are sent back to the clinical site. Patients are preconditioned with a treatment that ablates their bone marrow prior to infusion of CTX001.

In December 2020, we announced positive interim data from 10 people treated with CTX001 and that 20 people with severe hemoglobinopathies have been dosed with CTX001 in the ongoing Phase 1/2 clinical trials. All seven people with TDT were transfusion independent at last follow-up and all three people with SCD were free of vaso-occlusive crises from CTX001 infusion through the last follow-up. Enrollment and dosing are ongoing, and completion of enrollment for both clinical trials is expected in 2021.

Type 1 Diabetes

T1D is a chronic, metabolic disorder caused by an absence of insulin secretion by the beta cells in the pancreas. In patients with T1D, the person's own immune system attacks the insulin-producing islet cells of the pancreas, resulting in a complete lack of insulin. While insulin therapy allows patients to live for decades with the disease, challenges of insulin therapy include inadequate control of blood sugar (both hyper- and hypo-glycemia), burden of care on patients and families, and long-term vascular complications.

In 2019, we acquired Semma and established programs to develop cell-based therapies designed to replace insulin-producing islet cells in people with T1D. We are pursuing two programs for the transplant of functional islets into patients: transplantation of islet cells alone, using immunosuppression to protect the implanted cells, and implantation of the islet cells inside an immunoprotective device. The FDA has cleared our IND for VX-880, the first program (transplantation of islet cells alone), and we expect to initiate a Phase 1/2 clinical trial evaluating VX-880 in the first half of 2021. This clinical trial will involve an infusion of fully differentiated, functional islet cells, and chronic administration of concomitant immunosuppressive therapy, to protect the islet cells from immune rejection.

Duchenne Muscular Dystrophy

DMD and DM1 are inherited diseases that result in the weakening and breakdown of skeletal muscles over time. In 2019, we acquired Exonics and expanded our collaboration with CRISPR establishing preclinical programs to develop gene-editing therapies for DMD and DM1. We are focused on advancing gene-editing therapies aimed at treating the underlying cause of DMD by restoring expression of near-full length dystrophin protein, and in DM1 by addressing the repeat expansion that causes the disease. Our collaboration with Affinia enables access to a novel library of AAV capsids to support our ongoing research and development efforts in genetic therapies, including DMD and DM1.

COMMERCIALIZATION OF OUR MEDICINES

Commercial Organization

Our commercial organization focuses on supporting sales of TRIKAFTA/KAFTRIO, SYMDEKO/SYMKEVI, ORKAMBI and KALYDECO in the markets where these products have been approved. Our sales and marketing organizations are responsible for promoting products to health care providers and obtaining reimbursement for our products from third-party payors, including governmental organizations in the U.S. and ex-U.S. markets.

Our U.S. field-based CF commercial team is comprised of a small number of individuals to support commercialization of our medicines for CF. We focus our CF marketing efforts in the U.S. 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 U.S. focused on the treatment of CF. In international markets, we have small sales forces that support KALYDECO, ORKAMBI, SYMDEKO/SYMKEVI and TRIKAFTA/KAFTRIO in jurisdictions where these products are approved.

We market our products through personal interactions with physicians and allied health care professionals. 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 policymakers. We also have established programs in the U.S. that provide our products to qualified uninsured or underinsured patients at no charge or at a reduced charge, based on specific eligibility criteria.

Reimbursement

Sales of our products depend, to a large degree, on the extent to which our products will be reimbursed by third-party payors, such as government health programs, commercial insurance and managed health care organizations. Increasingly, these third-party payors are becoming stricter in the ways they evaluate 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. Decisions by third-party payors 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 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 therapeutics 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 provided funding for the federal government to compare the effectiveness of different treatments for the same illness. A plan for the research was to 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 were to 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. In the future, 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 Patient Protection and Affordable Care Act, or ACA, was enacted in March 2010 and was 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 was 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.

In Europe and other foreign jurisdictions, the success of our products depends largely on obtaining and maintaining government reimbursement because many patients are unable to access prescription pharmaceutical products that are not

reimbursed by their governments. Negotiating reimbursement agreements in foreign countries can delay the commercialization of a pharmaceutical product and can result in a reimbursement price that is lower than the net price that companies can obtain for the product in the U.S.

In some countries, such as Germany, commercial sales of a new product may begin while the reimbursement rate that a company will receive is under discussion. In other countries, a company must complete reimbursement negotiations prior to the commencement of commercial supply of the pharmaceutical product. The requirements governing drug pricing vary widely from country to country. For example, the member states of the E.U. can restrict the range of drugs for which their national health insurance systems provide reimbursement and can control the prices of prescription drugs. In addition, many ex-U.S. government payers require companies to provide health economic assessments of products, which are evaluated by government agencies set up for this purpose. 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 total amount of money that a company may receive for supply of a drug. Countries also may consider increasing mandatory discounts in an attempt to manage increased demands on healthcare budgets. Reimbursement for our products cannot be assured. In addition, it is possible that a country 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.

STRATEGIC TRANSACTIONS AND COLLABORATIONS

As part of our business strategy, we seek to license or acquire drugs, drug candidates, businesses and other technologies that have the potential to complement our ongoing research and development efforts. In addition, we establish business relationships with collaborators to support our research activities and to lead or support development and/or commercialization of certain drug candidates. We expect to continue to identify and evaluate potential acquisitions, licenses and collaborations that may be similar or different from the transactions that we have engaged in previously.

Strategic Transactions

Acquisitions

In 2019, we acquired Semma, a privately-held company focused on the use of stem cell-derived human islets as a potentially curative treatment for T1D. Our acquisition of Semma advanced our cell therapy capabilities and supports the development of transformative therapies for T1D. In connection with the acquisition, we acquired all of the outstanding equity of Semma for approximately $950.0 million in cash.

In 2019, we acquired Exonics, a privately held company focused on creating transformative gene-editing therapies to repair mutations that cause DMD and other severe neuromuscular diseases, including DM1. Our acquisition of Exonics enhanced our gene-editing capabilities and supports the potential development of novel therapies for DMD and DM1. In connection with the acquisition, we acquired all of the outstanding equity of Exonics for an upfront payment of approximately $245.0 million plus customary working capital adjustments in cash, and certain potential future payments based primarily upon the successful achievement of specified development and regulatory milestones for the DMD and DM1 programs.

Collaboration and Licensing Arrangements

Joint Development and Commercialization Agreement with CRISPR

In December 2017, we entered into a joint development and commercialization agreement, or JDA, with CRISPR pursuant to which we are co-developing and preparing to co-commercialize CTX001 for TDT and SCD. This JDA was entered into following our exercise of an option to co-develop and co-commercialize the hemoglobinopathies program that was contained in the collaboration agreement that we entered into with CRISPR in 2015. The net profits and net losses, as applicable, incurred under the JDA will be shared equally by the parties. Under the JDA, CRISPR will be responsible for commercialization activities in the U.S. and we will be responsible for commercialization activities outside of the U.S. There is a joint committee to provide high-level oversight and decision-making regarding the activities covered by the JDA. The committee contains an equal number of representatives from us and CRISPR.

Either party can terminate the JDA upon the other party’s material breach, subject to specified notice and cure provisions, or, in our case, in the event that CRISPR becomes subject to specified bankruptcy, winding up or similar

circumstances. Either party may terminate the JDA in the event the other party commences or participates in any action or proceeding challenging the validity or enforceability of any patent that is licensed to such challenging party pursuant to the JDA. We also have the right to terminate the JDA for convenience at any time after giving prior written notice. If circumstances arise pursuant to which a party would have the right to terminate the JDA on account of an uncured material breach, such party may elect to keep the JDA in effect and cause such breaching party to be treated as if it had exercised its opt-out rights with respect to the products associated with such uncured material breach and the royalties payable to the breaching party would be reduced by a specified percentage.

Either party may opt of out of the development of a product candidate under the JDA after predetermined points in the development of the product candidate, on a candidate-by-candidate basis. In the event of such opt-out, the party opting-out will no longer share in the net profits and net losses associated with such product candidate and, instead, the opting out party will be entitled to high single to mid- teen percentage royalties on the net sales of such product, if commercialized.

In-License Agreements

We have entered into various agreements pursuant to which we have obtained access to technologies from third parties and are conducting research and development activities with collaborators. Pursuant to these arrangements, we have obtained development and commercialization rights to resulting drug candidates. Depending on the terms of the arrangements, we may be responsible for the costs of research activities, required to make upfront payments and/or milestone payments upon the achievement of certain research and development objectives, and/or pay royalties on future sales, if any, of commercial products resulting from the collaboration. Our current in-license agreements include:

- Affinia Therapeutics, Inc. In 2020, we entered into a collaboration with Affinia to gain access to a novel library of AAV capsids to support on our ongoing research and development efforts in genetic therapies, including DMD, DM1 and CF.
- Arbor Biotechnologies, Inc. In 2018, we entered into a collaboration with Arbor Biotechnologies, pursuant to which we are focusing on the discovery of novel proteins, including DNA endonucleases, to advance the development of new gene-editing therapies.
- CRISPR Therapeutics AG. In 2015, we entered into a collaboration with CRISPR for the discovery and development of potential new treatments aimed at the underlying genetic causes of human diseases using CRISPR-Cas9 gene-editing technology. As described above, we currently are co-developing CTX001 for the treatment of SCD and beta thalassemia and, if successful, have agreed to co-commercialize CTX001. In addition, we have exercised options to exclusively license treatments for specific targets, including CF, that were subject to the research program. In 2019, we obtained exclusive worldwide rights to CRISPR's intellectual property for DMD and DM1 gene-editing products through a new agreement with CRISPR.
- Kymera Therapeutics, Inc. In 2019, we entered into a collaboration with Kymera Therapeutics for the research and development of small molecule protein degraders. Under the collaboration, Kymera Therapeutics conducts research activities in multiple targets, and upon designation of a clinical development candidate for a target, we have the option to exclusively license molecules against the target.
- Moderna, Inc. In 2016, we entered into a collaboration with Moderna, pursuant to which we are seeking to identify and develop mRNA therapeutics for the treatment of CF. In 2020, we entered into a new strategic collaboration with Moderna aimed at the discovery and development of lipid nanoparticles and mRNAs that can deliver gene-editing therapies to lung cells for the treatment of CF.
- Skyhawk Therapeutics, Inc. In December 2020, we entered into a collaboration with Skyhawk Therapeutics, for the discovery and development of novel small molecules that modulate RNA splicing for the treatment of serious diseases.
- Other Arrangements. In 2019, we entered into collaborations with Molecular Templates, Inc. and Ribometrix, Inc. In 2018, we entered into agreements with Genomics plc, Merck KGaA, Darmstadt, Germany, and X-Chem, Inc. in order to support our research and development efforts.

Out-license Agreements

We have entered into various agreements pursuant to which we have out-licensed rights to certain drug candidates to third-party collaborators. Pursuant to these out-license arrangements, our collaborators are 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 research and development objectives and/or pay royalties on future sales, if any, of commercial products licensed under the agreement. Our current out-license agreements include a Strategic Collaboration and License Agreement with Merck KGaA, Darmstadt, Germany, that we entered into in 2017, pursuant to which we granted an exclusive worldwide license to research, develop and commercialize four oncology research and development programs.

Cystic Fibrosis Foundation Therapeutics Incorporated

In 2004, we entered into a collaboration agreement with the Cystic Fibrosis Foundation, or CFF, as successor in interest to the Cystic Fibrosis Foundation Therapeutics, Inc., 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 covered compounds first synthesized and/or tested during a research term on or before February 28, 2014, including KALYDECO (ivacaftor), ORKAMBI (lumacaftor in combination with ivacaftor) and SYMDEKO/SYMKEVI (tezacaftor in combination with ivacaftor) and royalties ranging from low-single digits to mid-single digits on potential net sales of certain compounds first synthesized and/or tested between March 1, 2014 and August 31, 2016, including elexacaftor. For combination products, such as ORKAMBI, SYMDEKO/SYMKEVI and TRIKAFTA/KAFTRIO (elexacaftor, tezacaftor, and ivacaftor), sales are allocated equally to each of the active pharmaceutical ingredients in the combination product.

INTELLECTUAL PROPERTY

Patents and other proprietary rights such as trademarks, trade secrets, and copyrights are critical to our business. 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.

Patents provide a period of exclusivity that can make it more difficult for competitors to market and use our technology. We own patents and pending patent applications that relate to compounds, formulations, treatment of diseases, synthetic routes, intermediates and other inventions.

To protect our intellectual property, we typically apply for patents several years before a product receives marketing approval. Under current law, a patent expires 20 years from its first effective filing date. Since the drug development process may last for many years, there may be a period of time in which we have an issued patent but not marketing approval to sell the drug. To compensate for patent term lost while a product is in clinical trials and undergoing review for marketing approval, we may be able to apply for patent term extensions or supplementary protection certificates in some countries. In addition to patent protection, we have regulatory exclusivity from U.S. and European regulatory agencies for the active pharmaceutical agents and, where applicable, their approved orphan indications for a certain time period. Regulatory exclusivity runs concurrently with patent exclusivity and provides complementary protection.

We own or hold exclusive licenses to several hundred patents in the U.S. Upon approval of an NDA or a supplement thereto, NDA sponsors are required to list with the FDA each patent with claims that cover the applicant's product or a method of using the product. Each of the patents listed by the NDA sponsor is published in the FDA's Orange Book. We have ten issued U.S. patents listed in the Orange Book that cover the active pharmaceutical ingredients in KALYDECO, its marketed formulations, and/or its approved indication. We have 19 issued U.S. patents listed in the Orange Book that cover the active pharmaceutical ingredients in ORKAMBI, its marketed formulations, and/or its approved indication. We have 21 issued U.S. patents listed in the Orange Book that cover the active pharmaceutical ingredients in SYMDEKO, its marketed formulation, and/or its approved indication. We have 21 issued U.S. patents listed in the Orange Book that cover the active pharmaceutical ingredients in TRIKAFTA, its marketed formulation, and/or its approved indication.

The table below sets forth the year of projected expiration for the basic product patents covering each of our approved products. For products that are combinations of two or more active ingredients, the table lists the projected expiration of the

latest expiring patent covering any of the active pharmaceutical ingredients (lumacaftor for ORKAMBI, tezacaftor for SYMDEKO/SYMKEVI and elexacaftor for TRIKAFTA/KAFTRIO). Patent term extensions, supplementary protection certificates, and pediatric exclusivity periods are not reflected in the expiration dates listed in the table below and may extend protection. In some instances, we also own later-expiring patents and applications relating to solid forms, formulations, methods of manufacture, or the use of these drugs in the treatment of particular diseases or conditions. In some cases, however, such patents may not protect our drug from generic competition after the expiration of the basic patent.

Product	Projected Expiration of U.S. Patent	Projected Status of European Patent
KALYDECO	2027	2025 [1]
ORKAMBI	2030	2026 [2]
SYMDEKO/SYMKEVI	2027	2028 [3]
TRIKAFTA/KAFTRIO	2037	2037

[1] Certain European countries have granted supplementary protection certificates for KALYDECO, which expire in 2027.

[2] Certain European countries have granted supplementary protection certificates for ORKAMBI, which expire in 2030.

[3] Certain European countries have granted supplementary protection certificates for SYMKEVI, which expire in 2033.

In addition to protecting our marketed products, we actively monitor and file patent applications in the U.S. and in foreign countries on inventions relating to our pipeline. For example, we also own U.S. and foreign patents and/or we have patent applications relating to the following:

- CTX001 and other potential gene-editing approaches for treating hemoglobinopathies.
- VX-864 and other compounds being studied for the potential treatment of AAT deficiency.
- VX-147 and other compounds being studied for the potential treatment of APOL1-mediated kidney diseases.
- CF potentiators and correctors and many other related compounds, and the use of those compounds to treat CF.
- Other pre-clinical and clinical candidates and the use of such candidates to treat specified diseases.
- The manufacture, pharmaceutical compositions, related solid forms, formulations, dosing regimens and methods of use of many of the above compounds.

We and CRISPR intend to rely upon a combination of rights, including patent rights, trade secret protection, and regulatory exclusivities to protect CTX001. CRISPR has licensed certain rights to a worldwide patent portfolio that covers various aspects of the CRISPR/Cas9 editing platform technology including, for example, compositions of matter and methods of use, including their use in targeting or cutting DNA from Dr. Charpentier. In addition to Dr. Charpentier, this patent portfolio has named inventors who assigned their rights to the Regents of the University of California or the University of Vienna, to whom we refer, together with Dr. Charpentier, as the CVC Group. CRISPR has non-exclusive or co-exclusive rights to the patent rights that protect the core CRISPR/Cas9 gene-editing technology. For example, certain third parties, including competitors, have reported obtaining a license to rights in this patent portfolio in certain fields. In addition, patents and patent applications in this patent portfolio are the subject of proceedings in the U.S., Europe, and other jurisdictions, including proceedings between the CVC and the Broad Institute in the U.S. Patent and Trademark Office, or USPTO. To date, both the CVC and the Broad have obtained granted patents that purport to cover aspects of CRISPR/Cas9 editing platform technology. The patents and patent applications within the CVC patent portfolio and the Broad patent portfolio are, or may in the future be, involved in proceedings similar to interferences or priority disputes in Europe or other foreign jurisdictions. In addition to the patent portfolio licensed from Dr. Charpentier, we own patent applications relating to the composition, manufacture, and use of CTX001.

From time to time we enter into exclusive and 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.

We cannot be certain that issued patents we own or license will be enforceable or provide adequate protection or that pending patent applications will result in issued patents. The existence of patents does not guarantee our right to practice the patented technology or commercialize the patented product. Litigation, interferences, oppositions, *inter partes* reviews,

administrative challenges or other similar types of proceedings may be necessary in some instances to determine the validity and scope of certain patents, regulatory exclusivities or other proprietary rights, and in other instances to determine the validity, scope or non-infringement of intellectual property rights that may be claimed by third parties to be pertinent to the manufacture, use or sale of our products.

MANUFACTURING

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 a global 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. In addition to establishing supply chains for each new approved product, we need to adapt our supply chain for existing products to include additional formulations that are often required in order to treat younger patients or to increase scale of production for existing products. We are focused on ensuring the stability of the supply chains for our current products, including TRIKAFTA/KAFTRIO, and for our pipeline programs. In addition, we are focused on identifying and ensuring the optimal manufacturing and delivery requirements for the cell and genetic therapies we are developing.

We expect that we will continue to rely on third parties to meet our commercial supply needs and a significant portion of our clinical supply needs for the foreseeable future. We have established our own small-scale manufacturing capabilities in Boston, which we use for clinical trial and commercial supplies, and are evaluating additional manufacturing capacity for our current and future products.

Our supply chain for sourcing raw materials and manufacturing drug product ready for distribution is a multi-step global endeavor. In general, these raw materials are available from multiple sources. Third-party contract manufacturers, including some in China, perform different parts of our manufacturing process. Contract manufacturers may supply us with raw materials, convert these raw materials into drug substance and/or convert the drug substance into final dosage form. In addition, third parties assist us with packaging, warehousing and distribution of products.

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. To ensure the stability of our supply chains, we aim to develop alternatives for each step of our manufacturing process at the time of, or shortly after, marketing approval. Therefore, at any point in time, we may have a limited number of single source manufacturers for certain steps in our manufacturing processes, particularly for recently launched products.

In order to manufacture our commercial products, we utilize both continuous manufacturing technology as well as batch manufacturing processes. 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.

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.

The manufacturing processes for cell and genetic therapies are more complex than those required for small molecule drugs and require different systems, equipment, facilities and expertise. Additionally, we are unable to rely on a single process for all of our cell and genetic therapies; they must be customized for each program and therapy. Although we have been building expertise in these areas, which was augmented through our acquisitions of Exonics and Semma, we will need to continue to expand and strengthen our manufacturing infrastructure and capabilities, independently and/or through a third-party network, to successfully develop and commercialize cell and genetic therapies. We are focused on evaluating and securing potential relationships with various third parties that would enable us to expand and strengthen such capabilities to support our current and future cell and genetic therapy programs. We expect to make significant investment in our manufacturing capabilities and partnerships for our genetic and cell-based therapy programs in order to continue to advance and, in the future, commercialize these programs.

We and CRISPR rely on third-party manufacturers to produce or process cell culture reagents, gene-editing components, such as Cas9 protein and guide RNA molecules, and to generate gene-edited cells to supply CTX001 for clinical trials. If approved, we expect to continue to rely on third-party manufacturers for commercial supply of CTX001. The current manufacturing process for CTX001 involves a number of steps prior to the final infusion of drug product into patients. Following mobilization and collection of blood cells from the patient at the clinical site, cells are transferred to a manufacturing site where HSPCs are purified and CRISPR/Cas9 gene-editing is performed. The edited cellular product, called CTX001, is frozen and transported back to the clinical site where it is stored prior to infusion into the patient. Each step must be completed successfully, and in a timely manner, requiring coordination between CRISPR, Vertex, clinical sites, third-party manufacturers and shipping vendors. To increase production to commercial levels, Vertex and CRISPR will need to coordinate manufacturing and logistics activities at a larger scale across multiple facilities in the geographies in which CTX001 is approved. Approval will rely on inspection and approval of these facilities by global health authorities.

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. Mergers and acquisitions in the pharmaceutical, biotechnology and gene therapy industries may result in a larger concentration of resources among a smaller number of our competitors. Some of our competitors may have substantially greater financial, technical, marketing and human resources than we do.

We believe that competition in our industry is based on, among other factors, innovative research, the effective and rapid development of drug candidates, the ability to market and obtain reimbursement for products and the ability to establish effective patent protection. We face competition based on the safety and efficacy of our product 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. Another key element of remaining competitive in our industry is recruiting and retaining leading scientific, technical and management personnel to conduct our research activities and advance our development programs, including with the commercial expertise to effectively market our products.

Cystic Fibrosis

A number of companies are seeking to identify and develop drug candidates for the treatment of CF, including CFTR modulators and other therapies intended to address the underlying causes of CF.

AbbVie, Inc., or AbbVie, has indicated that it plans to develop a triple combination CFTR modulator therapy comprised of a potentiator and correctors. Currently, AbbVie is evaluating the combination of a potentiator and a corrector in a Phase 2 clinical trial. In March 2020, AbbVie disclosed plans to file an IND application with the FDA for another corrector in the second quarter of 2020. In addition, Proteostasis Therapeutics, Inc. was developing potential CFTR modulator therapies prior to its acquisition by Yumanity Therapeutics, Inc., or Yumanity. Following the merger, Yumanity has announced plans to divest its CF program.

Other therapeutic approaches include addressing CF utilizing nucleic acid therapies and read-through agents, which are compounds that allow expression of a full-length protein. Nucleic acid therapies are under development by companies such as Translate Bio, Arcturus Therapeutics Holdings, Inc., Krystal Biotech, Inc., Spirovant Sciences, Inc. and 4D Molecular Therapeutics, Inc. Translate Bio is evaluating its mRNA therapy in a proof of concept Phase 1/2 clinical trial. Eloxx Pharmaceuticals, Inc. is evaluating a read-through therapy for nonsense CFTR mutations in two Phase 2 clinical trials.

Our success in rapidly developing and commercializing our products 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 people with CF, our revenues from our current products and/or additional CF products, if then approved, could face significant competitive pressure.

Pipeline

In recent years, we have committed significant research resources to, and made significant investments in, our pipeline of potential new therapies for AAT deficiency, APOL1-mediated kidney diseases, TDT, SCD, muscular dystrophies, T1D and other diseases. We plan to continue investing in our pipeline, including expanding beyond small molecule therapies and into the discovery and development of cell and gene therapies. For example, we remain focused on our ongoing evaluation of CTX001, an investigational CRISPR/Cas9-based gene-editing therapy, for treatment of SCD and TDT currently in clinical development.

There are multiple approved treatments for TDT and SCD, including products from Novartis International AG, or Novartis, Global Blood Therapeutics, Inc. and Bristol Myers Squibb together with Acceleron Pharma, Inc. Bluebird Bio, Inc., or Bluebird, has a gene therapy, Zynteglo (Lentiglobin), approved by the European Medicines Agency, or EMA, for the treatment of certain TDT genotypes and in clinical development for SCD. In addition, various companies and private academic/medical institutes are developing gene therapy or gene-editing candidates for the treatment of SCD or TDT utilizing CRISPR technology, lenti-viral vectors, zinc finger nuclease technology, or base editing.

Many other pharmaceutical and biotechnology companies are also investing resources for discovery and development of small molecules, gene therapies and cell therapies to treat the same diseases for which we are developing therapies. If any of these competitors develop or successfully commercialize products involving therapies competitive with our pipeline therapies, the potential return on our investment in those pipeline therapies could be impacted.

GOVERNMENT REGULATION

Our operations and activities are subject to extensive regulation by numerous government authorities in the U.S., the E.U. and other countries. In the U.S., the E.U. and other countries, drugs are subject to rigorous regulations governing the testing, manufacture, labeling, storage, record keeping, approval, advertising and promotion of our products. As a result of these regulations, product development and product approval processes are very expensive and time consuming. The regulatory requirements applicable to drug development, approval, and marketing are subject to change. In addition, regulations and administrative guidance often are revised or reinterpreted by the agencies in ways that may significantly affect our business and our products. It is impossible to predict whether legislative changes will be enacted, or FDA or comparable ex-U.S. regulations, guidance or interpretations will change.

United States Government Regulation

New Drug Application Approval Processes

The process required by the FDA before a drug may be marketed in the U.S. 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 IND application, which must become effective before clinical trials in the U.S. 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 a New Drug Application, or 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; 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, which seeks FDA approval to test the drug candidate in humans. Preclinical or nonclinical testing typically continues even after the IND is submitted.

If the FDA accepts the IND, the drug candidate can then be studied in human clinical trials to determine if the drug candidate is safe and effective. These clinical trials involve three separate phases that often overlap, can take many years and are expensive. These three phases, which are subject to considerable regulation, are as follows:

- *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. All clinical trials must be conducted under the supervision of one or more qualified investigators in accordance with GCP. 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. 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.

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.

Once the submission is accepted for filing, the FDA begins an in-depth review. 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.

Biologics License Application Process

Certain of our drug candidates may be regulated by the FDA under the Food, Drug, and Cosmetic Act, or 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 developed a number of distinct approaches to make new drugs available as rapidly as possible in cases where there is no available treatment or there are advantages over existing treatments.

The FDA may grant "accelerated approval" to products that have been studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit to patients over existing treatments. For accelerated approval, the product must have an effect on a surrogate endpoint or an intermediate clinical endpoint that is considered reasonably likely to predict the clinical benefit of a drug, such as an effect on irreversible morbidity and mortality. When approval is based on surrogate endpoints or clinical endpoints other than survival or morbidity, the sponsor will be required to conduct additional post-approval clinical studies to verify and describe the clinical benefit. These studies are known as "confirmatory trials." Approval of a drug may be withdrawn, or the labeled indication of the drug changed if these trials fail to verify clinical benefit or do not demonstrate sufficient clinical benefit to justify the risks associated with the drug.

The FDA may grant "fast track" status to products that treat serious diseases or conditions and demonstrate the potential to address an unmet medical need. Fast track is a process designed to facilitate the development and expedite the review of such products by providing, among other things, more frequent meetings with the FDA to discuss the product's development plan and rolling review, which allows submission of individually completed sections of an NDA or BLA for FDA review before the entire submission is completed. Fast track status does not ensure that a product will be developed more quickly or receive FDA approval.

"Breakthrough Therapy" designation is a process designed to expedite the development and review of drugs that are intended to treat a serious condition and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over available therapy on a clinically significant endpoint. For drugs and biologics that have been designated as Breakthrough Therapies, robust FDA-sponsor interaction and communication can help to identify the most efficient and expeditious path for clinical development while minimizing the number of patients placed in ineffective control regimens.

"Regenerative Medicine Advanced Therapy," or RMAT, designation is a process created by the 21st Century Cures Act in December 2016. A product is eligible for RMAT designation if it is a regenerative medicine therapy that is intended to treat, modify, reverse or cure a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the product has the potential to address unmet medical needs for such disease or condition. The benefits of RMAT designation include the benefits available to breakthrough therapies, including potential eligibility for priority review and accelerated approval based on surrogate or intermediate endpoints.

The FDA may grant "priority review" status to products that, if approved, would provide significant improvement in the safety or effectiveness of the treatment, diagnosis, or prevention of serious conditions. Priority review is intended to reduce the time it takes for the FDA to review an NDA or BLA, with the goal to take action on the application within six months from when the application is filed, compared to ten months for a standard review.

Manufacturing Quality Control

Among the conditions for NDA or BLA approval is the requirement that the prospective manufacturer's quality control and manufacturing procedures continually conform with cGMP. In complying with cGMP, manufacturers must devote substantial time, money and effort in the areas of production, quality control and quality assurance to maintain compliance. Material changes in manufacturing equipment, location or process, may result in additional regulatory review and approval. The FDA, and other regulatory agencies, conduct periodic visits to inspect equipment, facilities, and processes following the initial approval of a product. If a manufacturing facility is not in substantial compliance with the applicable regulations and requirements imposed when the product was approved, regulatory enforcement action may be taken, which may include a warning letter or an injunction against shipment of products from the facility and/or recall of products previously shipped. We rely, and expect to continue to rely, on third parties for the production of our products. Future FDA, state, and foreign 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.

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 U.S. 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.

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 or our collaborators 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.

Patent Term Restoration and Regulatory Exclusivity

Upon approval, products may be entitled to certain kinds of exclusivity under applicable intellectual property and regulatory regimes. The Drug Price Competition and Patent Term Restoration Act of 1984 (commonly known as the Hatch-Waxman Act) permits a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. The length of the patent extension is roughly based on 50 percent of the period of time from the filing of an IND for a compound to the submission of the NDA for such compound, plus 100 percent of the time period from NDA submission to regulatory approval. The extension, however, cannot exceed five years and the patent term remaining after regulatory approval cannot exceed 14 years.

If the FDA approves a drug product that contains an active ingredient not previously approved, the product is typically entitled to five years of non-patent regulatory exclusivity. Other products may be entitled to three years of exclusivity if approval was based on the FDA’s reliance on new clinical studies essential to approval submitted by the NDA applicant. If

the NDA applicant studies the product for use by children, the FDA may grant pediatric exclusivity, which extends by 180 days each existing exclusivity (patent and regulatory) related to the product.

Biologics are also entitled to exclusivity under the Biologics Price Competition and Innovation Act, which was passed as Title VII to the ACA. The law provides a pathway for approval of biosimilars following the expiration of 12 years of exclusivity for the innovator biologic and a potential additional 180 day-extension term for conducting pediatric studies. Biologics are also eligible for orphan drug exclusivity, as discussed below. The law also includes an extensive process for the innovator biologic and biosimilar manufacturer to litigate patent infringement, validity, and enforceability prior to the approval of the biosimilar. There have been ongoing federal legislative and administrative efforts as well as judicial challenges seeking to repeal, modify or invalidate some or all of the provisions of the ACA. While none of those efforts have focused on changes to the provisions of the ACA related to the biosimilar regulatory framework, if the ACA is repealed, substantially modified, or invalidated, it is unclear what, if any, impact such action would have on biosimilar regulation.

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 U.S.

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 for seven years following marketing approval, except in certain very limited circumstances, such as if the later product is shown to be clinically superior to the orphan product. 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. KALYDECO, ORKAMBI, SYMDEKO, and TRIKAFTA have been granted orphan drug exclusivity by the FDA.

Foreign Regulation

We conduct clinical trials and market our products in numerous jurisdictions outside the U.S. Most of these jurisdictions have clinical trial, product approval and post-approval regulatory processes that are similar in principle to those in the U.S. Thus, 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 E.U., 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 E.U. 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 E.U. member states. In addition to the centralized procedure, Europe also has a nationalized procedure, which requires a separate application to and approval determination by each country; a decentralized procedure, whereby applicants submit identical applications to several countries and receive simultaneous approval; and a mutual recognition procedure, where applicants submit an application to one country for review and other countries may accept or reject the initial decision.

Other Regulations

Pharmaceutical companies are also subject to various laws pertaining to healthcare "fraud and abuse," including anti-kickback and false claims laws. Anti-kickback laws generally make it illegal to knowingly and willfully solicit, offer, receive or pay any remuneration in return for or to induce the referral of business, including the purchase or prescription of a particular drug that is reimbursed by a state or federal health care program. False claims laws prohibit knowingly and willingly presenting, or causing to be presented for payment to third-party payors (including Medicare and Medicaid), any 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. Violations of fraud and abuse laws may be punishable by criminal and/or civil sanctions, including fines and civil monetary penalties, as well as by the possibility of exclusion from federal healthcare programs (including Medicare and Medicaid). Liability under the false claims laws may also arise when a violation of certain laws or regulations related to the underlying products (e.g., violations regarding improper promotional activity or unlawful

payments) contributes to the submission of a false claim. If we were subject to allegations concerning, or convicted of violating, these laws, our business could be harmed.

Laws and regulations also have been enacted by the federal government and various states to regulate the sales and marketing practices of pharmaceutical manufacturers. The laws and regulations generally limit financial interactions between manufacturers and health care providers, require manufacturers to adopt certain compliance standards or require disclosure to the government and public of such interactions. The laws include U.S. federal and state "sunshine" provisions. The federal sunshine provisions apply to pharmaceutical manufacturers with products reimbursed under certain government programs and require those manufacturers to disclose annually to the federal government (for re-disclosure to the public) certain payments and other transfers of value made to physicians and teaching hospitals and, beginning with disclosures in 2022, to certain non-physician practitioners. State laws may also require disclosure of pharmaceutical pricing information and marketing expenditures. Many of these laws and regulations contain requirements that are subject to interpretation. Outside the U.S., other countries have implemented requirements for disclosure of financial interactions with healthcare providers and additional countries may consider or implement such laws.

We are subject to various federal and foreign laws that govern our international business practices with respect to payments to government officials. Those laws include the U.S. Foreign Corrupt Practices Act, or FCPA, which prohibits U.S. companies and their representatives from paying, offering to pay, promising, or authorizing the payment of anything of value to any foreign government official, government staff member, political party, or political candidate for the purpose of obtaining or retaining business or to otherwise obtain favorable treatment or influence a person working in an official capacity. In many countries, the health care professionals we regularly interact with may meet the FCPA's definition of a foreign government official. We are also subject to U.K. Bribery Act 2010, or the Bribery Act, which proscribes giving and receiving bribes in the public and private sectors, bribing a foreign public official, and failing to have adequate procedures to prevent employees and other agents from giving bribes. U.S. companies that conduct business in the United Kingdom, or U.K., generally will be subject to the Bribery Act.

We are subject to federal laws, including the Medicaid Drug Rebate Program, that require pharmaceutical manufacturers to report certain calculated product prices to the government or provide certain discounts or rebates to government authorities or private entities, often as a condition of reimbursement under government healthcare programs.

Our collection and use of personal data as part of our business activities is subject to various privacy and data security laws and regulations, including oversight by various regulatory or other governmental bodies, in the U.S., E.U., U.K., Canada, Australia and other jurisdictions. Such laws and regulations have the potential to affect our business materially, continue to evolve and increasingly are being enforced.

Our present and future business has been and will continue to be subject to various other laws and regulations. Various laws, regulations and recommendations relating to safe working conditions, laboratory practices, the experimental use of animals, and the purchase, storage, movement, import, export and use and disposal of hazardous or potentially hazardous substances are or may be applicable to our activities. In addition, as we expand our pipeline and contemplate different approaches that may incorporate the use of medical devices, such approaches may necessitate compliance with regulatory laws applicable to medical devices, including those governing the testing, manufacture, approval, distribution, and marketing of medical devices. Furthermore, the extent of government regulation, which might result from future legislation or administrative action, cannot accurately be predicted.

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. We expect to continue to devote substantial resources to maintain, administer and expand the compliance program globally. We cannot be certain, however, that our compliance program will ensure compliance with the various complex laws and regulations to which we are subject now or in the future.

EMPLOYEES AND HUMAN CAPITAL MANAGEMENT

As of December 31, 2020, we had approximately 3,400 employees. Of these employees, approximately 2,800 were based in the U.S. and approximately 600 were based outside the U.S. Our employees are not covered by a collective bargaining agreement, except for a small number of employees outside the U.S. We consider our relations with our employees to be good. We continue to face intense competition for our personnel from our competitors and other companies throughout our industry and from universities and research institutions.

We rely on skilled, experienced, and innovative employees to conduct the operations of our company. The biotechnology industry is very competitive and recruiting and retaining such employees is important to the continued success of our business. We are committed to building an outstanding, committed and passionate team at Vertex, and we focus on a culture that values inclusion, diversity and equity. We believe that each employee brings unique perspectives and strengths, and by embracing these strengths, we can do our best work for patients. We focus on recruiting, retaining, and developing employees from a diverse range of backgrounds to conduct our research, development, and commercial activities.

Our commitment to diversity, inclusion and equity begins with our executive management team: four of our ten members are women and/or from diverse racial and ethnic groups. On our Board of Directors, six of our ten members are women and/or from a diverse racial and ethnic group. As of December 31, 2020, women represented 53% of our global workforce and 38% of our leadership (VP and above). As of December 31, 2020, 34% of our U.S. workforce, and 18% of our U.S. leadership (VP and above), were from diverse racial and ethnic groups.

The leader of our diversity, inclusion, and equity strategy and efforts is a Vice President in our human resources group. Additionally, our employee resource networks promote connectivity and collaboration across levels and functions, and engage colleagues in personal and professional development opportunities, including mentoring, community outreach, and cultural awareness activities.

To promote our employees' continued well-being and development, we offer a variety of inclusive benefits and opportunities. We offer comprehensive work-life benefits, including health, dental, and income protection, such as life insurance and retirement savings programs. In 2020, we enhanced and expanded our employee benefits in response to the COVID-19 pandemic. For example, we increased company-wide personal time off, provided resources to enable employees to work from home, and introduced and expanded mental wellness tools for all employees. Our management has continued to assess and respond to the evolving needs of our workforce throughout the pandemic.

In addition, we provide our employees with career development and advancement opportunities, including job rotations, mentoring and managerial training. We also are committed to identifying and developing our next generation leaders and have developed programs focused on talent and succession for critical roles in our organization.

Succession Planning

In 2020, we successfully executed a leadership succession plan with the transition of Dr. Kewalramani to the role of Chief Executive Officer and our former Chief Executive Officer, Dr. Leiden, to the role of Executive Chairman. This transition was the culmination of a multi-year planning process led by our independent directors.

OTHER MATTERS

Financial Information and Significant Customers

The Company operates in one segment, pharmaceuticals. Financial information about our revenue by product and significant customers is set forth in Note Q, "Segment Information," to our consolidated financial statements included in 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.

INFORMATION ABOUT OUR EXECUTIVE OFFICERS

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

Name	Age	Position
Reshma Kewalramani, M.D.	48	Chief Executive Officer and President
Jeffrey M. Leiden, M.D., Ph.D.	65	Executive Chairman
David Altshuler, M.D., Ph.D.	56	Executive Vice President, Global Research and Chief Scientific Officer
Stuart A. Arbuckle	55	Executive Vice President and Chief Commercial Officer
Carmen Bozic, M.D.	58	Executive Vice President, Global Medicines Development and Medical Affairs, and Chief Medical Officer
Michael Parini, J.D.	46	Executive Vice President, Chief Administrative, Legal and Business Development Officer
Amit K. Sachdev, J.D.	53	Executive Vice President, Chief Patient Officer
Bastiano Sanna, Ph.D.	46	Executive Vice President, Chief of Cell and Genetic Therapies
Ourania “Nia” Tatsis, Ph.D.	51	Executive Vice President and Chief Regulatory and Quality Officer
Charles F. Wagner, Jr.	52	Executive Vice President and Chief Financial Officer
Paul M. Silva	54	Senior Vice President and Chief Accounting Officer

Dr. Kewalramani has been our Chief Executive Officer and President since April 2020 and a member of our Board of Directors since February 2020. Dr. Kewalramani was our Executive Vice President and Chief Medical Officer from April 2018 through April 2020. She was our Senior Vice President, Late Development from February 2017 until April 2018. From August 2004 to January 2017, she served in roles of increasing responsibility at Amgen Inc., most recently as Vice President, Global Clinical Development, Nephrology & Metabolic Therapeutic Area and as Vice President, U.S. Medical Organization. From 2014 through 2019, Dr. Kewalramani was the industry representative to the FDA’s Endocrine and Metabolic Drug Advisory Committee. She completed her internship and residency in Internal Medicine at the Massachusetts General Hospital and her fellowship in Nephrology at the Massachusetts General Hospital and Brigham and Women’s Hospital combined program. Dr. Kewalramani holds a B.A. from Boston University and an M.D. from Boston University School of Medicine. Dr. Kewalramani also completed the General Management Program at Harvard Business School and is an alumnus of the school.

Dr. Leiden became our Executive Chairman in April 2020. He was our Chief Executive Officer and President from 2012 through March 2020. 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 serves as a director of 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 and a director of Quest Diagnostics, a medical diagnostics company, from December 2014 to May 2019. 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 University and the Massachusetts Institute of Technology, 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, 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. 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 served as a member of the Board of Directors of Cerulean Pharma, Inc. from June 2015 through July 2017 and has served as a member of the Board of Directors of ImmunoGen, Inc. since January 2018 and of Rhythm Pharmaceuticals Inc. since July 2019. Mr. Arbuckle holds a BSc in pharmacology and physiology from the University of Leeds.

Dr. Bozic is our Executive Vice President, Global Medicines Development and Medical Affairs, a position she has held since October 2019, and she has been our Chief Medical Officer since April 2020. She was our Senior Vice President and Head of Global Clinical Development from May 2019 to October 2019. Prior to joining Vertex, Dr. Bozic spent more than 20 years at Biogen Inc., most recently as Senior Vice President of Global Development and Portfolio Transformation from 2015 to May 2019 and as Senior Vice President of Clinical and Safety Sciences from 2013 to 2015. Dr. Bozic has served as the industry representative to the FDA's Risk Communication Advisory Committee, and was a member of PhRMA's Clinical and Preclinical Development Committee and the Board of Managers at BioMotiv. She is a member of the Clinical Advisory Board at Akili Interactive. She received her M.D., C.M., completed her residency, and was Chief Resident in Internal Medicine at McGill University. She completed her fellowship in Pulmonary and Critical Care Medicine at Brigham and Women's Hospital and was an Associate Physician at Beth Israel Deaconess Medical Center and Harvard Medical School before joining the biopharmaceutical industry.

Mr. Parini is our Executive Vice President, Chief Administrative, Legal and Business Development Officer, a role he has held since March 2020. From January 2017 to March 2020, he was our Executive Vice President, Chief Legal and Administrative Officer. 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., a pharmaceutical company, 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 Patient Officer, a role he has held since October 2019. In addition, Mr. Sachdev has served in the role of Chief of Staff to the CEO since April 2020. He served as our Executive Vice President and Chief Regulatory Officer from January 2017 until September 2019, and as our Executive Vice President, Policy, Access and Value from October 2014 through December 2016. In 2010, he established our first international commercial operations in Canada. 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. 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. 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. He has served as a member of the Board of Directors of Eiger BioPharmaceuticals since May 2019. Mr. Sachdev holds a B.S from Carnegie Mellon University and a J.D. from Emory University School of Law.

Dr. Sanna has been our Executive Vice President, Chief of Cell and Genetic Therapies since February 2020. From October 2019 to February 2020, he was President of Semma Therapeutics, Inc., a private biotechnology company that Vertex acquired in October 2019. Prior to the acquisition, Dr. Sanna was the Chief Executive Officer and President of Semma from May 2018 until October 2019. Dr. Sanna was Chief Operating Officer at Magenta Therapeutics from May 2016 through April 2018. He served on the leadership team of the Novartis Cell and Gene Therapy Unit as the Global Program Head of Stem Cell Transplant and early programs from 2014 through 2016. Dr. Sanna served as Global Head of Strategic Planning and Portfolio Management at the Novartis Institutes for BioMedical Research from 2010 through 2014. Dr. Sanna has served as a member of the Board of Directors of Adicet Bio, Inc., a biotechnology company since December 2020. Dr. Sanna received a Ph.D. in Biotechnology from the University of Sassari.

Dr. Tatsis has been our Executive Vice President, Chief Regulatory and Quality Officer since August 2020. She was our Senior Vice President and Chief Regulatory Officer from October 2019 to August 2020. She served as our Senior Vice President, Global Regulatory Affairs from September 2017 to October 2019. Prior to joining Vertex, Dr. Tatsis held positions of increasing responsibility at several pharmaceutical companies, including Sanofi, Stemnion, Pfizer, and Wyeth. Most

recently, from 2014 to 2017, she was Vice President, Head of Global Regulatory Affairs, at the Sanofi Genzyme Business Unit focused on Inflammation/Immunology, Rare Disease, Multiple Sclerosis, Ophthalmology, Neurology, and Oncology/Immuno-Oncology. Dr. Tatsis also worked as an associate staff scientist and research fellow in Immunology and Vaccine Development at the Wistar Institute and completed a post-doctoral research fellowship in Immunology at Thomas Jefferson University. She received her Ph.D. in Cell and Molecular Biology from the University of Vermont and holds a B.S. in Biology from Temple University.

Mr. Wagner has been our Executive Vice President, Chief Financial Officer since April 2019. Prior to joining Vertex, Mr. Wagner was Chief Financial Officer and Executive Vice President, Finance of Ortho Clinical Diagnostics, a Carlyle Group portfolio company, from June 2015 to March 2019. In that role, he led the finance, accounting, tax, treasury, global information systems, lender relations, and acquisitions and divestiture groups, as well as shared leadership over several enterprise-wide projects. From July 2012 to June 2015, Mr. Wagner served as Executive Vice President, Chief Financial Officer of Bruker Corporation, a scientific instruments manufacturer. Prior to that, Mr. Wagner served as Chief Financial Officer for Progress Software Corporation, a provider of enterprise software, and Millipore Corporation, a global provider of products and services in the life science tools market. Mr. Wagner served as a director and chairman of the Audit Committee of Good Start Genetics, Inc. from April 2014 to August 2017 and served as a director and member of the Audit Committee of Bruker Corporation from August 2010 to June 2012. Mr. Wagner holds a B.S. in accounting from Boston College and a M.B.A from Harvard Business School.

Mr. Silva is our Senior Vice President, Chief Accounting Officer, a position he has held since April 2011. Mr. Silva also served as our interim Chief Financial Officer from January 2019 to April 2019. 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 finance 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.

ITEM 1A. 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.

SUMMARY OF RISK FACTORS

Our business is subject to numerous risks and uncertainties, discussed in more detail in the following section. These risks include, among others, the following key risks:

Risks Related to Our Business

- All of our product revenues and the vast majority of our total revenues are derived from sales of medicines for the treatment of CF. If we are unable to continue to increase revenues from sales of our CF medicines, our business would be materially harmed and the market price of our common stock would likely decline.
- We are investing significant resources in the research and development of therapies for serious diseases other than CF, and if we are unable to successfully commercialize one or more of these therapies, our business could be materially harmed.
- If our competitors bring drugs with superior product profiles to market, our drugs may not be competitive and our revenues could decline.
- 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.
- If physicians and patients do not accept our medicines, or if patients do not remain on treatment or comply with their prescribed dosing regimen, our product revenues would be materially harmed 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.
- We have experienced challenges commercializing products outside of the U.S, and our future revenues will be dependent on our ability to obtain adequate reimbursement for our products.
- We have limited experience developing cell and genetic therapies and could experience challenges with these programs, which could result in delays or prevent the development, manufacturing and commercialization of our cell and genetic therapies.

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

- Our drug candidates remain subject to clinical testing and regulatory approval. Our future success is dependent on our ability to successfully develop additional drug candidates for both CF and non-CF indications.
- If we are unable to obtain regulatory approval, we will be unable to commercialize our drug candidates.
- 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.

Risks Related to Government Regulation

- 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.

- If we fail to comply with our reporting and payment obligations under the Medicaid Drug Rebate Program or other governmental pricing programs in the U.S., we could be subject to additional reimbursement requirements, penalties, sanctions and fines which could have a material adverse effect on our business, financial condition, results of operations and growth prospects.
- 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 are subject to various and evolving laws and regulations governing the privacy and security of personal data, and our failure to comply could adversely affect our business, result in fines and/or criminal penalties, and damage our reputation.

Risks Related to Business Development Activities

- Our ability to execute on our long-term strategy depends in part on our ability to engage in transactions and collaborations with other entities that add to our pipeline or provide us with new commercial opportunities.
- We may not realize the anticipated benefits of acquisitions of businesses or technologies, and the integration following any such acquisition may disrupt our business and management.
- We face risks in connection with existing and future collaborations with respect to the development, manufacture and commercialization of our products and drug candidates.
- We may not be able to attract collaborators or external funding for the development and commercialization of certain of our drug candidates.

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 third parties to conduct pre-clinical work, clinical trials and other activities, 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.

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 which could result in injunctions preventing us from selling our products or substantial liabilities.
- 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.
- 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.

Risks Related to Our Operations

- Risks associated with operating in foreign countries could materially adversely affect our business.
- We are subject to risks associated with the global COVID-19 pandemic.
- If we fail to attract and retain skilled employees, our business could be materially harmed.
- Our business faces potential risks relating to the United Kingdom’s withdrawal from the European Union.

Risks Related to Financial Results and Holding Our Common Stock

- Our stock price may fluctuate.
- Changes in tax laws, regulations and treaties could affect our future taxable income.

Risks Related to Our Business

All of our product revenues and the vast majority of our total revenues are derived from sales of medicines for the treatment of CF. If we are unable to continue to increase revenues from sales of our CF medicines, our business would be materially harmed and the market price of our common stock would likely decline.

Our net product revenues and the vast majority of our total revenues are derived from the sale of our CF medicines. As a result, our future success is dependent upon our ability to increase revenues from sales of our CF medicines. This will require us to continue to gain approval and reimbursement for our triple combination therapy in ex-U.S. markets and successfully develop and commercialize our triple combination therapy for younger children with CF.

Our concentrated source of revenues presents a number of risks to our business, including:

- that one or more competing therapies may successfully be developed as a treatment for people with CF;
- that reimbursement policies of payors and other third parties may make it difficult to obtain reimbursement or reduce the net price we receive for our products;
- that we may experience manufacturing or supply disruptions for our CF medicines; and
- that we may experience adverse developments with respect to development or commercialization of our CF medicines and/or CF drug candidates.

If any of the above risks were to materialize, if we are otherwise unable to increase revenues from sales of our CF medicines, or if we do not meet the expectations of investors or public equity market analysts, our business would be materially harmed and our ability to fund our operations could be adversely affected. For example, if we are unable to increase revenues from sales of our CF medicines, our ability to fund our research and development programs for the discovery and development or acquisition of new products would be harmed, which would limit our ability to diversify our revenue base and our stock price would likely be adversely affected.

We are investing significant resources in the research and development of therapies for serious diseases other than CF, and if we are unable to successfully commercialize one or more of these therapies, our business could be materially harmed.

We are investing significant resources in the research and development of medicines for serious diseases including AAT deficiency, APOL1-mediated kidney diseases, pain, beta thalassemia, SCD, T1D, DMD and DM1. Some of these programs have progressed into clinical trials, while others are still in pre-clinical development. Product development is highly uncertain and expensive, and product candidates that may appear promising in the early phases of research and development may fail to reach commercial success for many reasons, including the failure to demonstrate acceptable clinical trial results or obtain marketing approval, the inability to manufacture or commercialize the product candidate on economically feasible terms, or the appearance of safety issues. For example, in October 2020, we discontinued development of VX-814, a drug candidate for the treatment of AAT, based on the safety and pharmacokinetic profile observed in a Phase 2 clinical trial.

Even if we gain marketing approval for one or more pipeline products, we cannot be sure that we will obtain market acceptance or adequate reimbursement levels from third-party payors or foreign governments for such products. Additionally, many of the therapies that we are developing in our pipeline target rare diseases that affect a limited number of patients. There can be no guarantee that we will effectively identify patients that are eligible for enrollment in our clinical trials or treatment with our drug candidates. Even if we do successfully identify eligible patients, the number of patients that our drug candidates are able to treat may turn out to be lower than we expect or new patients may become increasingly difficult to identify, each of which may adversely affect our revenues and materially harm our business. For these and other reasons, we may never be successful in expanding our pipeline and future revenue may continue to depend on sales of our CF medicines.

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

A number of companies are seeking to identify and develop drug candidates for the treatment of CF and other therapeutic areas we are targeting with our research and development activities. Our success in rapidly developing and commercializing our CF medicines may increase the resources that our competitors allocate to the development of potential competitive treatments. If one or more competing therapies are successfully developed as a treatment for people with CF or any of the other diseases we are currently targeting in our pipeline, our products and our net product revenues could face competitive pressures. If one or more competing therapies prove to be superior to our then existing products and/or drug candidates, our business could be materially adversely affected.

In addition, our business faces competition from major pharmaceutical companies possessing substantially greater financial resources than we possess. We also face competition from numerous smaller public and private companies, academic institutions, government agencies, 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.

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.

Our products 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 particularly important to our company because substantially all of our revenues as well as our most advanced drug candidates are related to the treatment of people with CF. There are many other companies developing drugs for the same patient populations that we are pursuing. In order to compete successfully in these areas, we must demonstrate improved safety, efficacy and/or tolerability, ease of manufacturing, and gain and maintain market acceptance over competing drugs.

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 or underestimated 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. Three of our commercial products are combination products, and each of our products shares at least one active pharmaceutical ingredient with another of our products. As a result, if any of our CF products were to experience safety issues, our other CF products 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. Our business also may be materially harmed by impaired sales of our products, denial or withdrawal of regulatory approvals, required label changes or additional clinical trials, reputational harm, or government investigations or lawsuits brought against us.

In addition, our products are subject to ongoing regulatory requirements governing the testing, manufacturing, labeling, packaging, storage, advertising, promotion, sale, distribution, import, export, recordkeeping and submission of safety and other post-market information. We and our third-party manufacturers must comply with cGMP and other applicable regulations governing the manufacturing and distribution of our products. Regulatory authorities periodically inspect our drug manufacturing facilities, and those of our third-party manufacturers, to evaluate compliance with cGMP and other regulatory requirements.

If we or our collaborators, or third-parties acting on our behalf, 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, any of which could have a material adverse effect on our business, reputation, financial condition and results of operations.

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

Our medicines may not gain or maintain market acceptance among physicians and patients. Effectively marketing our drugs and any of our drug candidates or investigational therapies, if approved, requires substantial efforts, both prior to launch and after approval. Physicians may elect not to prescribe our drugs or recommend our cell or genetic therapies, and patients may elect not to take them or receive them or they 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, including governmental entities;
- 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
- inadequate sales, marketing and/or distribution support, including as a result of limitations or restrictions resulting from COVID-19.

If our medicines 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.

Sales of our 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 U.S. and the national health care systems in ex-U.S. 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 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, the pricing and reimbursement of therapeutic and other pharmaceutical products is subject to governmental control, and government authorities are making greater efforts to limit or regulate the price of drug products. In the U.S., there have been, and we expect that there will continue to be, a number of federal and state proposals to implement governmental controls that are similar to those that currently exist in Europe. For example, the ACA required manufacturers of Medicare Part D brand name drugs to provide discounts on those drugs to Medicare Part D beneficiaries during the coverage gap; increased the rebates paid by pharmaceutical companies to state Medicaid programs on drugs covered by Medicaid; and imposed an annual fee, which increases annually, on sales by branded pharmaceutical manufacturers.

There also has been an increase in legislation and regulations related to drug pricing and drug pricing transparency. In the U.S., various states, including Nevada, Maryland, Louisiana, New York, California, Washington, Massachusetts, Connecticut, Utah, Minnesota and Oregon, have passed legislation requiring companies to disclose extensive information relating to drug prices, drug price increases, and spending on research, development, and marketing. Although it is not clear what states will do with the collected information, some laws were designed to obtain additional product discounts. We may continue to see more state action requiring additional disclosures or other actions. In addition, we could see increased federal activity related to drug pricing and transparency requiring disclosures or other actions instead of, or in addition to, state requirements. Similar initiatives are also occurring in, or being considered by, some of the ex-U.S. markets, including Italy and Brazil.

Complying with these laws is expensive and requires significant personnel and operational resources and deters focus on our business. Additionally, any additional required discounts would adversely affect the pricing of, and revenues from, our products. Finally, while we seek to comply with all statutory and regulatory requirements, we face increased enforcement activity by the U.S. federal government, state governments, and private payors against pharmaceutical and biotechnology companies for pricing and reimbursement-related issues.

Recently, there also has been rulemaking related to importation of prescription drugs from Canada as well as guidance related to importation of prescription drugs from other foreign countries. HHS also has issued a regulation seeking to establish a model for reference pricing of certain physician-administered drugs. While the recent regulation does not apply to our current medicines, it could affect future medicines. Additionally, in 2020, the Trump Administration issued several executive orders relating to drug pricing which were intended to broadly impact the pharmaceutical industry. Likewise, HHS recently issued a final regulation adopting changes to anti-kickback laws for rebates offered to pharmacy benefit managers. We expect such government scrutiny over drug pricing, reimbursement, and distribution to increase. Potential future government regulation of drug prices or reimbursement creates uncertainties about our portfolio and could have a material adverse effect on our operations.

Third-party payors throughout the world also have been attempting to control drug spending through various other actions, and this is expected to be an area of intensified focus for all payors in light of the global economic pressures, including due to the COVID-19 pandemic. In reimbursement negotiations, many payors are demanding price discounts and caps on total expenditures and limiting both the types and variety of drugs that they will cover if they are not able to secure them. As part of these negotiations, many ex-U.S. government payers also are requiring companies to establish product cost-effectiveness as a condition of reimbursement and companies' data-backed explanations are assessed by government agencies set up for this purpose. These cost-effectiveness reviews may not account for many of the benefits provided by innovative medicines, and for the most part, have not taken into account the specific circumstances of products that treat rare diseases. This has led to conclusions that certain medicines, including our products in certain jurisdictions, are not cost-effective. As a result, certain countries have declined to reimburse, or delayed their reimbursement of, some of our products. Although not mandated in the U.S., various organizations have started advocating for cost-effectiveness analyses in the U.S. If U.S. payors were to adopt such assessments and make negative coverage determinations, it could adversely affect our product revenues. Our business would be materially adversely affected if we are not able to obtain or maintain coverage and reimbursement of our products from third-party payors on a broad, timely or satisfactory basis or if such coverage is subject to overly broad or restrictive utilization management controls.

The U.S. government, individual states and some foreign jurisdictions also have been aggressively pursuing legislative and regulatory reforms that could affect our ability to sell products. For example, in the U.S., there have been ongoing federal legislative and administrative efforts to repeal, substantially modify or invalidate some or all of the provisions of the ACA. Various portions of the ACA are subject to legal challenges in various jurisdictions, including the U.S. Supreme Court, which could affect coverage and payment for medicines. Other reforms include the Bipartisan Budget Act of 2018, which contained various provisions that affect coverage and reimbursement of drugs, including an increase in the discount that manufacturers of Medicare Part D brand name drugs must provide to Medicare Part D beneficiaries during the coverage gap from 50% to 70%. There are a number of additional bills pending in Congress that would affect drug pricing in the Medicare and Medicaid programs. Additional healthcare reform efforts have sought to address issues related to the COVID-19 pandemic, including an expansion of telehealth coverage under Medicare and accelerated or advanced Medicare payments to healthcare providers. Adoption of new healthcare reform legislation at the federal or state level could affect demand for, or pricing of, our products or product candidates if approved for sale. We cannot, however, predict the ultimate content, timing or effect of any healthcare reform legislation or action, or its impact on us, including increased compliance requirements and costs, all of which may adversely affect our future business, operations and financial results.

The increasing availability and use of innovative specialty pharmaceuticals for rare diseases, combined with their relative higher cost as compared to other types of pharmaceutical products, is generating significant third-party payor interest in developing cost-containment strategies targeted to this sector. Government regulations in both U.S. and ex-U.S. markets could further limit the prices that can be charged for our products and may limit our commercial opportunity. The increasing use of cost-effectiveness assessments in markets around the world and the financial challenges faced by many governments may lead to significant adverse effects on our business. Additionally, any legislation or regulatory changes or relaxation of laws that restrict imports of drugs from other countries, revisions to reimbursement or pharmaceuticals under government programs or general budget control actions also could reduce the net price we receive for our products.

We have experienced challenges commercializing products outside of the U.S., and our future revenues will be dependent on our ability to obtain adequate reimbursement for our products.

In most ex-U.S. markets, the pricing and reimbursement of therapeutic and other pharmaceutical products is subject to governmental control. Given recent global economic pressures, including due to the COVID-19 pandemic, and geopolitical uncertainty, government authorities throughout the world are increasingly attempting to limit or regulate the price of drug products. The reimbursement process in ex-U.S. markets can take a significant time to conclude and reimbursement decisions are made on a country-by-country basis.

Our medicines treat life-threatening conditions and address relatively small patient populations, and our research and development programs are primarily focused on developing medicines to treat similar diseases. Particular attention is being paid by payors, including government and private payors, to these types of high-cost medicines, and countries are increasingly refusing to reimburse costly medicines. We have experienced challenges in obtaining timely reimbursement for our products in various countries outside the U.S. We continue to experience such challenges in some countries. For example, we obtained reimbursement for ORKAMBI and SYMKEVI in England in the fourth quarter of 2019, four years after ORKAMBI's initial approval in 2015. Our future product revenues, including from TRIKAFTA/KAFTRIO, depend on, among other things, our ability to complete reimbursement discussions in ex-U.S. markets for our products. There is no assurance that coverage and reimbursement will be available outside of the U.S. for our four approved medicines or any future medicine, and, even if it is available, whether the timing or the level of reimbursement will be sufficient to allow us to market our medicines. Adverse pricing limitations or a delay in obtaining coverage and reimbursement would decrease our future net product revenues and harm our business.

We have limited experience developing cell and genetic therapies and could experience challenges with these programs, which could result in delays or prevent the development, manufacturing and commercialization of our cell and genetic therapies.

We are investing significant resources in the research, development and manufacturing of cell and genetic therapies. While we have previously successfully developed, manufactured and commercialized several small molecule drugs, we have limited experience with the development, manufacture and commercialization of cell and genetic therapies. Development, manufacturing and commercialization of cell and genetic therapies are subject to the same risks and uncertainties as development, manufacturing and commercializing small molecules. In addition:

- the manufacturing processes for cell and genetic therapies are different and more complex than the manufacturing processes required for small molecule drugs, and require different systems, equipment, facilities and expertise to develop and maintain;
- we may encounter difficulties in the production of our cell and genetic therapies and ensuring that the product meets required specifications;
- there have been a limited number of regulatory approvals for genetic therapies to date, the regulatory requirements governing genetic therapies continue to evolve, and regulatory positions and interpretations can change or lead to delays or significant unexpected costs with respect to our genetic therapy programs;
- the commercial success of cell or genetic therapies, including CTX001, if approved, will depend in part on the medical community, patients, and third-party or governmental payers accepting cell or genetic therapy products in general, and the applicable medicine as medically useful, cost-effective, and safe; and
- market acceptance will be dependent in part on the prevalence and severity of side effects associated with the procedure by which the cell or genetic therapy is administered, including, with respect to CTX001, if approved, the prevalence and severity of any side effects resulting from the myeloablative preconditioning regimen.

For programs addressing rare genetic diseases with small patient populations, we may not be able to identify, recruit and enroll a sufficient number of patients, or those with required or desired characteristics, to complete our clinical studies in an adequate and timely manner. Additionally, patients may be unwilling to participate in our clinical trials because of concerns that cell and genetic therapies are unsafe or unethical, negative publicity from adverse events in the biotechnology or gene therapy industries or for other reasons, including competitive clinical studies for similar patient populations.

In order to develop and commercialize any future cell or genetic therapies, we will need to incur substantial expenditures to develop, contract for, or otherwise arrange for the necessary manufacturing capabilities. Additionally, the manufacture of cell and genetic therapies requires significant expertise. Even with the relevant experience and expertise, manufacturers of cell and genetic therapy products often encounter difficulties in production, including difficulties with production costs and yields, quality control, and compliance with federal, state and foreign regulations. We cannot make any assurances that these problems will not occur, or that we will be able to resolve or address problems that occur in a timely manner, or at all.

To the extent we develop capabilities internally, there are many risks that could result in delays and additional costs, including the need to hire and train qualified employees and obtain access to necessary equipment and third-party technology. To the extent we partner with third parties to manufacture our cell or genetic therapies, any complexity in the manufacture of our products and product candidates may require lengthy technology transfers.

There also is significant uncertainty related to the insurance coverage and reimbursement of cell or genetic therapy products, including gene therapies that are potential one-time treatments. It is difficult to predict what third party payors, including U.S. or ex-U.S. governments or private insurance companies, will decide with respect to reimbursement for novel cell and genetic therapies like the ones in our pipeline. Additionally, reimbursement rates for cell and genetic therapies approved before ours could create an adverse environment for reimbursement of any therapies we ultimately commercialize. The administration of our products may require procedures for the collection of cells from patients, followed by other procedures either before or after delivery of the cell or genetic therapy. The manner and level at which reimbursement is provided for these services also is important. An inadequate reimbursement for such services may adversely affect physician decision to recommend any product for which we obtain approval in the future and our ability to market or sell them.

Given there are only a few approved cell and genetic therapy products, it also is difficult to determine how long it will take or reasonably estimate the costs to develop, manufacture and commercialize cell or genetic therapies. In addition, our cell-based therapies include approaches involving devices, which are subject to additional regulatory requirements. If we are unable to successfully develop, manufacture or commercialize such therapies on a timely or profitable basis, or at all, we may not realize benefits or generate cash flows based on our investments in these programs and our business, financial condition, results of operations and our stock price would likely be adversely affected.

We are dependent upon a small number of customers for a significant portion of our revenue, and the loss of, or significant reduction in sales to, these customers would adversely affect our results of operations.

In the U.S., we sell our products principally to a limited number of specialty pharmacy and specialty distributors, which subsequently resell our products to patients and health care providers. Internationally, we sell our products primarily to a limited number of specialty distributors and retail chains, as well as hospitals and clinics. We expect this significant customer concentration to continue for the foreseeable future. Our ability to generate and grow sales of our CF medicines will depend significantly on the extent to which these specialty distributors and specialty pharmacies are able to provide adequate distribution of our products to patients and healthcare providers. The loss of any large customer, a significant reduction in sales we make to them, any cancellation of orders they have made with us, or any failure to pay for the products we have shipped to them could adversely affect our business, financial condition and results of operations.

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

Our drug candidates remain subject to clinical testing and regulatory approval. Our future success is dependent on our ability to successfully develop additional drug candidates for both CF and non-CF indications.

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;
- show the level of safety and efficacy, including the level of statistical significance, required by the FDA or other regulatory authorities for approval of a drug candidate;

- 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. The strength of our product portfolio and pipeline will depend in large part upon the outcomes of these clinical trials, including clinical trials evaluating our triple combination therapy in younger children with CF and our clinical trials of potential medicines to treat other diseases. 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. For example, in October 2020, we discontinued development of VX-814, a drug candidate for the treatment of AAT, based on the safety and pharmacokinetic profile observed in the clinical trial.

Moreover, clinical data are often susceptible to varying interpretations, 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 or otherwise provide the level of evidence or safety and efficacy required by the FDA or other regulatory authorities for approval of a drug candidate. Finally, clinical trials are expensive and require significant operational resources to implement and maintain.

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. For example, 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. Failure to advance drug candidates through clinical development could impair our ability to ultimately commercialize products, which could materially harm our business and long-term prospects.

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, Priority Review, Breakthrough Therapy, and/or RMAT designation for some of our drug candidates. Drug candidates that receive one or more 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, Priority Review, Breakthrough Therapy and/or RMAT designation, the FDA may disagree and instead determine not to make such designation. The receipt of one or more of these designations for a drug candidate does not guarantee a faster development process, review or approval compared to drugs developed or 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, Priority Review, Breakthrough Therapy and/or RMAT 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 or demand 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 U.S. 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 U.S., 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 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 U.S., 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 therapies 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, the eligibility criteria for the clinical trial, and the ongoing COVID-19 pandemic. 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. Clinical trials are expensive and require significant operational

resources. 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.

Risks Related to Government Regulation

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 anti-kickback laws, which prohibit off-label product promotion and other similar laws and regulations both in the U.S. and in non-U.S. markets.

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. Because of the broad scope of the prohibition, most financial interactions between pharmaceutical manufacturers and prescribers, purchasers, third party payors and patients would be subject to the statute. Although there are a number of statutory exceptions and regulatory safe harbors protecting certain common activities from prosecution, the exceptions and safe harbors are narrow. Financial interactions must therefore be structured carefully to qualify for protection or otherwise withstand scrutiny.

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 those 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 our products to eligible people with CF for whom the applicable product has been approved and provide promotional materials and training programs to physicians regarding the use of each product in these patient populations. These eligible people do not represent all people 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.

In the U.S., federal and state laws regulate financial interactions between pharmaceutical manufacturers and healthcare providers, require disclosure to government authorities and the public of such interactions, and mandate the adoption of compliance standards or programs. For example, the so-called federal “sunshine law” requires pharmaceutical manufacturers to report annually to the Centers for Medicare & Medicaid Services, or CMS, payments or other transfers of value made by that entity to physicians and teaching hospitals (and additional categories of health care practitioners beginning with reports submitted on or after January 1, 2022). We also have similar reporting obligations with respect to financial interactions throughout the E.U. 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. Requirements to track and disclose financial interactions with health care providers and organizations increase government and public scrutiny of these financial interactions. Failure to comply with the reporting requirements could result in significant civil monetary penalties.

The sales and marketing practices of our industry have been the subject of increased scrutiny from government authorities in the U.S. and other countries in which we market our products, and we believe that this trend will continue. Many of these laws have not been fully interpreted by the government authorities or the courts, and their provisions are subject to a variety of interpretations. While we have a corporate compliance program which, together with our policies and procedures, is 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 and regulations, our business could be materially harmed. 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. Even if we successfully defend against government challenge, responding to the challenge may cause us to incur significant legal expenses and divert our management's attention from the operation of our business.

If we fail to comply with our reporting and payment obligations under the Medicaid Drug Rebate Program or other governmental pricing programs in the U.S., we could be subject to additional reimbursement requirements, penalties, sanctions and fines which could have a material adverse effect on our business, financial condition, results of operations and growth prospects.

We participate in the Medicaid Drug Rebate Program, the 340B Drug Pricing Program, and a number of other federal and state government pricing programs in the U.S. in order to obtain coverage for our products by certain government health care programs. These programs would generally require us to pay rebates or provide discounts to certain private purchasers or government payers in connection with our products when dispensed to beneficiaries of these programs. In some cases, such as with the Medicaid Drug Rebate Program, the rebates are based on pricing and rebate calculations that we report on a monthly and quarterly basis to the government agencies that administer the programs. The terms, scope and complexity of these government pricing programs change frequently. We may also have reimbursement obligations or be subject to penalties if we fail to provide timely and accurate information to the government, pay the correct rebates or offer the correct discounted pricing. Changes to the price reporting or rebate requirements of these programs would affect our obligations to pay rebates or offer discounts. CMS recently proposed changes to the Medicaid Drug Rebate calculations to address treatment of value-based arrangements, accumulator adjustment programs implemented by payers, and new formulations of existing products. Responding to current and future changes to these and other Medicaid Rebate requirements may increase our costs and the complexity of compliance, will be time-consuming, and could have a material adverse effect on our results of operations.

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 both prior to and following approval of 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, if at all. 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 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.

We are subject to various and evolving laws and regulations governing the privacy and security of personal data, and our failure to comply could adversely affect our business, result in fines and/or criminal penalties, and damage our reputation.

We are subject to data privacy and security laws and regulations in various jurisdictions that apply to the collection, storage, use, sharing and security of personal data, including health information, and impose significant compliance obligations. In addition, numerous other federal and state laws, including state security breach notification laws, state health information privacy laws and federal and state consumer protection laws, govern the collection, use, disclosure and security of personal information. The legislative and regulatory landscape for privacy and data protection continues to evolve, and there has been an increasing focus on privacy and data protection issues with the potential to affect our business.

For example, the E.U. General Data Protection Regulation, or GDPR, went into effect in 2018 and has imposed new obligations on us with respect to our processing of personal data and the cross-border transfer of such data, including higher standards of obtaining consent, more robust transparency requirements, data breach notification requirements, requirements for contractual language with our data processors, and stronger individual data rights. Different E.U. member states have interpreted the GDPR differently and many have imposed additional requirements, which add to the complexity of processing personal data in the E.U. The GDPR also imposes strict rules on the transfer of personal data to countries outside the E.U., including the U.S., and permits data protection authorities to impose large penalties for violations of the GDPR. Compliance with the GDPR is a rigorous and time-intensive process that may increase our cost of doing business or require us to change our business practices, and despite those efforts, there is a risk that we may be subject to fines and penalties, litigation, and reputational harm in connection with any activities falling within the scope of the GDPR.

In the U.S., California has passed the California Consumer Privacy Act, which went into effect on January 1, 2020, and several states and the federal government are actively considering proposed legislation governing the protection of personal data. Additionally, Brazil passed the General Data Protection Law, or LGPD, which went into effect in August 2020. While we continue to address the implications of the new data privacy regulations, data privacy remains an evolving landscape at both the domestic and international level, with new regulations coming into effect and continued legal challenges. Each law is also subject to various interpretations by courts and regulatory agencies, creating even more uncertainty. While we have a global privacy program that addresses such laws and regulations, our efforts to comply with the evolving data protection rules may be unsuccessful.

We must devote significant resources to understanding and complying with the changing landscape in this area. Failure to comply with data protection laws may expose us to risk of enforcement actions taken by data protection authorities, private rights of action in some jurisdictions, and potential significant penalties if we are found to be non-compliant. Failure to comply with the GDPR and applicable national data protection laws of European Economic Area member states could lead to fines of up to €20,000,000 or up to 4% of the total worldwide annual revenue of the preceding financial year, whichever is higher. Some of these laws and regulations also carry the possibility of criminal sanctions. For example, while we are not directly subject to the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act, or HIPAA, we could be subject to penalties, including criminal penalties if we knowingly obtain or disclose individually identifiable health information from a HIPAA-covered health care provider or research institution that has not complied with HIPAA's requirements for disclosing such information. Furthermore, the number of government investigations related to data security incidents and privacy violations continue to increase and government investigations typically require significant resources and generate negative publicity, which could harm our business and our reputation.

The COVID-19 pandemic has added further complexity to the processing of personal data. For example, safety measures intended to protect our employees, contractors, and other visitors to our sites may require the collection of certain personal data. Although we are focused on ensuring that personal data is properly protected, our efforts may be unsuccessful and we could unintentionally be subject to unauthorized access or disclosure of such personal data.

Clinical Trial Regulation (EU) No. 536/2014, or the Clinical Trial Regulation, and the EMA policy on publication of clinical data for medicinal products for human use both permit the EMA to publish clinical information submitted in MAAs. This provision of the Clinical Trial Regulation is expected to be effective by the end of 2021. The ability of third parties to review and/or analyze data from our clinical trials may increase the risk of commercial confidentiality breaches and result in enhanced scrutiny of our clinical trial results. Such scrutiny could result in public misconceptions regarding our drugs and drug candidates. These publications could also result in the disclosure of information to our competitors that we might otherwise deem confidential, which could harm 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.

Risks Related to Business Development Activities

Our ability to execute on our long-term strategy depends in part on our ability to engage in transactions and collaborations with other entities that add to our pipeline or provide us with new commercial opportunities.

In order to achieve our long-term business objectives, we seek to license or acquire drugs, drug candidates and other technologies that have the potential to complement our ongoing research and development efforts, access emerging technologies and license or acquire pipeline assets. These transactions may be similar to prior transactions or may involve larger transactions or later-stage assets. We have faced and will continue to face significant competition for the acquisition of rights to these types of drugs, drug candidates and other technologies from a variety of other companies, 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. Also, 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. As a result, 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 may not realize the anticipated benefits of acquisitions of businesses or technologies, and the integration following any such acquisition may disrupt our business and management.

It is challenging to effectively integrate businesses and technologies that we acquire, including the acquisitions of Semma and Exonics and the exclusive licenses that we have acquired from CRISPR and Moderna, and we may not realize the benefits anticipated from such transactions. Achieving the anticipated benefits of any transaction and successfully integrating acquired businesses or technologies involves a number of risks, including:

- failure to successfully develop and commercialize the acquired drugs, drug candidates or technologies or to achieve other strategic objectives;
- delays or inability to progress preclinical programs into clinical development or unfavorable data from clinical trials evaluating the acquired or licensed drug or drug candidates;
- difficulty in integrating the drugs, drug candidates, technologies, business operations and personnel of an acquired asset or company;
- disruption of our ongoing business and distraction of our management and employees from daily operations or other opportunities and challenges;
- the potential loss of key employees of an acquired company;

- entry into markets in which we have no or limited direct prior experience or where competitors in such markets have stronger market positions;
- potential failure of the due diligence processes to identify significant problems, liabilities or challenges of an acquired company, or acquired or licensed drug, drug candidate or technology, including but not limited to, problems, liabilities or challenges with respect to intellectual property, clinical or non-clinical data, safety, accounting practices, employee, 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; 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, licensing arrangements and other strategic transactions are inherently risky, and ultimately, if we do not complete an announced acquisition, collaboration or strategic transaction or integrate an acquired or licensed asset, business or technology successfully and in a timely manner, we may not realize the anticipated benefits of the strategic transaction.

We may later incur impairment charges related to assets acquired in any such transaction. For example, we entered into a strategic collaboration and license agreement with Parion Sciences, Inc. to develop ENaC inhibitors in 2015 and incurred an impairment charge related to this collaboration in 2017. Even if we achieve the long-term benefits associated with our strategic transactions, our expenses and short-term costs may increase materially and adversely affect our liquidity and short-term net income. Future strategic transactions could result in potentially dilutive issuances of equity securities, the incurrence of debt, the creation of contingent liabilities, impairment expenses related to goodwill, or impairment or amortization expenses related to other intangible assets, all of 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 CRISPR, and any future collaborations, include the following:

- Our collaborators may change the focus of their development and commercialization efforts or may have insufficient resources or expertise to effectively develop, manufacture or commercialize our drug candidates.
- The ability of some of our therapies to reach their potential could be limited if collaborators are unable to effectively develop, manufacture or commercialize these therapies or drug candidates or decrease or fail to increase development or commercialization efforts related to those therapies or drug candidates. Our collaboration agreements allocate development, manufacturing and commercialization responsibilities between us and our collaborators and 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.
- Our collaborators may have limited experience in developing, manufacturing and commercializing therapies, either generally, or in the specific therapeutic area. For example, CRISPR, which is responsible for leading commercialization of CTX001 in the U.S., has no prior experience commercializing a therapy and is in the process of establishing the capabilities that would be required to commercialize CTX001 in the U.S.
- 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 or costs for us with respect to drug candidates, or might result in litigation or arbitration. Any such disagreements would divert management attention and resources and would 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 with a third party, it might de-emphasize 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 clinical development programs, some of which are being developed in collaboration with a third party. For example, we are co-developing CTX001, an investigational CRISPR/Cas9-based gene-editing therapy for SCD and TDT with our collaborator, CRISPR. 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, EMA or other regulatory authorities, 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 to manufacture 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, perform different parts of our manufacturing process. Contract manufacturers may supply us with raw materials, convert these raw materials into drug substance and/or convert the drug substance into final dosage form. Third parties are used for packaging, warehousing and distribution of products. In cell and genetic therapies, third parties also will be used to both manufacture and deliver our therapies, which requires significant expertise.

Establishing, managing and expanding 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 could be subject to supply disruptions outside of our control. For example, we are collaborating with CRISPR on establishing the supply chain to support clinical trials and commercial supply for CTX001, if approved. As a result, we do not have independent control over the related supply operations and are reliant on CRISPR to adequately establish the corresponding supply chains.

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 for our medicines for commercial sale and a supply of our drug candidates for use in our clinical trials. While we have developed some internal capabilities, a majority of the manufacturing steps needed to produce our drug candidates and drug products are performed through a third-party manufacturing network. To ensure the stability of our supply chains, we aim to develop additional sources of manufacture for all steps of our manufacturing processes at the time of, or shortly after, marketing approval. Therefore, at any point in time, we may have a limited number of single source manufacturers for certain steps in our manufacturing processes, particularly for recently launched products.

If we or our third-party manufacturers become unable or unwilling to continue manufacturing product and we are not able to promptly identify another manufacturer, we could experience a disruption in the commercial supply of our then-marketed medicines, 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 additional manufacturers for all of our drug candidates and drug products 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 pre-clinical work, clinical trials and other activities, 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 CFF, to assist in the design and review of, and to conduct our clinical trials, including enrolling qualified patients. In addition, we engage third party contractors to support numerous other research, commercial and administrative activities. 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. Such standards, particularly with respect to newer cell and genetic therapies, will continue to evolve and subject us and third parties to new or changing requirements.

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 the activities, it may result in a delay of the affected clinical trial, drug development program or applicable activity. 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. In addition, failure of any third party contractor to conduct activities in accordance with our expectations could adversely affect the relevant research, development, commercial or administrative activity.

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 which could result in injunctions preventing us from selling our products or substantial liabilities.

We have numerous issued patents and pending patent applications in the U.S., 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 U.S. patent law. These include provisions that affect the way patent applications are prosecuted and may also affect patent litigation. The U.S. 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 Leahy-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 and certain of our patents have been challenged in the past. This could result 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 or patents we license might not contain claims that are sufficiently broad to prevent others from developing competing products. For instance, issued patents, or patents that may issue in the future, (i) relating to our small molecules may be limited to a particular molecule or molecules and may not cover similar molecules that have similar clinical properties, and (ii) relating to cell or genetic therapies may not cover similar technologies that would allow competitors to achieve similar results. Consequently, our competitors may independently develop competing products that do not infringe our patents or other intellectual property. In addition, CRISPR only has non-exclusive or co-exclusive rights to the patent rights that protect the core CRISPR/Cas9 gene-editing technology.

The laws of many foreign jurisdictions do not protect intellectual property rights to the same extent as in the U.S. 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 effect for only a short period following commercialization of such drug candidate. This would result in a minimal or non-existent period of patent exclusivity. If our drug candidates are not commercialized significantly ahead of the expiration date of any applicable patent, or if 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 U.S. 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 pharmaceutical 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 consolidated financial statements.

On July 24, 2020, we filed a lawsuit against Sun Pharmaceutical Industries Limited, or Sun, in the U.S. District Court for the District of Delaware alleging infringement of U.S. Patent No. 10,646,481, or the ’481 patent. The lawsuit follows Vertex’s receipt of a Notice Letter on June 11, 2020, advising that Sun had submitted an ANDA to the FDA seeking approval to manufacture and market a generic version of the 150 mg tablet of KALYDECO in the U.S. The Notice Letter indicated that Sun submitted a “Paragraph IV” certification to the FDA in which Sun asserted that the ’481 patent is invalid or would not be infringed by Sun’s generic product. The ’481 patent, which expires in 2029, was issued on May 12, 2020, and listed in the Orange Book with respect to KALYDECO 150 mg tablets on June 1, 2020. Sun does not appear to challenge our other U.S. patents covering KALYDECO. Vertex intends to vigorously enforce its intellectual property rights relating to KALYDECO, including the ’481 patent.

CRISPR has licensed certain rights to a worldwide patent portfolio that covers various aspects of the CRISPR/Cas9 editing platform technology including, for example, compositions of matter and methods of use, including their use in targeting or cutting DNA from Dr. Charpentier, one of the named inventors of this patent portfolio. The patent portfolio also has named inventors who assigned their rights either to the Regents of the University of California or the University of Vienna, to whom we refer, together with Dr. Charpentier, as the CVC Group. For example, in connection with their collaboration, Novartis and Intellia Therapeutics, Inc. have obtained a license to this patent portfolio in certain fields. Patents and patent applications in this patent portfolio have been the subject of numerous contentious proceedings in the U.S., Europe, and other jurisdictions, including interference proceedings between the CVC and the Broad Institute in the USPTO. Decisions rendered to date in these proceedings may be subject to appeal. To date, both the CVC and the Broad have obtained granted patents that purport to cover aspects of CRISPR/Cas9 editing platform technology. The patents and patent

applications within the CVC patent portfolio and the Broad patent portfolio are, or may in the future be, involved in proceedings similar to interferences or priority disputes in Europe or other foreign jurisdictions. We can give no assurances to the ultimate outcome of these proceedings or the dispute between the CVC Group and Broad.

In addition to the Broad, other third parties have filed patent applications claiming CRISPR/Cas9-related inventions and may allege that they invented one or more of the inventions claimed by the CVC Group. Thus, the USPTO may, in the future, declare an interference between certain CVC Group patent applications and one or more patent applications. The Broad, as well as other third parties, could seek to assert its issued patents against us based on our CRISPR/Cas9-based activities, including commercialization. Defense of these claims, regardless of their merit, could involve substantial litigation expense and could result in a substantial diversion of management and other employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, obtain one or more licenses from third parties, pay royalties or redesign our infringing products, which may be impossible or require substantial time and monetary expenditure. In that event, we could be unable to further develop and commercialize CTX001 or other products that we may develop using the CRISPR/Cas9 technology we license from CRISPR.

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 our CF medicines and expand our research and development capabilities. New laws and industry codes in the E.U. and elsewhere have expanded transparency requirements regarding payments and transfers of value to healthcare professionals, requirements surrounding patient-level clinical trial data, the protection of personal data and increased sanctions for violations. Collectively, our expansion and these new requirements are adding to our compliance costs and potentially exposes us to sanctions in the event of an infringement or failure to report 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 E.U. Consequently, we are, and will continue to be, subject to risks related to operating in foreign countries, including risks relating to intellectual property protections and business interruptions. These risks are increased with respect to countries such as China that have substantially different local laws and business practices and weaker protections for intellectual property. Risks associated with operating a global biotechnology company 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 foreign countries in a timely manner;
- differing patient treatment infrastructures, particularly since our business is focused on the treatment of serious diseases that affect relatively smaller numbers of patients and are typically prescribed by specialist physicians;
- collectability 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 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 U.S.;
- reliance on third-party vendors and suppliers;
- import and export licensing requirements, tariffs, and other trade and travel restrictions;
- global or regional public health emergencies that could affect our operations or business;
- 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 FCPA 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 FCPA. 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.

We are subject to risks associated with the global COVID-19 pandemic.

The COVID-19 pandemic has broadly affected the global economy, resulted in significant travel and work restrictions in many regions and has put a significant strain on healthcare resources. COVID-19 has had, and we expect it will continue to have, an impact on our operations, an impact on the operations of our collaborators, third-party contractors and other entities, including governments, governmental agencies and payors, with which we interact, and an impact on the people with CF who take our medicines. To date, the most significant effect on our business operations has been the requirement that a majority of our employees work remotely. We have re-initiated enrollment and dosing in all of our ongoing clinical trials and initiated new clinical trials despite some temporary pauses to enrollment and dosing early in the pandemic.

We continue to monitor local COVID-19 trends and government guidance for each of our site locations and are utilizing a phased, site-specific approach to assess employee access to our sites. Currently, all of our research and manufacturing sites are open to essential employees. There can be no assurance that our sites will remain open, when additional employees will gain access to our sites or whether we will be required to pause enrollment and dosing at clinical trial sites. Any site closure or pause of a clinical trial could harm our operations and delay the development of our product candidates. In addition, even if sites or clinical trials are open for enrollment, COVID-19 may nevertheless impact clinical trial enrollment or participation, for example due to suspension of in-person procedures required for enrollment, government shut-down orders, or decreased patient willingness to participate compared to pre-COVID-19 pandemic levels. COVID-19 may also impact uptake of our medicines generally and patient retention in clinical trials, potentially resulting in higher drop-out rates or missed visits, which may negatively affect the strength of our clinical trial data.

In the future, the economic impacts of the COVID-19 pandemic could affect our business directly or indirectly, including potentially affecting the net prices for our products through changes in our payor mix as a result of increased unemployment in the U.S. or increased pressure on healthcare costs in the U.S. and around the world. The effects on our research, development, manufacturing and commercialization activities, including the virtual launch of KAFTRIO in the E.U., will be dependent on, among other things, the severity and duration of the COVID-19 pandemic and any worsening of the global economic environment as a result thereof, as well as the impact of the pandemic on our third-party manufacturers, suppliers, distributors, subcontractors and customers. While the ultimate impact of COVID-19 on our business is highly uncertain, any negative impacts that materialize could materially adversely affect our operations, financial performance and stock price. Any negative impacts of COVID-19, alone or in combination with others, could exacerbate other risk factors discussed herein. The full extent to which the COVID-19 pandemic will negatively affect our operations, financial performance and stock price will depend on future developments that are highly uncertain and cannot be predicted, including the scope and duration of the pandemic and actions taken by governmental authorities and other third parties in response to the pandemic.

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; and
- enhance our compliance and legal resources.

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

Due to the highly technical nature of our drug discovery and development activities, 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 have entered into employment agreements with some executives and provide stock-related compensation 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 restricted stock units and stock options - can be 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. We face intense competition for our personnel from our competitors and other companies throughout our industry, especially with respect to employees with expertise in cell or genetic therapies. 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 has increased competition for the available pool of skilled employees, especially in technical fields. The high cost of living can make it difficult to attract employees from other parts of the country to our Massachusetts headquarters. 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 continue 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.

Our business faces potential risks relating to the United Kingdom's withdrawal from the European Union.

Our European headquarters and European research facility are located in the U.K., and a significant portion of our ex-U.S. net product revenues are derived from sales in the U.K. On January 31, 2020, the U.K. formally withdrew from the E.U., also known as Brexit. The U.K. and the E.U. negotiated a detailed post-Brexit Trade and Cooperating Agreement which went into effect on January 1, 2021. As of January 1, 2021, E.U. Treaties, E.U. free movement rights and the general principals of E.U. law no longer apply in relation to the U.K. By virtue of the E.U. (Withdrawal) Act 2018, E.U. relations will continue to apply in U.K. domestic law to the extent that they are not modified of revoked by regulations under that Act. 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. 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.

We are or may be involved in various legal proceedings, including securities/shareholder matters and claims related to product liability, intellectual property and breach of contract. Such proceedings may involve claims for, or the possibility of, damages or 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 and 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, cyber-attacks are increasing in their frequency, sophistication and intensity, and have become increasingly difficult to detect. There can be no assurance that our efforts to protect our data and information systems will prevent breakdowns or breaches in our systems that could adversely affect our business. In addition, our liability insurance may not be sufficient in type or amount to cover us against claims related to security breaches, cyber-attacks or other related liabilities.

Risk of cyber-attack is increased with the majority of employees working remotely during the ongoing COVID-19 pandemic. During this time, there is an increased risk that we may be vulnerable to cybersecurity-related events such as phishing attacks and other security threats as a result of our employees, third party vendors and collaborators working remotely from non-corporate managed networks.

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 an earthquake, severe storms, fire 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 business continuity 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, large expenses to repair or replace the facility and/or the loss of critical data, which could have a material adverse effect on our business.

The use of social media platforms presents risks and challenges.

Social media 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, our employees may engage on social media in ways that may not comply with legal or regulatory requirements, which may give rise to liability, lead to the loss of trade secrets and other intellectual property, or result in public disclosure of protected personal information. There is a risk of inappropriate disclosure of sensitive information or negative or inaccurate posts or comments about us on any social networking website. Certain data protection regulations, such as the GDPR, apply to personal data contained on social media. If any of these events were to occur or we otherwise fail to comply with applicable regulations, we could incur liability, face regulatory actions or incur harm to our business, including damage to our reputation.

Risks Related to Financial Results and Holding Our Common Stock

Our stock price may fluctuate.

Market prices for securities of companies such as ours are highly volatile. From January 1, 2020 to December 31, 2020, our common stock traded between $197.47 and $306.08 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 therapies or those of our competitors, or regulatory filings for our therapies or those of our competitors, or announcements of interim or final results of clinical trials or nonclinical studies relating to our therapies or those of our competitors;
- developments in domestic and international governmental policy or regulation, for example, relating to drug pricing or intellectual property rights;
- 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;
- information disclosed by third parties regarding our business or products;
- 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, including as a result of the ongoing COVID-19 pandemic.

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 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 our CF medicines. Our total net product revenues could vary on a quarterly basis based on, among other factors, the timing of orders from our significant customers. Additional factors that have caused quarterly fluctuations to our operating results in recent years include variable amounts of revenues, expenses related to business development activities, changes in the fair value of our strategic investments, 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. The release of such information may result in volatility in the price of our common stock.

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

We are subject to taxation in numerous countries, states and other jurisdictions. As a result, our effective tax rate is derived from a combination of applicable tax rates in the various places that we operate globally. Our effective tax rate may be different than experienced in the past due to numerous factors, including changes in the mix of our profitability from country to country, the results of tax authority examinations/audits of our tax filings, adjustments to the value of our uncertain tax positions, changes in accounting for income taxes and changes in tax laws or modifications of treaties in various jurisdictions. For example, changes to the U.S. tax code are anticipated under the new administration. Any of these factors could cause us to experience an effective tax rate that is significantly different from previous periods or our current expectations.

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.

Recommendations from the Organization for Economic Co-operation and Development that are part of the base erosion and profit shifting, or BEPS, framework could result in changes in tax laws in countries where we do business and adversely affect our provision for income taxes and our current rate. If these recommendations (or other changes in law) were adopted by the countries in which we do business, it could adversely affect our provision for income tax and our current rate.

General Risk Factors

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

We may need to raise additional capital in the future. 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. 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.

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

In 2019, we entered into a credit agreement providing for a $500 million revolving facility. In September 2020, we entered into a second credit agreement providing for a $2.0 billion revolving facility. Each of the credit agreements provides that, subject to the satisfaction of certain conditions, we may request the borrowing capacity be increased by an additional $500.0 million. If we borrow under our current credit agreements or any future credit agreement, such 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 agreements require that we comply with certain financial covenants, including (i) a consolidated leverage ratio covenant and (ii) a consolidated interest coverage ratio covenant, in each case to be measured on a quarterly basis. Further, the credit agreements include 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 agreements and/or our finance leases and could have a material adverse effect on our business. Additionally, our obligations under the credit agreements are unconditionally guaranteed by certain of our domestic subsidiaries.

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

As of December 31, 2020, we had 259.9 million shares of common stock issued and outstanding. As of December 31, 2020, we also had outstanding options to purchase 4.2 million shares of common stock with a weighted-average exercise price of $140.47 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 equity awards 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.

There can be no assurance that we will repurchase shares of common stock or that we will repurchase shares at favorable prices.

In November 2020, our Board of Directors authorized a share repurchase program pursuant to which we are authorized to repurchase up to $500 million of our common stock by December 31, 2022. As of December 31, 2020, we had repurchased $75.1 million of common stock under the share repurchase program and had remaining available $424.9 million to repurchase additional shares pursuant to this program.

Our stock repurchases will depend upon, among other factors, our cash balances and potential future capital requirements, results of operations, financial condition and other factors that we may deem relevant. We can provide no assurance that we will repurchase stock at favorable prices, if at all.

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 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.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K, including the descriptions of our Business set forth in Part I, Item 1, our Risk Factors set forth in Part I, Item 1A, and our Management's Discussion and Analysis of Financial Condition and Results of Operations set forth in Part II, Item 7, contains forward-looking statements. Forward-looking statements are not purely historical and may be accompanied by words such as "anticipates," "may," "forecasts," "expects," "intends," "plans," "potentially," "believes," "seeks," "estimates," and other words and terms of similar meaning. Such statements may relate to:

- our expectations regarding the amount of, timing of, and trends with respect to our financial performance, including revenues, costs and expenses and other gains and losses;
- our expectations regarding clinical trials, including expectations for patient enrollment, development timelines, the expected timing of data from our ongoing and planned clinical trials, and regulatory authority filings and submissions for our therapies;
- our ability to obtain reimbursement for our medicines in ex-U.S. markets and our ability to launch, commercialize and market our medicines or any of our other therapies for which we obtain regulatory approval;
- 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 therapies for further investigation, clinical trials or potential use as a treatment;
- our plans to continue investing in our research and development programs, including anticipated timelines for our programs, and our strategy to develop our pipeline programs, alone or with third party-collaborators;
- our beliefs regarding the approximate patient populations for each of our disease areas;
- the potential benefits and therapeutic scope of our acquisitions and collaborations;
- the establishment, development and maintenance of collaborative relationships, including potential milestone payments or other obligations;

- potential business development activities, including the identification of potential collaborative partners or acquisition targets;
- potential fluctuations in foreign currency exchange rates;
- our expectations regarding our provision for or benefit from income taxes and the utilization of our deferred tax assets, including the impact of the Coronavirus Aid, Relief and Economic Security Act;
- our ability to use our research programs to identify and develop new drug candidates to address serious diseases and significant unmet medical needs;
- our plans to expand, strengthen, and invest in our global supply chains and manufacturing infrastructure and capabilities;
- our expectations regarding the effect of the COVID-19 pandemic on, among other things, our financial performance, liquidity, business and operations, including manufacturing, supply chain, research and development activities and pipeline programs; and
- our liquidity and our expectations regarding the possibility of raising additional capital.

Forward-looking statements are subject to certain risks, uncertainties, or other factors that are difficult to predict and could cause actual events or results to differ materially from those indicated in any such statements. These risks, uncertainties, and other factors include, but are not limited to, those described in our Risk Factors, set forth in Part I, Item 1A, and elsewhere in this report and those described from time to time in our future reports filed with the Securities and Exchange Commission.

Any such forward-looking statements are made on the basis of our views and assumptions as of the date of the filing and are not estimates of future performance. Except as required by law, we undertake no obligation to publicly update any forward-looking statements. The reader is cautioned not to place undue reliance on any such 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, 2020 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. These 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.

Additional United States and Worldwide Locations

In addition to our corporate headquarters, we lease an aggregate of approximately 678,000 square feet of space globally. This space includes logistical, laboratory, commercial and manufacturing operations, as well as laboratory and office space to support our research and development organizations. We also own approximately 213,000 square feet at our continuous manufacturing facility in Massachusetts.

ITEM 3. LEGAL PROCEEDINGS

We are not currently subject to any material legal proceedings.

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

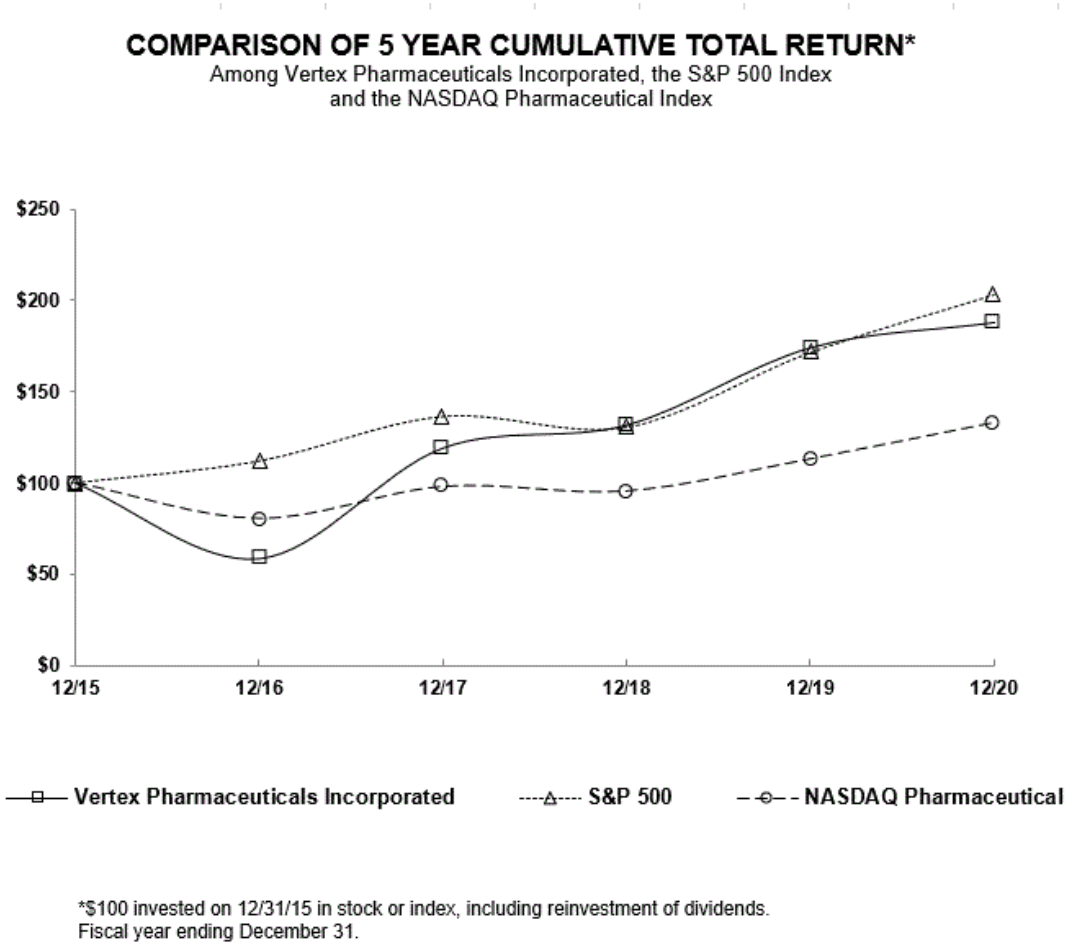
Market Information

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

Shareholders

As of January 31, 2021, there were 115 holders of record of our common stock.

Performance Graph



Dividends

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

In July 2019, our Board of Directors approved a share repurchase program (the "2019 Share Repurchase Program"), pursuant to which we were authorized to repurchase up to $500.0 million of our common stock between August 1, 2019 and December 31, 2020. As of December 31, 2020, we had repurchased the entire $500.0 million of common stock that was authorized under the 2019 Share Repurchase Program.

In November 2020, our Board of Directors approved a new share repurchase program (the "2020 Share Repurchase Program"), pursuant to which we are authorized to repurchase up to $500.0 million of our common stock by December 31, 2022. As of December 31, 2020, there was a total of $424.9 million remaining for repurchases under the 2020 Share Repurchase Program.

The table set forth below shows repurchases of securities by us during the three months ended December 31, 2020 under our 2019 Share Repurchase Program and our 2020 Share Repurchase Program.

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (3)	Approximate dollar value of Shares that May Yet be Purchased Under the Plans or Programs (3)
Oct. 1, 2020 to Oct. 31, 2020 (1)	252,375	$ 221.90	252,375	$ —
Nov. 1, 2020 to Nov. 30, 2020 (2)	345,897	$ 217.08	345,897	$ 424,912,410
Dec. 1, 2020 to Dec. 31, 2020 (2)	—	$ —	—	$ 424,912,410
Total	598,272	$ 219.12	598,272	$ 424,912,410

(1) Shares purchased and approximate dollar value of shares that may yet be purchased under our 2019 Share Repurchase Program.

(2) Shares purchased and approximate dollar value of shares that may yet be purchased under our 2020 Share Repurchase Program.

(3) Under our 2020 Share Repurchase Program, we are authorized to purchase shares from time to time through open market or privately negotiated transactions. Such purchases may be made pursuant to Rule 10b5-1 plans or other means as determined by our management and in accordance with the requirements of the Securities and Exchange Commission. The approximate dollar value of shares that may yet be repurchased is based solely on shares that may be repurchased under the share repurchase program and excludes any shares that may be repurchased under our employee equity programs.

ITEM 6. SELECTED FINANCIAL DATA

The following unaudited selected consolidated financial data are derived from our audited consolidated financial statements. 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,				
	2020	2019	2018	2017	2016
Consolidated Statements of Operations Data:	(in thousands, except per share amounts)				
Product revenues, net	$ 6,202,783	$ 4,160,726	$ 3,038,325	$ 2,165,480	$ 1,683,632
Collaborative and royalty revenues	2,900	2,095	9,272	323,172	18,545
Total revenues	6,205,683	4,162,821	3,047,597	2,488,652	1,702,177
Total costs and expenses (1)	3,349,393	2,965,255	2,412,447	2,365,409	1,692,241
Provision for (benefit from) income taxes (2)	405,151	218,109	(1,486,862)	(107,324)	16,665
Net income (loss) attributable to Vertex	$ 2,711,647	$ 1,176,810	$ 2,096,896	$ 263,484	$ (112,052)
Diluted income (loss) per share attributable to Vertex common shareholders	$ 10.29	$ 4.51	$ 8.09	$ 1.04	$ (0.46)
Shares used in per diluted share calculations	263,396	260,673	259,185	253,225	244,685

	As of December 31,				
	2020	2019	2018	2017	2016
Consolidated Balance Sheet Data:	(in thousands)				
Cash, cash equivalents and marketable securities	$ 6,658,897	$ 3,808,294	$ 3,168,242	$ 2,088,666	$ 1,434,557
Deferred tax assets (2)	882,779	1,190,815	1,499,672	—	—
Total assets	11,751,808	8,318,465	6,245,898	3,546,014	2,896,787
Total current liabilities	1,877,533	1,334,827	1,120,290	807,260	792,537
Long-term finance leases	539,042	538,576	581,550	583,902	521,335
Other long-term liabilities	648,418	359,818	108,853	112,546	244,724
Total shareholders' equity	8,686,815	6,085,244	4,435.203	2,042,306	1,338,191

(1) Total costs and expenses included (i) in 2017, an intangible asset impairment charge of $255.3 million, and (ii) in 2020, 2019, 2018 and 2017, collaborative license and asset acquisition expenses of $184.6 million, $318.3 million, $111.9 million and $168.7 million, respectively. See Note B, "Collaborative Arrangements."

(2) In 2018, we released the valuation allowance on the majority of our net operating losses and other deferred tax assets resulting in a benefit from income taxes of $1.56 billion in the fourth quarter of 2018 and we recorded a $1.50 billion deferred tax asset on our consolidated balance sheet as of December 31, 2018. In 2020 and 2019, we began recording a provision for income taxes on our pre-tax income approximating statutory rates. In 2020, our provision for income taxes included discrete tax benefits associated with the $209.0 million transfer of intellectual property rights to the U.K., the write-off of a long-term intercompany receivable, and an increase in the U.K.'s corporate tax rate. See Note O, "Income Taxes." In 2017, we recorded a benefit from income taxes related to the impairment of an intangible asset.

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

OVERVIEW

We invest in scientific innovation to create transformative medicines for people with serious diseases with a focus on specialty markets. We have four approved medicines to treat cystic fibrosis, or CF, a life-threatening genetic disease, and we are focused on increasing the number of patients eligible and able to receive our current medicines through label expansions, approval of new medicines and expanded reimbursement. We are broadening our pipeline into additional disease areas through internal research efforts and accessing external innovation through business development transactions.

Our triple combination regimen, TRIKAFTA/KAFTRIO, was approved in 2019 in the United States, or U.S., and in 2020 in the European Union, or E.U. Collectively, our four medicines are approved to treat the majority of the approximately 83,000 people with CF in North America, Europe and Australia. We are evaluating our medicines, including our triple combination regimen, in additional patient populations, including younger children, with the goal of having small molecule treatments for up to 90% of people with CF. We are also pursuing genetic therapies to address the remaining 10% of people with CF.

Beyond CF, our small molecule programs include programs focused on developing treatments for alpha-1 antitrypsin, or AAT, deficiency, APOL1-mediated kidney diseases and pain. We are also focused on developing cell and genetic therapies for various diseases in our pipeline. We are evaluating CTX001, a genetic therapy, as a potential treatment for sickle cell disease, or SCD, and transfusion-dependent beta thalassemia, or TDT, in Phase 1/2 clinical trials in collaboration with CRISPR Therapeutics AG, or CRISPR. In T1D, we are pursuing two programs for the transplant of functional islets into patients: transplantation of islet cells alone, using immunosuppression to protect the implanted cells, and implantation of the islet cells inside a novel immunoprotective device. In 2020, we continued to advance our cell and genetic therapy pipeline programs through internal research efforts and investing in business development transactions to access emerging technologies.

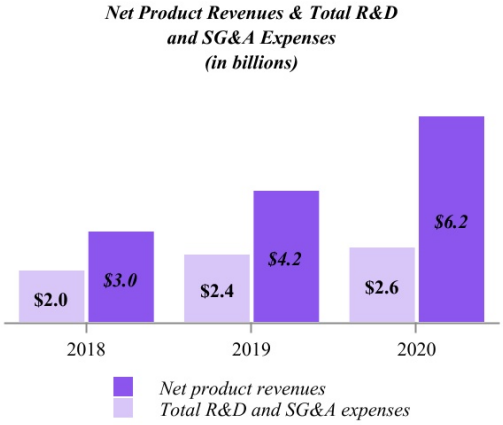
Financial Highlights

Revenues

In 2020, our net product revenues continued to increase due to the approval of TRIKAFTA in late 2019 and uptake of our medicines in ex-U.S. markets following the approval of KAFTRIO and completion of several significant reimbursement agreements.

Expenses

Our total R&D and SG&A expenses increased from $2.41 billion in 2019 to $2.60 billion in 2020. In 2020, cost of sales was approximately 12% of our net product revenues.



Business Updates

Cystic Fibrosis

We expect to continue to grow our CF business through increasing the number of people with CF eligible and able to receive our medicines and providing improved treatment options for people who are already eligible for one of our medicines. Since the beginning of 2020, we have made important progress in activities supporting these efforts.

- In August, the European Commission granted marketing authorization for KAFTRIO to treat people with CF 12 years of age and older with one *F508del* mutation and one minimal function mutation, or two *F508del* mutations.
- The FDA expanded the eligibility for TRIKAFTA to include people with CF 12 years of age and older with certain mutations that are responsive to TRIKAFTA based on *in vitro* data. SYMDEKO and KALYDECO also received approvals to include additional responsive mutations in people with CF 6 years of age and older and 4 months of age and older, respectively.
- In January 2021, the FDA accepted our supplemental New Drug Application, or sNDA, for TRIKAFTA for the treatment of children with CF 6 to 11 years of age with at least one *F508del* mutation or have certain mutations that are responsive to TRIKAFTA based on *in vitro* data. The FDA granted Priority Review of the sNDA.
- The European Commission approved the label extension of SYMKEVI in combination with KALYDECO for the treatment of children with CF 6 years of age and older with two *F508del* mutations or one *F508del* mutation and certain residual function mutations.
- The FDA approved KALYDECO for treatment of infants with CF four months of age and older who have at least one mutation in their CFTR gene that is responsive to KALYDECO.
- The European Commission approved KALYDECO for treatment of infants with CF four months of age and older who have the *R117H* mutation or certain gating mutations.

Pipeline

We continue to advance a broad pipeline of potentially transformative small molecule, cell and genetic therapies aimed at treating serious diseases. Since the beginning of 2020, we have made important progress in activities supporting these efforts.

Beta Thalassemia and Sickle Cell Disease

- In December, we and our collaborator, CRISPR, announced positive interim data from 10 people with TDT or SCD treated with CTX001 and that 20 people with severe hemoglobinopathies have been dosed with CTX001 in the ongoing Phase 1/2 clinical trials. Enrollment and dosing are ongoing, and completion of enrollment in both clinical trials is expected in 2021.

Alpha-1 Antitrypsin Deficiency

- Enrollment is ongoing in a Phase 2 proof-of-concept clinical trial for the corrector VX-864. We expect data from this clinical trial in the first half of 2021.
- We discontinued development of VX-814, our first corrector, based on the safety and pharmacokinetic profile of VX-814 observed in a Phase 2 clinical trial.

APOL1-Mediated Kidney Diseases

- Enrollment is ongoing in a Phase 2 proof-of-concept clinical trial designed to evaluate the reduction of proteinuria in people with APOL1-mediated FSGS after treatment with VX-147. We expect data from this clinical trial in 2021.

Type 1 Diabetes

- We are developing a cell therapy designed to replace insulin-producing islet cells in patients with T1D. We are pursuing two programs for the transplant of these functional islets into patients: transplantation of islet cells alone,

using immunosuppression to protect the implanted cells, and implantation of the islet cells inside a novel immunoprotective device.

- In January 2021, the FDA cleared our IND for VX-880, the islet cells alone program. We expect to initiate a Phase 1/2 clinical trial evaluating this program in the first half of 2021. This clinical trial will involve an infusion of fully differentiated, functional islet cells, and chronic administration of concomitant immunosuppressive therapy, to protect the islet cells from immune rejection.

Investment in External Innovation

- We entered into a collaboration with Skyhawk Therapeutics, Inc., or Skyhawk, for the discovery and development of novel small molecules that modulate RNA splicing for the treatment of serious diseases.
- We entered into a new collaboration with Moderna, Inc., or Moderna, aimed at the discovery and development of lipid nanoparticles and mRNAs that can deliver gene-editing therapies to lung cells for the treatment of CF.
- We entered into a collaboration with Affinia Therapeutics, Inc., or Affinia, to gain access to a novel library of AAV capsids to support on our ongoing research and development efforts in genetic therapies, including DMD, DM1 and CF.

COVID-19

We continue to monitor the impacts of the COVID-19 global pandemic on our business. COVID-19 has not affected our supply chain or the demand for our medicines, and we believe that we will be able to continue to supply all of our approved medicines to patients globally. We have adjusted our business operations in response to COVID-19, with a majority of our employees continuing to work remotely. We continue to monitor local COVID-19 trends and government guidance for each of our site locations, and are utilizing a phased, site-specific approach to assess employee access to our sites. Currently, all of our research and manufacturing sites are open to essential employees. To provide a safe working environment for our on-site employees, we have, among other things, limited employee numbers at our open sites and increased safety measures, including at home and on-site testing in the U.S., enhanced cleaning and sanitation protocols, required use of personal protective equipment for all on-site employees, hand sanitation stations throughout our open sites and implementation of various social distancing measures while on-site.

Research

We continue to invest in our research programs and foster scientific innovation in order to identify and develop transformative medicines. Our strategy is to combine transformative advances in the understanding of human disease and the science of therapeutics in order to identify and develop new medicines. We believe that pursuing innovative approaches to treat diverse diseases of great unmet need allows us to balance the risks inherent in drug development and may provide drug candidates that will form our pipeline in future years. To supplement our internal research programs, we acquire technologies and programs and 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 and to access technologies needed to execute on our strategy.

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. 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 rapid 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. For example, in October 2020, we discontinued development of VX-814, a

drug candidate for the treatment of AAT, based on the safety and pharmacokinetic profile of VX-814 observed in a Phase 2 clinical trial.

If we believe that data from a completed registration program support approval of a drug candidate, we submit an NDA or BLA to the FDA requesting approval to market the drug candidate in the U.S. and seek analogous approvals from comparable regulatory authorities in jurisdictions outside the U.S. 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 ex-U.S. 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 laws in other jurisdictions, pertaining to health care fraud and abuse, including anti-kickback and false claims laws, and laws prohibiting the promotion of drugs for unapproved or off-label uses. Anti-kickback laws generally make it illegal for a prescription drug manufacturer to knowingly and willfully solicit, offer, receive or pay any remuneration in return for or to induce the referral of business, including the purchase or prescription of a particular drug that is reimbursed by a state or federal health care program. False claims laws prohibit anyone from knowingly or willfully 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 are subject to laws and regulations that regulate the sales and marketing practices of pharmaceutical manufacturers, as well as laws such as the U.S. Foreign Corrupt Practices Act, which govern our international business practices with respect to payments to government officials. In addition, we are subject to various data protection and privacy laws and regulations in the U.S., E.U., U.K., Canada, Australia and other jurisdictions. 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 reimbursed 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 U.S. and ex-U.S. markets.

In the U.S., we have worked successfully with third party payors in order to promptly obtain appropriate levels of reimbursement for our CF medicines. We plan to 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, to ensure that payors recognize the significant benefits that our medicines provide by treating the underlying cause of CF and continue to provide access to our medicines.

In Europe and other ex-U.S. markets, we seek government reimbursement for our medicines on a country-by-country basis. This is necessary for each new medicine, as well as label expansions for our current medicines. We successfully obtained reimbursement for KALYDECO in each significant ex-U.S. market within two years of approval, but experienced significant challenges in obtaining reimbursement for ORKAMBI in certain ex-U.S. markets. With the completion of reimbursement discussions in England and France in 2019, we have reimbursement for ORKAMBI or SYMKEVI in most of our significant ex-U.S. markets. In addition, in several ex-U.S. markets, including England, Ireland, Denmark and Australia, our reimbursement agreements include innovative arrangements that provide a pathway to access and rapid reimbursement for certain future CF medicines. For example, our existing reimbursement agreements in England, Ireland, and Denmark have been expanded to include KAFTRIO. We expect to continue to focus significant resources to obtain appropriate reimbursement for our products in ex-U.S. markets.

Strategic Transactions

Acquisitions

As part of our business strategy, we seek to acquire drugs, drug candidates and other technologies and businesses that have the potential to complement our ongoing research and development efforts. In 2019, we invested significantly in business development transactions designed to augment our pipeline, including the acquisition of Semma Therapeutics, Inc., or Semma, a privately-held company focused on the use of stem cell-derived human islets as a potentially curative treatment for T1D, and Exonics Therapeutics, Inc., or Exonics, a privately-held company focused on creating transformative gene-editing therapies to repair mutations that cause DMD and other severe neuromuscular diseases, including DM1. In the Semma acquisition, we paid approximately $950.0 million in cash to Semma equity holders. In the Exonics acquisition, we paid approximately $245.0 million upfront to Exonics equity holders and agreed to additional payments based upon successful achievement of specified development and regulatory milestones. We expect to continue to identify and evaluate potential acquisitions and may include larger transactions or later stage assets.

Both of our 2019 acquisitions were accounted for as business combinations. As of the acquisition date for each transaction, the cash payments, as well as the fair value of contingent consideration for Exonics, were allocated primarily to goodwill and the fair value of several in-process research and development assets that we acquired. The fair value of contingent consideration related to Exonics was recorded as a liability and continues to be adjusted on a quarterly basis. As a result, these acquisitions are primarily reflected in additional assets and liabilities on our consolidated balance sheet. Operating expenses incurred by Exonics and Semma after the acquisition dates and specific expenses associated with the acquisitions are reflected in our consolidated statement of operations.

Please refer to our critical accounting policies, "*Acquisitions*," for further information regarding the significant judgments and estimates related to our acquisitions.

Collaboration and Licensing Arrangements

We enter into arrangements with third parties, including collaboration and licensing arrangements, for the development, manufacture and commercialization of drugs, drug candidates and other technologies that have the potential to complement our ongoing research and development efforts. We expect to continue to identify and evaluate collaboration and licensing opportunities that may be similar to or different from the collaborations and licenses that we have engaged in previously.

In-License Agreements

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 a number of companies, including Affinia, Arbor Biotechnologies, Inc., CRISPR, Kymera Therapeutics, Inc., Moderna, Molecular Templates, Inc. and Skyhawk. Generally, when we in-license a technology or drug candidate, we make upfront payments to the collaborator, assume the costs of the program and/or agree to make contingent payments, which could consist of milestone, royalty and option payments. Most of these collaboration payments are expensed as research and development expenses; however, depending on many factors, including the structure of the collaboration, the significance of the in-licensed drug candidate to the collaborator's operations and the other activities in which our collaborators are engaged, the accounting for these transactions can vary significantly. Our research and development expenses included $184.6 million in 2020, $318.3 million in 2019 and $111.9 million in 2018 related to upfront and milestone payments pursuant to our collaboration agreements.

Out-License Agreements

We also have out-licensed internally-developed programs to collaborators who are leading the development of these programs. These out-license arrangements include our agreement with Merck KGaA, Darmstadt, Germany, which licensed oncology research and development programs from us in early 2017. Pursuant to these out-licensing 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 royalty revenues resulting from these programs.

Please refer to Note B, “Collaborative Arrangements,” for further information regarding our in-license agreements and out-license agreements.

Strategic Investments

In connection with our business development activities, we have periodically made equity investments in our collaborators. As of December 31, 2020, we held strategic equity investments in several public companies and certain private companies, and we plan to make additional strategic equity investments in the future. While we invest the majority of our cash, cash equivalents and marketable securities in instruments that meet specific credit quality standards and limit our exposure to any one issue or type of instrument, our strategic investments are maintained and managed separately from our other cash, cash equivalents and marketable securities. Any changes in the fair value of equity investments with readily determinable fair values (including publicly traded securities) are recorded to other income (expense), net in our consolidated statement of operations.

In 2020, 2019 and 2018, we recorded within other income (expense), net gains of $311.9 million, $197.6 million and $2.6 million, respectively, related to changes in the fair value of our strategic investments and from sales of certain investments. As of December 31, 2020, the fair value of our investments in publicly traded companies was $195.8 million. To the extent that we continue to hold strategic investments, particularly strategic investments in publicly traded companies, we will record other income (expense) related to these strategic investments on a quarterly basis. Due to the increased volatility of the global markets, including as a result of COVID-19, and the high volatility of stocks in the biotechnology industry, we expect the value of these strategic investments to fluctuate and that the increases or decreases in the fair value of these strategic investments will continue to have material impacts on our net income (expense) and our profitability on a quarterly and/or annual basis.

RESULTS OF OPERATIONS

				2020/2019 Comparison		2019/2018 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2020	2019	2018	$	%	$	%
	(in thousands, except percentages and per share amounts)						
Revenues	$ 6,205,683	$ 4,162,821	$ 3,047,597	$ 2,042,862	49 %	$ 1,115,224	37 %
Operating costs and expenses	3,349,393	2,965,255	2,412,447	384,138	13 %	552,808	23 %
Income from operations	2,856,290	1,197,566	635,150	1,658,724	139 %	562,416	89 %
Other non-operating income (expense), net	260,508	197,353	(25,116)	63,155	32 %	**	**
Provision for (benefit from) income taxes	405,151	218,109	(1,486,862)	187,042	86 %	**	**
Net income attributable to Vertex	$ 2,711,647	$ 1,176,810	$ 2,096,896	$ 1,534,837	130 %	$ (920,086)	**
Net income per diluted share attributable to Vertex common shareholders	$ 10.29	$ 4.51	$ 8.09				
Diluted shares used in per share calculations	263,396	260,673	259,185				

** Not meaningful

Net Income Attributable to Vertex

Our net income attributable to Vertex increased to $2.71 billion in 2020 as compared to $1.18 billion in 2019 primarily due to increased revenues and increased other income (expense) related to our strategic investments partially offset by increased operating costs and expenses and an increased provision for income taxes. The increased revenues were primarily due to the U.S. approval of TRIKAFTA in the fourth quarter of 2019, E.U. approval of KAFTRIO in the third quarter of 2020 and continued uptake of our medicines in ex-U.S. markets. The increased operating costs and expenses were primarily due to increased cost of sales consistent with increased net product revenues, increased investment in research and development and increased sales, general and administrative expenses to support our business.

Net income attributable to Vertex in 2018 included a one-time non-cash benefit from income taxes of $1.56 billion resulting from our release of our valuation allowance. Net income attributable to Vertex decreased in 2019 as compared to 2018 as a result of this one-time tax benefit and increased operating costs and expenses. The increases in operating costs and expenses were primarily due to increased cost of sales due to increased net product revenues and increased research expenses associated with our business development activities. These decreases in our net income in 2019 as compared to 2018 were partially offset by increased net product revenues and increased gains recorded to other income (expense) related to our strategic investments.

Earnings Per Share

In 2020, 2019, and 2018, net income attributable to Vertex was $10.29, $4.51 and $8.09, respectively, per diluted share. In 2018, the benefit from income taxes as a result of the release of our valuation allowance increased net income attributable to Vertex by $6.03 per diluted share.

Revenues

	2020	2019	2018	2020/2019 Comparison Increase/(Decrease) $	2020/2019 Comparison Increase/(Decrease) %	2019/2018 Comparison Increase/(Decrease) $	2019/2018 Comparison Increase/(Decrease) %
	(in thousands, except percentages)						
Product revenues, net	$ 6,202,783	$ 4,160,726	$ 3,038,325	$ 2,042,057	49 %	$ 1,122,401	37 %
Collaborative and royalty revenues	2,900	2,095	9,272	805	38 %	(7,177)	(77)%
Total revenues	$ 6,205,683	$ 4,162,821	$ 3,047,597	$ 2,042,862	49 %	$ 1,115,224	37 %

Product Revenues, Net

	2020	2019	2018
	(in thousands)		
TRIKAFTA/KAFTRIO	$ 3,863,824	$ 420,105	$ —
SYMDEKO/SYMKEVI	628,577	1,417,668	768,657
ORKAMBI	907,512	1,331,891	1,262,166
KALYDECO	802,870	991,062	1,007,502
Product revenues, net	$ 6,202,783	$ 4,160,726	$ 3,038,325

In 2020, our net product revenues increased by $2.04 billion as compared to 2019. In 2019, our net product revenues increased by $1.12 billion as compared to 2018. The increase in total net product revenues in 2020 was primarily due to the launch of TRIKAFTA in the U.S in the fourth quarter of 2019 and KAFTRIO in the E.U. in the third quarter of 2020. Decreases in revenues for our other products were the result of patients in the U.S. switching from these medicines to TRIKAFTA, partially offset by label expansions and expanded access to our medicines in ex-U.S. markets. The increase in total net product revenues in 2019 was primarily due to the increasing number of patients being treated with SYMDEKO/SYMKEVI, the October 2019 approval of TRIKAFTA in the U.S., label expansions for KALYDECO and ORKAMBI and expanded access to our medicines in ex-U.S. markets. In 2020, 2019 and 2018, our net product revenues included product revenues of $1.4 billion, $1.1 billion and $682.4 million, respectively, from ex-U.S. markets.

We expect that our net product revenues will increase in 2021 due to increasing numbers of people being treated with our medicines as a result of the continued uptake of TRIKAFTA, the approval of KAFTRIO by the European Commission, label expansions for our previously approved products and expanded access to our medicines.

Upon reaching an agreement with the French government for ORKAMBI in the fourth quarter of 2019, including the final amount for ORKAMBI distributed through early access programs, we recognized an adjustment to increase net product revenues related to prior period shipments of ORKAMBI distributed through early access programs of $155.8 million. Please refer to “Critical Accounting Policies - Revenue Recognition” below for a discussion of our accounting treatment for our early access program for ORKAMBI in France.

Collaborative and Royalty Revenues

Our collaborative and royalty revenues were $2.9 million, $2.1 million and $9.3 million in 2020, 2019 and 2018, respectively. Our collaborative revenues have historically fluctuated significantly from one period to another and may continue to fluctuate in the future. Our future royalty revenues will be dependent on if, and when, our collaborators are able to successfully develop drug candidates that we have out-licensed to them.

Operating Costs and Expenses

				2020/2019 Comparison		2019/2018 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2020	2019	2018	$	%	$	%
	(in thousands, except percentages)						
Cost of sales	$ 736,300	$ 547,758	$ 409,539	$ 188,542	34 %	$ 138,219	34 %
Research and development expenses	1,829,537	1,754,540	1,416,476	74,997	4 %	338,064	24 %
Sales, general and administrative expenses	770,456	658,498	557,616	111,958	17 %	100,882	18 %
Change in fair value of contingent consideration	13,100	4,459	—	8,641	194 %	4,459	**
Restructuring income	—	—	(184)	—	**	184	**
Intangible asset impairment charge	—	—	29,000	—	**	(29,000)	**
Total costs and expenses	$ 3,349,393	$ 2,965,255	$ 2,412,447	$ 384,138	13 %	$ 552,808	23 %

** Not meaningful

Cost of Sales

Our cost of sales primarily consists of the third-party royalties payable on our net sales of our products as well as the cost of producing inventories that corresponded to product revenues for the reporting period. Pursuant to our agreement with the Cystic Fibrosis Foundation, or CFF, our tiered third-party royalties on sales of TRIKAFTA/KAFTRIO, SYMDEKO/SYMKEVI, KALYDECO and ORKAMBI, calculated as a percentage of net sales, range from the single digits to the sub-teens, with royalties on sales of TRIKAFTA/KAFTRIO slightly lower than for our other products. Over the last several years, our cost of sales has been increasing due to increased net product revenues. Our cost of sales as a percentage of our net product revenues was approximately 12%, 13%, and 13% for 2020, 2019 and 2018, respectively. In 2021, we expect our total cost of sales will increase due to expected increases in our net product revenues and our cost of sales as a percentage of total net product revenues will be similar to our cost of sales as a percentage of total net product revenues in 2020.

Research and Development Expenses

				2020/2019 Comparison		2019/2018 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2020	2019	2018	$	%	$	%
	(in thousands, except percentages)						
Research expenses	$ 636,759	$ 732,772	$ 438,360	$ (96,013)	(13)%	$ 294,412	67 %
Development expenses	1,192,778	1,021,768	978,116	171,010	17 %	43,652	4 %
Total research and development expenses	$ 1,829,537	$ 1,754,540	$ 1,416,476	$ 74,997	4 %	$ 338,064	24 %

Our research and development expenses include internal and external costs incurred for research and development of our drugs and drug candidates and expenses related to certain technology that we acquire or license through business development transactions. 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 $5.0 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 to 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 2020, 2019 and 2018, 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. Until we have data from Phase 3 clinical trials, we cannot make a meaningful estimate regarding when, or if, a clinical development program will generate revenues and cash flows.

Research Expenses

				2020/2019 Comparison		2019/2018 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2020	2019	2018	$	%	$	%
	(in thousands, except percentages)						
Research Expenses:							
Salary and benefits	$ 129,835	$ 134,642	$ 87,773	$ (4,807)	(4)%	$ 46,869	53 %
Stock-based compensation expense	85,609	69,417	62,925	16,192	23 %	6,492	10 %
Outsourced services and other direct expenses	116,182	116,575	89,355	(393)	— %	27,220	30 %
Collaborative payments	184,600	307,828	111,600	(123,228)	(40)%	196,228	176 %
Infrastructure costs	120,533	104,310	86,707	16,223	16 %	17,603	20 %
Total research expenses	$ 636,759	$ 732,772	$ 438,360	$ (96,013)	(13)%	$ 294,412	67 %

We expect to continue to invest in our research programs with a focus on identifying drug candidates with the goal of creating transformative medicines for serious diseases. Our total research expenses have historically fluctuated, and are expected to continue to fluctuate, from one period to another due to upfront and milestone payments related to our business development activities that are reflected in the preceding table as collaborative payments. Our research expenses, excluding these collaborative payments, have been increasing over the last several years as we have invested in our pipeline and expanded our cell and genetic therapies capabilities.

Development Expenses

				2020/2019 Comparison		2019/2018 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2020	2019	2018	$	%	$	%
	(in thousands, except percentages)						
Development Expenses:							
Salary and benefits	$ 295,744	$ 249,860	$ 220,128	$ 45,884	18 %	$ 29,732	14 %
Stock-based compensation expense	177,081	155,141	140,187	21,940	14 %	14,954	11 %
Outsourced services and other direct expenses	512,157	425,149	471,338	87,008	20 %	(46,189)	(10)%
Collaborative payments	—	10,440	250	(10,440)	**	10,190	**
Infrastructure costs	207,796	181,178	146,213	26,618	15 %	34,965	24 %
Total development expenses	$ 1,192,778	$ 1,021,768	$ 978,116	$ 171,010	17 %	$ 43,652	4 %

** Not meaningful

Our development expenses increased by $171.0 million, or 17%, in 2020 as compared to 2019 and increased by $43.7 million, or 4%, in 2019 as compared to 2018, primarily due to increased expenses related to our diversifying pipeline, including clinical trials, headcount and infrastructure costs. We expect our development expenses to continue to increase in 2021 as a result of our advancing pipeline.

Sales, General and Administrative Expenses

				2020/2019 Comparison		2019/2018 Comparison	
				Increase/(Decrease)		Increase/(Decrease)	
	2020	2019	2018	$	%	$	%
	(in thousands, except percentages)						
Sales, general and administrative expenses	$ 770,456	$ 658,498	$ 557,616	$ 111,958	17 %	$ 100,882	18 %

Sales, general and administrative expenses increased by 17% in 2020 as compared to 2019, and by 18% in 2019 as compared to 2018, primarily due to increased global support for our medicines, including incremental investment to support the launch of our triple combination regimen and increased support for our CF pipeline products and other disease areas. We expect our sales, general and administrative expenses to continue to increase in 2021.

Contingent Consideration

In 2020 and 2019, the increase in the fair value of contingent consideration potentially payable to Exonics' former equity holders was $13.1 million and $4.5 million, respectively, primarily due to changes in market interest rates. There were no similar amounts in 2018. In future periods, we expect the fair value of contingent consideration to increase or decrease based on, among other things, our estimates of the probability of achieving and the timing of these contingent development and regulatory milestone payments, as well as the time value of money changes in market interest rates.

Intangible Asset Impairment Charge

In 2018, we recorded a $29.0 million impairment charge related to VX-210 that was licensed from BioAxone Biosciences, Inc., or BioAxone, in 2014. This charge was attributable to non-controlling interest on our consolidated statement of operations because we consolidated BioAxone as a variable interest entity, or VIE, until December 31, 2018. There were no corresponding intangible asset impairment charges in 2020 or 2019.

Other Non-Operating Income (Expense), Net

Interest Income

Interest income increased from $38.4 million in 2018 to $63.7 million in 2019 and decreased to $22.2 million in 2020. The increase in our interest income in 2019 as compared to 2018 was primarily due to increases in our cash equivalents and available-for-sale debt securities and prevailing market interest rates. The decrease in our interest income in 2020 as compared to 2019 was primarily due to a decrease in prevailing market interest rates despite continued increases in our cash equivalents and available-for-sale debt securities. Our future interest income will be dependent on the amount of, and prevailing market interest rates on, our outstanding cash equivalents and available-for-sale debt securities.

Interest Expense

Interest expense was $58.2 million in 2020, $58.5 million in 2019 and $72.5 million in 2018. The majority of our interest expense in these periods was related to imputed interest expense associated with our leased corporate headquarters in Boston and our research site in San Diego. On January 1, 2019, we adopted ASC 842, *Leases*, which resulted in a reduction in our imputed interest expense associated with these leases in 2020 and 2019. Our future interest expense will be dependent on whether, and to what extent, we borrow amounts under our credit facilities.

Other Income (Expense), Net

In 2020 and 2019, we recorded net other income of $296.4 million and $192.2 million, respectively, primarily related to changes in the fair value of our strategic investments. In 2018, we recorded net other expense of $0.8 million. We expect that due to the volatility of the stock price of biotechnology companies, our other income (expense), net will fluctuate in future periods based on increases or decreases in the fair value of our strategic investments.

Noncontrolling Interest (VIEs)

In 2018, our $9.8 million net loss attributable to noncontrolling interest reflects BioAxone's net loss for the reporting period. We deconsolidated BioAxone from our consolidated financial statements as of December 31, 2018 and did not consolidate any VIEs into our consolidated financial statements in 2020 or 2019.

Income Taxes

Our provision for income taxes was $405.2 million for 2020 and $218.1 million for 2019. Our effective tax rate of 13% for 2020 was lower than the U.S. statutory rate primarily due to (i) discrete tax benefits associated with the $209.0 million transfer of intellectual property rights to the U.K., the write-off of a long-term intercompany receivable, and an increase in the U.K.'s corporate tax rate; and (ii) excess tax benefits related to stock-based compensation. The impact of these items was partially offset by a U.S. deemed dividend. Our effective tax rate of 16% for 2019 was lower than the U.S. statutory rate primarily due to excess tax benefits related to stock-based compensation and research and development tax credits.

In 2018, we recorded a benefit from income taxes of $1.5 billion because we released our valuation allowance on the majority of our net operating losses and other deferred tax assets in the fourth quarter of 2018, resulting in a non-cash credit to net income of $1.56 billion. Starting in 2019, we began recording a provision for income taxes on our pre-tax income using an effective tax rate approximating statutory rates. Due to our ability to offset our pre-tax income against previously benefited net operating losses, the majority of our tax provision in 2020 and 2019 represented a non-cash expense. We utilized substantially all of our remaining previously benefited U.S. net operating losses in 2020. As a result, a larger portion of our tax provision will represent a cash tax payable in future periods.

LIQUIDITY AND CAPITAL RESOURCES

The following table summarizes the components of our financial condition as of December 31, 2020 and 2019:

			Increase/(Decrease)	
	2020	2019	$	%
	(in thousands, except percentages)			
Cash, cash equivalents and marketable securities	$ 6,658,897	$ 3,808,294	$ 2,850,603	75 %
Working Capital:				
Total current assets	$ 8,133,379	$ 4,822,829	$ 3,310,550	69 %
Total current liabilities	(1,877,533)	(1,334,827)	(542,706)	(41)%
Total working capital	$ 6,255,846	$ 3,488,002	$ 2,767,844	79 %

As of December 31, 2020, total working capital was $6.3 billion, which represented an increase of $2.8 billion from $3.5 billion as of December 31, 2019. The increase in total working capital in 2020 was primarily related to $3.3 billion of cash provided by operations partially offset by $539.1 million of cash used to repurchase our common stock pursuant our share repurchase programs and purchases of property and equipment of $259.8 million.

Sources of Liquidity

As of December 31, 2020, we had cash, cash equivalents and marketable securities of $6.7 billion, which represented an increase of $2.9 billion from $3.8 billion as of December 31, 2019. 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 may borrow up to a total of $2.5 billion pursuant to two revolving credit facilities. We may repay and reborrow amounts under these revolving credit agreements without penalty. Subject to certain conditions, we may request that the borrowing capacity for each of the credit agreements be increased by an additional $500.0 million, for a total of $3.5 billion collectively. Other possible sources of future liquidity include commercial debt, public and private offerings of our equity and debt securities, 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. As of December 31, 2020, we were in compliance with these covenants.

Future Capital Requirements

We have significant future capital requirements including:

- significant expected operating expenses to conduct research and development activities and to operate our organization; and
- substantial facility and finance lease obligations.

In addition:

- We have entered into certain collaboration agreements with third parties that include the funding of certain research, development and commercialization efforts. Certain of our business development transactions, including collaborations and acquisitions, include the potential for future milestone and royalty payments by us upon the achievement of pre-established developmental and regulatory targets and/or commercial targets. We may enter into additional business development transactions, including acquisitions, collaborations and equity investments, that require additional capital.
- To the extent we borrow amounts under the credit agreements we entered into in 2020 and 2019, we would be required to repay any outstanding principal amounts in 2022 or 2024, respectively.
- As of December 31, 2020, $424.9 million remained available to fund repurchases under the 2020 Share Repurchase Program that we announced in November 2020.

We expect that cash flows from our products together with our current cash, cash equivalents and marketable securities will be sufficient to fund our operations for at least the next twelve months and do not expect COVID-19 to have an adverse effect on our liquidity. 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 our products, 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 may raise additional capital by borrowing under credit agreements, 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, 2020:

	Payments Due by Period				
	2021	2022-2023	2024-2025	2026 and later	Total
	(in thousands)				
Fan Pier Leases	$ 66,540	$ 145,177	$ 155,942	$ 233,913	$ 601,572
Finance leases, excluding Fan Pier Leases	18,930	33,028	30,913	182,542	265,413
Operating leases	15,266	68,782	65,677	320,684	470,409
Research and development costs	66,955	1,724	—	—	68,679
Total contractual commitments and obligations	$ 167,691	$ 248,711	$ 252,532	$ 737,139	$ 1,406,073

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. We also lease office and laboratory

space in San Diego, California. We commenced lease payments for this building in the second quarter of 2019 pursuant to an initial 16 year lease term. The future minimum rental payments that we are obligated to pay related to the San Diego building are included in "Finance leases, excluding Fan Pier Leases," which also reflects leases of equipment and a land lease. The remainder of our real estate leases are reflected in "Operating leases" in the table above, including office and laboratory space at our Cell and Genetic Therapies facility near our corporate headquarters. Base rent payments will commence for this building in the fourth quarter of 2021 pursuant to an initial 15 year lease term.

Research and Development Costs

"Research and development costs" included in the table above primarily relate to pharmaceutical materials to be utilized in our clinical trials and research costs related to our advancing pipeline. The amounts reflected in "Research and development costs" do not include certain payments we anticipate making 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, 2020, we had accrued $42.8 million related to these contracts for costs incurred for services provided through December 31, 2020, and we have approximately $237.6 million in cancelable future commitments based on existing contracts as of December 31, 2020. 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 and Asset Acquisitions

We have entered into certain research and development collaboration agreements with third parties and acquired certain assets 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. These payments, which are not included in the contractual obligations table above, include:

- *CFF:* We pay royalties, which are included in cost of sales, to CFF on sales of our CF products.
- *Research and Development Milestones:* The majority of our in-license agreements and our acquisitions have milestone and royalty payments payable by us upon the successful achievement of pre-established developmental, regulatory and/or commercial targets or net sales. Contingent payments under these agreements become due and payable only upon achievement of certain milestones.

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, 2020, our liabilities associated with uncertain tax positions were $86.6 million.

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 will 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 U.S. 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;
- acquisitions, including intangible assets, goodwill and contingent consideration; and
- income taxes.

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 U.S. and in international markets. We sell our products principally to a limited number of specialty pharmacy and specialty distributors in the U.S., which account for the largest portion of our total revenues, and make international sales primarily to specialty distributors and retail chains, as well as hospitals and clinics, many of which are government-owned or supported customers, collectively, our customers. Our customers in the U.S. subsequently resell our products to patients and health care providers. We contract with government agencies 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 when our customers obtain control of our products, which typically occurs upon delivery to our customers. Revenues from our product sales are recorded at the net sales price, or “transaction price,” which requires us to make several significant estimates regarding the net sales price.

The most significant estimate we are required to make is related to government and private payor rebates, chargebacks, discounts and fees, collectively rebates. The value of the rebates 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, 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 based on new information, including information regarding actual rebates for our products, as it becomes available. Claims by third-party payors for rebates are submitted to us significantly after the related sales, potentially resulting in adjustments in the period in which the new information becomes known. Our credits to revenue related to prior period sales, excluding the adjustment to the transaction price for ORKAMBI distributed through early access programs in France in 2019, have not been significant (typically less than 1% of gross product revenues) and primarily related to U.S. rebates.

The following table summarizes activity related to our accruals for rebates (including our refund liability to the French government related to ORKAMBI distributed through early access programs in France as described below) for the three years ended December 31, 2020:

	(in thousands)
Balance as of December 31, 2017	$ 112,215
Provision related to 2018 sales and the adoption of ASC 606	684,299
Adjustments related to prior year(s) sales	(22,099)
Credits/payments made	(229,361)
Balance as of December 31, 2018	$ 545,054
Provision related to 2019 sales	655,980
Adjustments related to prior year(s) sales	(95,480)
Credits/payments made	(469,832)
Balance as of December 31, 2019	$ 635,722
Provision related to 2020 sales	1,284,068
Adjustments related to prior year(s) sales	631
Credits/payments made	(1,144,832)
Balance as of December 31, 2020	$ 775,589

We have also entered into annual contracts with government-owned and supported customers in international markets that limit the amount of annual reimbursement we can receive. Upon exceeding the annual reimbursement amount, products are provided free of charge, which is a material right. We defer a portion of the consideration received, which includes upfront payments and fees, for shipments made up to the annual reimbursement limit as "Other current liabilities." The deferred amount is recognized as revenue when the free products are shipped. In order to estimate the portion of the consideration received to recognize as revenue and the portion of the amount to defer, we rely on our forecast of the number of units we will distribute during the applicable annual period in each international market in which our contracts with government-owned and supported customers limit the amount of annual reimbursement we can receive. Our forecasts are based on, among other things, our historical experience.

The preceding estimates and judgments 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.

French Early Access Programs

In 2015, we began distributing ORKAMBI through early access programs in France and remained engaged in reimbursement discussions with the French government for ORKAMBI, including ORKAMBI distributed through early access programs, until November 2019, when we reached an agreement with the French government. From the time we began distributing ORKAMBI through early access programs in France, we expected that the difference between the amounts collected based on the invoiced amount and the final amount for ORKAMBI distributed through these programs would be returned to the French government. Our refund liability related to the early access programs in France was classified in "Accrued expenses" on our consolidated balance sheets.

From the first quarter of 2018 through the third quarter of 2019, we recognized net product revenues for ORKAMBI sales in France under the early access programs based on a transaction price that reflected our estimate of consideration we expected to retain that would not be subject to a significant reversal in amounts recognized, which resulted in revenue representing a portion of the invoiced amount.

Upon reaching an agreement with the French government for ORKAMBI, including the final amount for ORKAMBI distributed through early access programs in France in the fourth quarter of 2019, we updated the transaction price related to ORKAMBI distributed through early access programs and recognized net product revenues of $155.8 million related to these shipments, which occurred from 2015 through the date of our agreement with the French government, because the final amount for these shipments exceeded our previous estimate.

Acquisitions

We are required to make several significant judgments and estimates in order to calculate the purchase price for our business combinations and then allocate it to the assets that we have acquired and the liabilities that we have assumed on our consolidated balance sheet. The most significant judgments and estimates relate to the fair value of the in-process research and development assets and contingent consideration liabilities related to these business combinations. Based on these judgments and estimates, the fair value of the goodwill that we record as a result of these business combinations may be material. Once recorded, these assets are subject to quarterly impairment analysis and our contingent consideration liability is adjusted quarterly, which requires similar judgments and estimates.

Intangible Assets

In 2019, we recorded in-process research and development assets related to our acquisitions of Exonics and Semma totaling $400.0 million on our consolidated balance sheet, which remained on our consolidated balance sheet as of December 31, 2020. Each of these assets is accounted for as an indefinite-lived intangible asset and is maintained on our consolidated balance sheet until either the 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 record an impairment charge in the period in which the impairment occurs. In 2018, we recorded a full impairment charge of $29.0 million for the in-process research and development asset that had previously been recorded on our consolidated balance sheets related to our collaboration with BioAxone.

To determine the fair value of our in-process research and development assets, we utilize the multi-period excess earnings method of the income approach, which requires us to make estimates of the probability of technical and regulatory success, development cost assumptions, revenue projections and growth rates, commercial cost estimates and appropriate discount rates. These assumptions require significant management judgment and reasonable changes in the assumptions can cause material changes to the fair value of the intangible assets. Due to the early stage of Exonics and Semma's programs, these significant assumptions could be affected by future economic and market conditions.

Contingent Consideration

As of December 31, 2020 and 2019, we had $189.6 million and $176.5 million, respectively, of liabilities on our consolidated balance sheet attributable to the fair value of the contingent development and regulatory payments that we may owe to Exonics' former equity holders upon the achievement of certain events. Our acquisition of Semma in 2019 did not include similar contingent payments; therefore, we are not required to record contingent consideration liabilities related to our acquisition of Semma.

We record an increase or a decrease in the fair value of the contingent consideration liability on our consolidated balance sheet and in our consolidated statement of operations on a quarterly basis. We determine the fair value of our contingent consideration liability using a probability weighted discounted cash flow method of the income approach, which requires us to make estimates of the timing of regulatory and commercial milestone achievement and the corresponding estimated probability of technical and regulatory success rates. Significant judgment is used in determining the appropriateness of these assumptions during each reporting period. Reasonable changes in these assumptions can cause material changes to the fair value of our contingent consideration liability. Due to the early stage of Exonics' DMD and DM1 programs, these significant assumptions could be affected by future economic and market conditions.

Goodwill

In 2020, we did not have any business combinations; therefore, we did not record any additional goodwill on our consolidated balance sheet. In 2019, we recorded goodwill of $554.6 million and $397.1 million related to our acquisitions of Semma and Exonics, respectively. Goodwill reflects the difference between the fair value of the consideration transferred and the fair value of the net assets acquired. Thus, the goodwill that we record is dependent on the significant judgments and estimates inherent in the fair value of our in-process research and development assets and contingent consideration liabilities.

Income Taxes

We utilize the asset and liability method of accounting for income taxes. Under this method, deferred tax assets and liabilities are determined based on the difference between the financial statement carrying amounts and tax basis of assets and liabilities using enacted tax rates in effect for years in which the temporary differences are expected to reverse. If our estimate

of the tax effect of reversing temporary differences is (i) not reflective of actual outcomes, (ii) modified to reflect new developments or interpretations of the tax law, or (iii) revised to incorporate new accounting principles, or changes in the expected timing or manner of the reversal, our results of operations could be materially impacted.

We are engaged in research and development activities and incurred significant net operating losses for a number of years before recently becoming profitable. Accordingly, we did not report any tax benefits relating to our net operating loss carryforwards and income tax credit carryforwards that were available for utilization in future periods because we maintained a valuation allowance on the majority of our net operating losses and other deferred tax assets until December 31, 2018. We released the valuation allowance on the majority of our net operating losses and other deferred tax assets resulting in a non-cash benefit from income taxes of $1.56 billion in the fourth quarter of 2018.

We provide a valuation allowance when it is more likely than not that deferred tax assets will not be realized. On a periodic basis, we reassess our valuation allowances on our deferred tax assets, weighing positive and negative evidence to assess the recoverability of the deferred tax assets. In the fourth quarter of 2018, we reassessed our valuation allowances and considered positive evidence including significant cumulative consolidated and U.S. income over the three years ended December 31, 2018, revenue growth, clinical program progression, including the advancement and clinical trial data from our triple combination regimens, and expectations regarding future profitability, and negative evidence, including potential impact of competition on our projections and cumulative losses in the jurisdictions. After assessing both the positive evidence and the negative evidence, we released the valuation allowance on the majority of our net operating losses and other deferred tax assets as of December 31, 2018.

Significant judgment is required in making these assessments to maintain or reverse our valuation allowances and, to the extent our future expectations change we would have to assess the recoverability of these deferred tax assets at that time. The determination to release the majority of our valuation allowances increased our net income by $1.56 billion, or $6.03 per share in 2018.

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 and new accounting pronouncements adopted during 2020.

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. None of these market risk-sensitive instruments are 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, including potential fluctuations as a result of COVID-19. 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.

We entered into a credit agreement in each of 2020 and 2019. Loans under these credit agreements bear interest, at our option, at either a base rate or a Eurocurrency rate, in each case plus an applicable margin 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). Pursuant to the credit agreement that we entered into in 2019, the applicable margin on base rate loans ranges from 0.125% to 0.500% and the applicable margin on Eurocurrency loans ranges from 1.125% to 1.500%. Pursuant to the credit agreement that we entered into in 2020, the applicable margin on base rate loans ranges from 0.500% to 0.875% and the applicable margin on Eurocurrency loans ranges from 1.500% to 1.875%. We do not believe that changes in interest rates related to either credit agreement would have a material effect on our consolidated financial statements. As

of December 31, 2020, we had no principal or interest outstanding under either of our existing credit facilities. A portion of our "Interest expense" in 2021 will be dependent on whether, and to what extent, we borrow amounts under these existing facilities.

Foreign Exchange Market Risk

As a result of our foreign operations, we face exposure to movements in foreign currency exchange rates, primarily the Euro and British Pound against the U.S. Dollar. Fluctuations in the global markets, including as a result of COVID-19, may have a positive or negative effect on our foreign exchange rate exposure. The current exposures arise primarily from cash, accounts receivable, intercompany receivables and payables, payables and accruals and inventories. Both positive and negative effects to our net revenues from international product sales from movements in exchange rates are partially mitigated by the natural, opposite effect that 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 cash flow hedges for the Euro, British Pound, Canadian Dollar and Australian Dollar related to a portion of our forecasted product revenues that qualify for hedge accounting treatment under U.S. GAAP. We do not seek hedge accounting treatment for our foreign currency forward contracts related to monetary assets and liabilities that impact our operating results. As of December 31, 2020, we held foreign exchange forward contracts that were designated as cash flow hedges with notional amounts totaling $1.1 billion representing a net liability of $63.5 million recorded on our consolidated balance sheet.

Although not predictive in nature, we believe a hypothetical 10% threshold reflects a reasonably possible near-term change in exchange rates. Assuming that the December 31, 2020 exchange rates were to change by a hypothetical 10%, the fair value recorded on our consolidated balance sheet related to our foreign exchange forward contracts that were designated as cash flow hedges as of December 31, 2020 would change by approximately $109.2 million. However, since these contracts hedge a specific portion of our forecasted product revenues denominated in certain foreign currencies, any change in the fair value of these contracts is recorded in "Accumulated other comprehensive loss" on our consolidated balance sheet and is reclassified to earnings in the same periods during which the underlying product revenues affect earnings. Therefore, any change in the fair value of these contracts that would result from a hypothetical 10% change in exchange rates would be entirely offset by the change in value associated with the underlying hedged product revenues resulting in no impact on our future anticipated earnings and cash flows with respect to the hedged portion of our forecasted product revenues.

Equity Price Risk

Information required by this section is incorporated by reference from the discussion in the "Strategic Investments" section of this Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations."

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The information required by this Item 8 is contained on pages F-1 through F-49 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, 2020. In making this assessment, it used the criteria set forth in the *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on its assessment, the Company's management has concluded that, as of December 31, 2020, 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, 2020, 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

To the Shareholders and the Board of Directors of Vertex Pharmaceuticals Incorporated

Opinion on Internal Control over Financial Reporting

We have audited Vertex Pharmaceuticals Incorporated's internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Vertex Pharmaceuticals Incorporated (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the 2020 consolidated financial statements of the Company and our report dated February 11, 2021, expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's 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 are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

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

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

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

/s/ Ernst & Young LLP

Boston, Massachusetts
February 11, 2021

ITEM 9B. OTHER INFORMATION

Michael Parini, one of our current executive officers, has informed us that he will be leaving his position at our company effective March 1, 2021.

Stuart Arbuckle, one of our current executive officers, will assume additional responsibilities and be appointed to the position of EVP and Chief Commercial and Operations Officer, effective March 1, 2021.

Additional information regarding Mr. Arbuckle and Mr. Parini is provided in Part I, Item 1 of this Annual Report on Form 10-K.

PART III

Portions of our definitive Proxy Statement for the 2021 Annual Meeting of Shareholders, or 2021 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 2021 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 2021 Annual Meeting and Nominations for Director," "Delinquent Section 16(a) Reports" and "Code of Conduct." The information regarding executive officers required by this Item 10 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 2021 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 2021 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 2021 Proxy Statement and is incorporated herein by reference. We expect this information to be provided under "Election of Directors," "Corporate Governance and Risk Management," and "Audit and Finance Committee."

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this Item 14 will be included in the 2021 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
Plan of Acquisition					
2.1	Agreement and Plan of Merger, dated as of August 30, 2019, by and among Vertex Pharmaceuticals Incorporated, Vertex Disc Inc., Semma Therapeutics, Inc., and Shareholder Representative Services LLC, solely in its capacity as agent for the Equityholders.†		10-Q (Exhibit 2.1)	October 31, 2019	000-19319
2.2	Agreement and Plan of Merger, dated as of June 6, 2019, among Vertex Pharmaceuticals Incorporated, VXP Merger Sub, Inc., Exonics Therapeutics, Inc. and Shareholder Representative Services LLC, solely in its Capacity as Shareholders' Representative, as amended by the Amendment to Agreement and Plan of Merger, dated as of June 12, 2019, among Vertex Pharmaceuticals Incorporated, VXP Merger Sub, Inc., Exonics Therapeutics, Inc. and Shareholder Representative Services LLC, solely in its Capacity as Shareholders' Representative.†		10-Q (Exhibit 10.1)	August 1, 2019	000-19319
Governance Documents					
3.1	Restated Articles of Organization of Vertex Pharmaceuticals Incorporated, as amended.		10-Q (Exhibit 3.1)	July 26, 2018	000-19319
3.2	Amended and Restated By-Laws of Vertex Pharmaceuticals Incorporated.		10-Q (Exhibit 3.2)	May 1, 2020	000-19319
Stock Certificate					
4.1	Specimen Stock Certificate.		10-K (Exhibit 4.1)	February 15, 2018	000-19319
4.2	Description of Securities.		10-K (Exhibit 4.2)	February 13, 2020	000-19319
Collaboration Agreement					
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

Exhibit Number	Exhibit Description	Filed with this report	Incorporated by Reference herein from—Form or Schedule	Filing Date/ Period Covered	SEC File/Reg. Number
10.4	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.†		10-K (Exhibit 10.05)	February 23, 2017	000-19319
10.6	Joint Development and Commercialization Agreement, dated December 12, 2017, between Vertex Pharmaceuticals Incorporated, Vertex Pharmaceuticals (Europe) Limited and CRISPR Therapeutics AG, CRISPR Therapeutics Limited, CRISPR Therapeutics, Inc., TRACR Hematology Ltd.†	X			
Leases					
10.7	Lease, dated May 5, 2011, between Fifty Northern Avenue LLC and Vertex Pharmaceuticals Incorporated.†		10-Q (Exhibit 10.4)	August 9, 2011	000-19319
10.8	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
Financing Agreements					
10.9	Credit Agreement, dated as of September 17, 2019, by and among Vertex Pharmaceuticals Incorporated, Bank of America, N.A. and the other lenders party thereto.		10-Q (Exhibit 10.1)	October 31, 2019	000-19319
10.10	First Amendment to Credit Agreement, dated as of December 29, 2020, by and among Vertex Pharmaceuticals Incorporated, Bank of America, N.A. and the other lender parties thereto.	X			
10.11	Credit Agreement, dated as of September 18, 2020, by and among Vertex Pharmaceuticals Incorporated, Bank of America, N.A. and the other lender parties thereto.		10-Q (Exhibit 10.1)	October 30, 2020	000-19319
Equity Plans					
10.12	Amended and Restated 2006 Stock and Option Plan.*		10-Q (Exhibit 10.1)	October 25, 2018	000-19319
10.13	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
10.14	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
10.15	Amended and Restated 2013 Stock and Option Plan.*		DEF 14A (Appendix A)	April 26, 2019	000-19319
10.16	Form of Non-Qualified Stock Option Agreement under 2013 Stock and Option Plan.*		10-K (Exhibit 10.17)	February 13, 2015	000-19319
10.17	Form of Restricted Stock Agreement under 2013 Stock and Option Plan.*		10-K (Exhibit 10.18)	February 13, 2015	000-19319
10.18	Form of Restricted Stock Unit Agreement under 2013 Stock and Option Plan (U.S.).*		10-K (Exhibit 10.25)	February 16, 2016	000-19319
10.19	Form of Restricted Stock Unit Agreement under 2013 Stock and Option Plan (International).*		10-K (Exhibit 10.19)	February 13, 2015	000-19319
10.20	Form of Restricted Stock Unit Agreement Under 2013 Stock and Option Plan.*		10-K (Exhibit 10.17)	February 13, 2020	000-19319
10.21	Non-Employee Director Deferred Compensation Plan.*		10-K (Exhibit 10.27)	February 16, 2016	000-19319
10.22	Vertex Pharmaceuticals Incorporated Employee Stock Purchase Plan.*		DEF 14A (Appendix B)	April 26, 2019	000-19319
Agreements with Executive Officers and Directors					
10.23	Employment Agreement, dated as of April 1, 2020, by and between Vertex Pharmaceuticals Incorporated and Jeffrey M. Leiden, M.D., Ph.D.*		8-K (Exhibit 10.1)	April 1, 2020	000-19319
10.24	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
10.25	Employment Agreement, dated as of July 24, 2019, between Vertex Pharmaceuticals Incorporated and Reshma Kewalramani.*		8-K (Exhibit 10.1)	July 25, 2019	000-19319
10.26	Change of Control Agreement, dated as of July 24, 2019, between Vertex Pharmaceuticals Incorporated and Reshma Kewalramani.*		8-K (Exhibit 10.2)	July 25, 2019	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
10.27	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
10.28	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
10.29	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
10.30	Change of Control Agreement, dated as of December 10, 2014, between Vertex Pharmaceuticals Incorporated and David Altshuler.*		10-K (Exhibit 10.35)	February 16, 2016	000-19319
10.31	Employment Agreement, dated as of November 14, 2015, between Vertex Pharmaceuticals Incorporated and Michael Parini.*		10-K (Exhibit 10.40)	February 23, 2017	000-19319
10.32	Change of Control Agreement, dated as of November 9, 2015, between Vertex Pharmaceuticals Incorporated and Michael Parini.*		10-K (Exhibit 10.41)	February 23, 2017	000-19319
10.33	Third Amended and Restated Employment Agreement, dated as of February 26, 2013, between Vertex Pharmaceuticals Incorporated and Amit Sachdev.*		10-K (Exhibit 10.42)	February 23, 2017	000-19319
10.34	Third Amended and Restated Change of Control Agreement, dated as of February 26, 2013, between Vertex Pharmaceuticals Incorporated and Amit Sachdev.*		10-K (Exhibit 10.43)	February 23, 2017	000-19319
10.35	Employment Agreement, dated March 28, 2019, by and between Vertex Pharmaceuticals Incorporated and Charles F. Wagner, Jr.*		10-Q (Exhibit 10.1)	May 1, 2019	000-19319
10.36	Change of Control Agreement, dated as of March 28, 2019, by and between Vertex Pharmaceuticals Incorporated and Charles F. Wagner, Jr.*		10-Q (Exhibit 10.2)	May 1, 2019	000-19319
10.37	Amended and Restated Change of Control Agreement, dated as of May 18, 2012, between Vertex Pharmaceuticals Incorporated and Paul M. Silva.*		10-K (Exhibit 10.35)	February 13, 2020	000-19319
10.38	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 4, 2009	000-19319
10.39	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
10.40	Vertex Employee Compensation Plan.*		10-K (Exhibit 10.46)	February 15, 2018	000-19319
10.41	Vertex Pharmaceuticals Non-Employee Board Compensation.*	X			
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			
104	Cover Page Interactive Data File—the cover page interactive data file does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.	X			

* Management contract, compensatory plan or agreement.

† Confidential portions of this document have been redacted according to the applicable rules.

ITEM 16. FORM 10-K SUMMARY

Not applicable.

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 11, 2021 By: /s/ Reshma Kewalramani

Reshma Kewalramani
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/ Reshma Kewalramani Reshma Kewalramani	President, Chief Executive Officer and Director (Principal Executive Officer)	February 11, 2021
/s/ Charles F. Wagner, Jr. Charles F. Wagner, Jr.	Executive Vice President and Chief Financial Officer (Principal Financial Officer)	February 11, 2021
/s/ Paul M. Silva Paul M. Silva	Senior Vice President and Chief Accounting Officer (Principal Accounting Officer)	February 11, 2021
/s/Jeffrey M. Leiden Jeffrey M. Leiden	Executive Chairman	February 11, 2021
/s/ Sangeeta N. Bhatia Sangeeta N. Bhatia	Director	February 11, 2021
/s/ Lloyd Carney Lloyd Carney	Director	February 11, 2021
/s/ Alan Garber Alan Garber	Director	February 11, 2021
/s/ Terrence C. Kearney Terrence C. Kearney	Director	February 11, 2021
/s/ Yuchun Lee Yuchun Lee	Director	February 11, 2021
/s/ Margaret G. McGlynn Margaret G. McGlynn	Director	February 11, 2021
/s/ Diana McKenzie Diana McKenzie	Director	February 11, 2021
/s/ Bruce I. Sachs Bruce I. Sachs	Director	February 11, 2021

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Vertex Pharmaceuticals Incorporated

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Vertex Pharmaceuticals Incorporated (the Company) as of December 31, 2020 and 2019, the related consolidated statements of operations, comprehensive income, shareholders' equity and noncontrolling interest, and cash flows for each of the three years in the period ended December 31, 2020, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2020, based on 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 11, 2021, expressed an unqualified opinion thereon.

Adoption of New Accounting Standard

ASU No. 2016-02

As discussed in Note A to the consolidated financial statements, the Company changed its method for lease accounting as a result of the adoption of ASU No. 2016-02, Leases (Topic 842), and the related amendments effective January 1, 2019.

Basis for Opinion

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

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

Critical Audit Matter

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

Revenue recognition - Payor Mix Impact on Measuring Variable Consideration

Description of the Matter

As discussed in Note A to the Company's consolidated financial statements, the Company records product sales at the net sales price, or "transaction price," which requires the Company to make several significant estimates regarding the net sales price. The most significant estimates relate to government rebates, chargebacks, discounts and fees, collectively rebates. Due to the delay in receipt of claims by third-party payors, the Company estimates the percentage of prescriptions that will be covered by each third-party payor, which is referred to as the payor mix. Rebate accruals inclusive of estimated amounts due for claims not yet received or processed are recorded within accrued expenses on the Company's consolidated balance sheet.

Auditing the measurement of the Company's net product revenues was especially complex and judgmental due to the significant estimation required in determining the amount of consideration that will be collected net of estimates for payor rebates. In particular, the net sales price is affected by assumptions in payor behavior such as changes in payor mix, payor collections, current customer contractual requirements, and experience with ultimate collection from third-party payors.

How We Addressed the Matter in Our Audit

We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's revenue recognition process, including controls over the underlying assumptions and inputs used by management to estimate amounts due to third-party payors and the completeness and accuracy of the data used in the estimates. We also tested the Company's controls to assess the completeness and accuracy of the current and historical data that supports the estimate.

Our audit procedures to test the Company's recognition of net product revenues included, among others, assessing the methodology used to determine the estimate and testing the significant assumptions and the underlying data used by the Company in its analysis, which included historical claims data. To assess the payor mix assumptions we tested contracted rates, historical claims and payment data and related trends, and other relevant factors. We also assessed the historical accuracy of the Company's estimates of third-party payor rebates.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2005.

Boston, Massachusetts
February 11, 2021

VERTEX PHARMACEUTICALS INCORPORATED

Consolidated Statements of Operations

(in thousands, except per share amounts)

	Year Ended December 31,		
	2020	**2019**	**2018**
Revenues:			
Product revenues, net	$ 6,202,783	$ 4,160,726	$ 3,038,325
Collaborative and royalty revenues	2,900	2,095	9,272
Total revenues	6,205,683	4,162,821	3,047,597
Costs and expenses:			
Cost of sales	736,300	547,758	409,539
Research and development expenses	1,829,537	1,754,540	1,416,476
Sales, general and administrative expenses	770,456	658,498	557,616
Change in fair value of contingent consideration	13,100	4,459	—
Restructuring income	—	—	(184)
Intangible asset impairment charge	—	—	29,000
Total costs and expenses	3,349,393	2,965,255	2,412,447
Income from operations	2,856,290	1,197,566	635,150
Interest income	22,239	63,678	38,352
Interest expense	(58,151)	(58,502)	(72,471)
Other income (expense), net	296,420	192,177	(790)
Income before provision for (benefit from) income taxes	3,116,798	1,394,919	600,241
Provision for (benefit from) income taxes	405,151	218,109	(1,486,862)
Net income	2,711,647	1,176,810	2,087,103
Loss attributable to noncontrolling interest	—	—	9,793
Net income attributable to Vertex	$ 2,711,647	$ 1,176,810	$ 2,096,896
Amounts per share attributable to Vertex common shareholders:			
Net income:			
Basic	$ 10.44	$ 4.58	$ 8.24
Diluted	$ 10.29	$ 4.51	$ 8.09
Shares used in per share calculations:			
Basic	259,841	256,728	254,292
Diluted	263,396	260,673	259,185

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

VERTEX PHARMACEUTICALS INCORPORATED

Consolidated Statements of Comprehensive Income

(in thousands)

	Year ended December 31,		
	2020	**2019**	**2018**
Net income	$ 2,711,647	$ 1,176,810	$ 2,087,103
Changes in other comprehensive income:			
Unrealized holding (losses) gains on marketable securities, net	(169)	1,039	58
Unrealized (losses) gains on foreign currency forward contracts, net of tax of $14.3 million, $7.0 million and $(7.1) million, respectively	(51,555)	(14,003)	27,438
Foreign currency translation adjustment	(14,783)	10,332	8,855
Total other comprehensive (loss) income	(66,507)	(2,632)	36,351
Comprehensive income	2,645,140	1,174,178	2,123,454
Comprehensive loss attributable to noncontrolling interest	—	—	9,793
Comprehensive income attributable to Vertex	$ 2,645,140	$ 1,174,178	$ 2,133,247

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,	
	2020	**2019**
Assets		
Current assets:		
Cash and cash equivalents	$ 5,988,187	$ 3,109,322
Marketable securities	670,710	698,972
Accounts receivable, net	885,352	633,518
Inventories	280,777	167,502
Prepaid expenses and other current assets	308,353	213,515
Total current assets	8,133,379	4,822,829
Property and equipment, net	958,534	745,080
Goodwill	1,002,158	1,002,158
Intangible assets	400,000	400,000
Deferred tax assets	882,779	1,190,815
Operating lease assets	325,564	88,202
Other assets	49,394	69,381
Total assets	$ 11,751,808	$ 8,318,465
Liabilities and Shareholders' Equity		
Current liabilities:		
Accounts payable	$ 155,139	$ 87,610
Accrued expenses	1,404,971	1,116,912
Other current liabilities	317,423	130,305
Total current liabilities	1,877,533	1,334,827
Long-term finance lease liabilities	539,042	538,576
Long-term operating lease liabilities	350,463	84,292
Long-term contingent consideration	189,600	176,500
Other long-term liabilities	108,355	99,026
Total liabilities	3,064,993	2,233,221
Commitments and contingencies	—	—
Shareholders' equity:		
Preferred stock, $0.01 par value; 1,000 shares authorized; none issued and outstanding	—	—
Common stock, $0.01 par value; 500,000 shares authorized, 259,890 and 258,993 shares issued and outstanding, respectively	2,599	2,589
Additional paid-in capital	7,894,027	7,937,606
Accumulated other comprehensive loss	(68,480)	(1,973)
Retained earnings (accumulated deficit)	858,669	(1,852,978)
Total shareholders' equity	8,686,815	6,085,244
Total liabilities and shareholders' equity	$ 11,751,808	$ 8,318,465

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 Income (Loss)	Retained Earnings (Accumulated Deficit)	Total Vertex Shareholders' Equity	Noncontrolling Interest	Total Shareholders' Equity
	Shares	Amount						
Balance, December 31, 2017	253,253	$ 2,512	$ 7,157,362	$ (11,572)	$ (5,119,723)	$ 2,028,579	$ 13,727	$ 2,042,306
Cumulative effect adjustment for adoption of new accounting guidance	—	—	—	(24,120)	33,349	9,229	—	9,229
Other comprehensive income, net of tax	—	—	—	36,351	—	36,351	—	36,351
Net income (loss)	—	—	—	—	2,096,896	2,096,896	(9,793)	2,087,103
Repurchases of common stock	(2,094)	(21)	(350,022)	—	—	(350,043)	—	(350,043)
Issuance of common stock under benefit plans	4,013	55	288,480	—	—	288,535	—	288,535
Stock-based compensation expense	—	—	325,656	—	—	325,656	—	325,656
VIE noncontrolling interest upon deconsolidation	—	—	—	—	—	—	(3,540)	(3,540)
Other VIE activity	—	—	—	—	—	—	(394)	(394)
Balance, December 31, 2018	255,172	$ 2,546	$ 7,421,476	$ 659	$ (2,989,478)	$ 4,435,203	$ —	$ 4,435,203
Cumulative effect adjustment for adoption of new accounting guidance	—	—	—	—	(40,310)	(40,310)	—	(40,310)
Other comprehensive loss, net of tax	—	—	—	(2,632)	—	(2,632)	—	(2,632)
Net income	—	—	—	—	1,176,810	1,176,810	—	1,176,810
Repurchases of common stock	(1,046)	(10)	(186,010)	—	—	(186,020)	—	(186,020)
Common stock withheld for employee tax obligations	(28)	—	(5,995)	—	—	(5,995)	—	(5,995)
Issuance of common stock under benefit plans	4,895	53	345,926	—	—	345,979	—	345,979
Stock-based compensation expense	—	—	362,209	—	—	362,209	—	362,209
Balance, December 31, 2019	258,993	$ 2,589	$ 7,937,606	$ (1,973)	$ (1,852,978)	$ 6,085,244	$ —	$ 6,085,244
Other comprehensive loss, net of tax	—	—	—	(66,507)	—	(66,507)	—	(66,507)
Net income	—	—	—	—	2,711,647	2,711,647	—	2,711,647
Repurchases of common stock	(2,405)	(24)	(539,112)	—	—	(539,136)	—	(539,136)
Common stock withheld for employee tax obligations	(804)	(8)	(200,263)	—	—	(200,271)	—	(200,271)
Issuance of common stock under benefit plans	4,106	42	262,726	—	—	262,768	—	262,768
Stock-based compensation expense	—	—	433,070	—	—	433,070	—	433,070
Balance, December 31, 2020	259,890	$ 2,599	$ 7,894,027	$ (68,480)	$ 858,669	$ 8,686,815	$ —	$ 8,686,815

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,		
	2020	2019	2018
Cash flows from operating activities:			
Net income	$ 2,711,647	$ 1,176,810	$ 2,087,103
Adjustments to reconcile net income to net cash provided by operating activities:			
Stock-based compensation expense	429,461	360,489	325,047
Depreciation expense	109,515	106,941	72,420
Deferred income taxes (including benefit from valuation allowance release in 2018)	277,341	167,387	(1,512,325)
Gains on equity securities	(311,937)	(197,597)	(2,558)
Increase in fair value of contingent consideration	13,100	4,459	—
Intangible asset impairment charge	—	—	29,000
Other non-cash items, net	78,832	16,942	33,579
Changes in operating assets and liabilities:			
Accounts receivable, net	(223,444)	(225,587)	(108,152)
Inventories	(132,014)	(64,047)	(31,965)
Prepaid expenses and other assets	(297,562)	35,440	16,684
Accounts payable	51,276	(22,785)	36,554
Accrued expenses	122,198	172,881	302,755
Other liabilities	425,092	37,997	22,144
Net cash provided by operating activities	3,253,505	1,569,330	1,270,286
Cash flows from investing activities:			
Payments to acquire businesses, net of cash acquired	—	(1,154,212)	—
Purchases of available-for-sale debt securities	(431,396)	(537,196)	(431,918)
Maturities of available-for-sale debt securities	372,342	475,924	431,576
Sale of equity securities	437,567	94,936	—
Purchases of property and equipment	(259,798)	(75,451)	(95,449)
Investment in equity securities	(19,327)	(39,319)	(83,471)
Investment in note receivable	—	—	(15,000)
Decrease in restricted cash due to deconsolidation of VIE	—	—	(7,896)
Net cash provided by (used in) investing activities	99,388	(1,235,318)	(202,158)
Cash flows from financing activities:			
Issuances of common stock under benefit plans	264,946	343,244	289,293
Repurchases of common stock	(539,136)	(186,020)	(350,043)
Payments in connection with common stock withheld for employee tax obligations	(200,271)	(5,995)	—
Payments on finance leases *	(42,275)	(39,185)	(33,388)
Proceeds from finance leases *	13,251	10,046	20,840
Other financing activities	(1,796)	4,683	2,079
Net cash (used in) provided by financing activities	(505,281)	126,773	(71,219)
Effect of changes in exchange rates on cash	20,552	1,643	(6,182)
Net increase in cash, cash equivalents and restricted cash	2,868,164	462,428	990,727
Cash, cash equivalents and restricted cash—beginning of period	3,120,681	2,658,253	1,667,526
Cash, cash equivalents and restricted cash—end of period	$ 5,988,845	$ 3,120,681	$ 2,658,253
Supplemental disclosure of cash flow information:			
Cash paid for interest	$ 54,520	$ 55,554	$ 66,458
Cash paid for income taxes	$ 191,776	$ 24,730	$ 12,402
Capitalization of costs related to construction financing lease obligation *	$ —	$ —	$ 3,389
Issuances of common stock from employee benefit plans receivable	$ 642	$ 2,820	$ 86

* For the year ended December 31, 2018, amounts are related to the Company's capital leases and construction financing lease obligations pursuant to ASC 840, *Leases*, which was applicable until December 31, 2018.

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") invests in scientific innovation to create transformative medicines for serious diseases. The Company's business is focused on developing and commercializing therapies for the treatment of cystic fibrosis ("CF") and advancing research and development programs in other indications. The Company's marketed products are TRIKAFTA/KAFTRIO (elexacaftor/tezacaftor/ivacaftor and ivacaftor), SYMDEKO/SYMKEVI (tezacaftor in combination with ivacaftor), ORKAMBI (lumacaftor in combination with ivacaftor) and KALYDECO (ivacaftor), which are approved to treat people with CF who have specific mutations in their cystic fibrosis transmembrane conductance regulator ("CFTR") gene.

As of December 31, 2020, the Company had cash, cash equivalents and marketable securities of $6.7 billion. The Company expects that cash flows from the sales of its products, together with its cash, cash equivalents and marketable securities, will be sufficient to fund its operations for at least the next twelve months.

The Company is subject to risks common to companies in its industry including, but not limited to, the dependence on revenues from its CF products, 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 accompanying consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"), reflect the operations of (i) the Company, (ii) its wholly-owned subsidiaries and (iii) a consolidated variable interest entity ("VIE"). In 2018, the Company deconsolidated BioAxone Biosciences, Inc. ("BioAxone"), a VIE the Company had consolidated since 2014. As of December 31, 2020 and 2019, the Company did not have any consolidated VIEs. All material intercompany balances and transactions have been eliminated. The Company operates in one segment, pharmaceuticals. Please refer to Note Q, "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 items from the prior year's consolidated financial statements to conform to the current year's presentation.

Use of Estimates

The preparation of consolidated financial statements in accordance with U.S. 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 (i) determining the transaction price of revenues, (ii) accounting for acquisitions, including intangible assets, goodwill and contingent consideration and (iii) evaluating deferred tax asset valuation allowances and the provision for 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

The Company recognizes revenue when a customer obtains control of promised goods or services. The Company records the amount of revenue that reflects the consideration that it expects to receive in exchange for those goods or services. The Company applies the following five-step model in order to determine this amount: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations, including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) the Company satisfies each performance obligation.

The Company only applies the five-step model to contracts when it is probable that it will collect the consideration to which it is entitled in exchange for the goods or services that it transfers to the customer. Once a contract is determined to be within the scope of Accounting Standards Codification ("ASC") 606, *Revenue from Contracts with Customers* ("ASC 606") at contract inception, the Company reviews the contract to determine which performance obligations it must deliver and which of these performance obligations are distinct. The Company recognizes as revenue the amount of the transaction price that is allocated to each performance obligation when that performance obligation is satisfied or as it is satisfied. Generally, the Company's performance obligations are transferred to customers at a point in time, typically upon delivery.

Product Revenues, Net

The Company sells its products principally to a limited number of specialty pharmacy and specialty distributors in the United States ("U.S."), which account for the largest portion of its total revenues, and makes international sales primarily to specialty distributors and retail chains, as well as hospitals and clinics, many of which are government-owned or supported (collectively, its "Customers"). The Company's Customers in the U.S. subsequently resell the products to patients and health care providers. The Company recognizes net product revenues from sales when the Customers obtain control of the Company's products, which typically occurs upon delivery to the Customer. The Company's payment terms are approximately 30 days in the U.S. and consistent with prevailing practice in international markets.

Revenues from product sales are recorded at the net sales price, or "transaction price," which includes estimates of variable consideration that result from (a) invoice discounts for prompt payment and distribution fees, (b) government and private payor rebates, chargebacks, discounts and fees and (c) costs of co-pay assistance programs for patients, as well as other incentives for certain indirect customers. Reserves are established for the estimates of variable consideration based on the amounts earned or to be claimed on the related sales. The reserves are classified as reductions to "Accounts receivable, net" if payable to a Customer or "Accrued expenses" if payable to a third-party. Where appropriate, the Company utilizes the expected value method to determine the appropriate amount for estimates of variable consideration based on factors such as the Company's historical experience, current contractual and statutory requirements, specific known market events and trends, industry data and forecasted customer buying and payment patterns. The amount of variable consideration that is included in the transaction price may be constrained and is included in net product revenues only to the extent that it is probable that a significant reversal in the amount of the cumulative revenue recognized will not occur in a future period. Actual amounts of consideration ultimately received may differ from the Company's estimates. If actual results vary from the Company's estimates, the Company adjusts these estimates, which would affect net product revenue and earnings in the period such variances become known.

Invoice Discounts and Distribution Fees: 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 Company estimates 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, Discounts and Fees: The Company contracts with government agencies (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, discounts and fees 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 and fees

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.

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. 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 appropriate accruals.

The Company makes significant estimates and judgments that materially affect its recognition of net product revenues. 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. The Company's credits to product revenue related to prior period sales have not been significant and primarily related to rebates and discounts.

The Company excludes taxes collected from Customers relating to product sales and remitted to governmental authorities from revenues.

Contract Liabilities

The Company recorded contract liabilities of $191.5 million and $62.3 million as of December 31, 2020 and 2019, respectively, related to annual contracts with government-owned and supported customers in international markets that limit the amount of annual reimbursement the Company can receive. Upon exceeding the annual reimbursement amount, products are provided free of charge, which is a material right. These contracts include upfront payments and fees. The Company defers a portion of the consideration received for shipments made up to the annual reimbursement limit as a portion of "Other current liabilities." The deferred amount is recognized as revenue when the free products are shipped. The Company's product revenue contracts include performance obligations that are one year or less.

The Company's contract liabilities at the end of each fiscal year relate to contracts with annual reimbursement limits in international markets in which the annual period associated with the contract is not the same as the Company's fiscal year. In these markets the Company recognizes revenues related to performance obligations satisfied in previous years; however, these revenues do not relate to any performance obligations that were satisfied more than 12 months prior to the beginning of the current year. During the years ended December 31, 2020, 2019 and 2018, the Company recorded $62.3 million, $24.9 million and $1.7 million, respectively, of revenues that were recorded as contract liabilities at the beginning of the year.

French Early Access Programs

In 2015, the Company began distributing ORKAMBI through early access programs in France and remained engaged in reimbursement discussions with the French government until November 2019, when the Company reached an agreement with the French government for ORKAMBI, including ORKAMBI distributed through early access programs. From the time the Company began distributing ORKAMBI through early access programs in France, it expected the difference between the amounts collected based on the invoiced amount and the final amount for ORKAMBI distributed through early access programs would be returned to the French government. As a result, the Company had classified a refund liability related to the early access programs in France within "Accrued expenses" on its consolidated balance sheets.

From the first quarter of 2018 through the third quarter of 2019, the Company recognized net product revenues for ORKAMBI sales in France under the early access programs based on a transaction price that reflected the Company's estimate of consideration it expected to retain that would not be subject to a significant reversal in amounts recognized. When determining if variable consideration should be constrained, the Company considers whether there are factors outside its control that could result in a significant reversal of revenue. In making these assessments, the Company considers the likelihood and magnitude of a potential reversal of revenue.

Upon reaching an agreement with the French government for ORKAMBI, including ORKAMBI distributed through early access programs in November 2019, the Company updated the transaction price to reflect the final amount for ORKAMBI distributed through early access programs. As a result, the Company recognized net product revenues of

$155.8 million related to prior period ORKAMBI early access program sales in the fourth quarter of 2019 because the updated transaction price for ORKAMBI distributed through these programs exceeded the Company's previous estimate of the consideration it expected to retain that would not be subject to a significant reversal in amounts recognized. The Company paid the final amount due to the French government in 2020.

Collaborative and Royalty Revenues

The Company has not recorded significant collaborative and royalty revenues during the three years ended December 31, 2020; however, in future periods, it may recognize collaborative revenues generated through collaborative research, development and/or commercialization agreements. The terms of these agreements typically include payment to the Company related to one or more of the following: nonrefundable, upfront license fees; development and commercial milestones; funding of research and/or development activities; and royalties on net sales of licensed products. Revenue is recognized upon satisfaction of a performance obligation by transferring control of a good or service to the collaborator.

For each collaborative research, development and/or commercialization agreement that results in revenue, the Company identifies all material performance obligations, which may include a license to intellectual property and know-how, research and development activities and/or transition activities. In order to determine the transaction price, in addition to any upfront payment, the Company estimates the amount of variable consideration at the outset of the contract either utilizing the expected value or most likely amount method, depending on the facts and circumstances relative to the contract. The Company constrains (reduces) the estimate of variable consideration such that it is probable that a significant reversal of previously recognized revenue will not occur throughout the life of the contract. When determining if variable consideration should be constrained, management considers whether there are factors outside the Company's control that could result in a significant reversal of revenue. In making these assessments, the Company considers the likelihood and magnitude of a potential reversal of revenue. These estimates are re-assessed each reporting period as required.

Once the estimated transaction price is established, amounts are allocated to the performance obligations that have been identified. The transaction price is generally allocated to each separate performance obligation on a relative standalone selling price basis. In order to account for these agreements, the Company must develop assumptions that require judgment to determine the standalone selling price, which may include (i) the probability of obtaining marketing approval for the drug candidate, (ii) estimates regarding the timing of and the expected costs to develop and commercialize the drug candidate, (iii) estimates of future cash flows from potential product sales with respect to the drug candidate and (iv) appropriate discount and tax rates. Standalone selling prices used to perform the initial allocation are not updated after contract inception. The Company does not include a financing component to its estimated transaction price at contract inception unless it estimates that certain performance obligations will not be satisfied within one year.

Upfront License Fees: If a license to the Company's intellectual property is determined to be distinct from the other performance obligations identified in an arrangement, the Company recognizes revenue from the related nonrefundable, upfront license fees based on the relative standalone selling price prescribed to the license compared to the total selling price of the arrangement. The revenue is recognized when the license is transferred to the collaborator and the collaborator is able to use and benefit from the license. For licenses that are not distinct from other obligations identified in the arrangement, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time. If the combined performance obligation is satisfied over time, the Company applies an appropriate method of measuring progress for purposes of recognizing revenue from nonrefundable, upfront license fees. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Development and Regulatory Milestone Payments: Depending on facts and circumstances, the Company may conclude that it is appropriate to include certain milestones in the estimated transaction price or that it is appropriate to fully constrain the milestones. A milestone payment is included in the transaction price in the reporting period that the Company concludes that it is probable that recording revenue in the period will not result in a significant reversal in amounts recognized in future periods. This may result in revenues from certain milestones and a corresponding contract asset being recorded in a reporting period before the milestone is achieved. Milestone payments that have not been included in the transaction price to date are fully constrained until the Company concludes that their achievement is probable and that recognition of the related revenue will not result in a significant reversal in amounts recognized in future periods. The Company re-evaluates the probability of achievement of such development milestones and any related constraint each reporting period and adjusts its estimate of the overall transaction price, including the amount of collaborative revenue that it has recorded, if necessary.

Research and Development Activities/Transition Services: If the Company is entitled to reimbursement from its collaborators for specified research and development expenses, it accounts for the related services that it provides as separate performance obligations if it determines that these services represent a material right. The Company also determines whether the reimbursement of research and development expenses should be accounted for as collaborative revenues or an offset to research and development expenses in accordance with the provisions of gross or net revenue presentation. The Company recognizes the corresponding revenues or records the corresponding offset to research and development expenses as it satisfies the related performance obligations.

Sales-based Milestone and Royalty Payments: The Company's collaborators may be required to pay the Company sales-based milestones or royalties on future sales of commercial products. The Company recognizes revenues related to sales-based milestone and royalties upon the later to occur of (i) achievement of the collaborator's underlying sales or (ii) satisfaction of any performance obligation(s) related to these sales, in each case assuming the license to the Company's intellectual property is deemed to be the predominant item to which the sales-based milestones and/or royalties relate.

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 believes that its allowances, which are not significant to its consolidated financial statements, are adequate at December 31, 2020. Please refer to Note Q, "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

As of December 31, 2020, the Company's marketable securities consisted of investments in available-for-sale debt securities and corporate equity securities with readily determinable fair values. 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. The fair value of these securities is based on quoted prices for identical or similar assets.

The Company records unrealized gains (losses) on available-for-sale debt securities as a component of "Accumulated other comprehensive loss," which is a separate component of shareholders' equity on its consolidated balance sheet, until such gains and losses are realized. Realized gains and losses, if any, are determined using the specific identification method.

The Company records changes in the fair value of its investments in corporate equity securities to "Other income (expense), net" in its consolidated statements of operations. Realized gains and losses, which are also included in "Other income (expense), net," are determined on an original weighted-average cost basis.

The Company adopted Accounting Standards Update ("ASU") 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* ("ASU 2016-13") as of January 1, 2020, which did not have a significant impact on its consolidated financial statements. For available-for-sale debt securities in unrealized loss positions, ASU 2016-13 requires the Company to record an allowance for credit losses using an expected loss model, which replaces the incurred loss model required under the previous guidance. A credit loss is limited to the amount by which the amortized cost of an investment exceeds its fair value. A previously recognized credit loss may be decreased in subsequent periods if the Company's estimate of fair value for the investment increases. To determine whether to record a credit loss, the Company considers issuer specific credit ratings and historical losses as well as current economic conditions and its expectations for future economic conditions.

Accounts Receivable

The Company deducts invoice discounts 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 credit losses, which has not been significant to date, is determined based on existing contractual payment terms, historical payment patterns, current economic conditions and the Company's expectation for future economic conditions.

Stock-based Compensation Expense

The Company expenses the fair value of employee restricted stock units 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 and is adjusted each period to reflect actual forfeitures and the outcomes of certain performance conditions.

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.

The Company provides to employees who have rendered a certain number of years of service 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, 2020. 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; outsourced services and other direct expenses, including clinical trial and pharmaceutical development costs; collaborative payments; and infrastructure costs, including facilities costs and depreciation expense.

Inventories

The Company values its inventories at the lower-of-cost or net realizable value. 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 net 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 sales" in the consolidated statements of operations. Shipping and handling costs incurred for product shipments are recorded as incurred in "Cost of sales" 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, net of accumulated depreciation. Depreciation expense is recorded using the straight-line method over the estimated useful life of the related asset generally as follows:

Description	Estimated Useful Life
Buildings and improvements	15 to 40 years
Furniture and equipment	7 to 10 years
Leasehold improvements; assets under finance leases	The shorter of the useful life of the assets or the estimated remaining term of the associated lease
Computers and software	3 to 5 years

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. Amortization of capitalized internally developed software costs is recorded in depreciation expense over the useful life of the related asset.

Leases

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

A lease qualifies as a finance lease if any of the following criteria are met at the inception of the lease: (i) there is a transfer of ownership of the leased asset to the Company by the end of the lease term, (ii) the Company holds an option to purchase the leased asset that it is reasonably certain to exercise, (iii) the lease term is for a major part of the remaining

economic life of the leased asset, (iv) the present value of the sum of lease payments equals or exceeds substantially all of the fair value of the leased asset, or (v) the nature of the leased asset is specialized to the point that it is expected to provide the lessor no alternative use at the end of the lease term. All other leases are recorded as operating leases.

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

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

Finance leases are recorded in “Property and equipment, net,” “Other current liabilities” and “Long-term finance lease liabilities” and operating leases are recorded in “Operating lease assets,” “Other current liabilities” and “Long-term operating lease liabilities” on the Company’s consolidated balance sheet.

In 2018, prior to the adoption of ASC 842 on January 1, 2019, the Company applied build-to-suit accounting and was the deemed owner of its leased corporate headquarters in Boston and research site in San Diego, for which it was recognizing depreciation expense over the buildings’ useful lives and imputed interest on the corresponding construction financing lease obligations.

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. On a periodic basis, the Company reassesses the valuation allowance on its deferred income tax assets weighing positive and negative evidence to assess the recoverability of its deferred tax assets. The Company includes, among other things, its recent financial performance and its future projections in this periodic assessment.

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 it licenses assets owned by a collaborator in order to determine whether or not it 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, the value of the collaborator’s total assets 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. On a quarterly basis,

the Company evaluates whether it continues to be the primary beneficiary of any consolidated VIEs. 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.

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

The present-value models the Company uses to estimate the fair values of in-process research and development assets and contingent payments pursuant to collaborations and acquisitions incorporate significant assumptions.

The Company's discounted cash flow models pertaining to in-process research and development assets include: (i) assumptions regarding the probability of obtaining marketing approval for a drug candidate; (ii) the timing of and the expected costs to develop and commercialize a drug candidate; (iii) estimates of future cash flows from potential product sales with respect to a drug candidate; and (iv) appropriate discount and tax rates.

The Company bases its estimates of the probability of achieving the milestones relevant to the fair value of contingent payments, which could include milestone, royalty and option payments, on industry data. Estimates included in the discounted cash flow models pertaining to contingent payments also include: (i) estimate regarding the timing of the relevant development and commercial milestones and royalties, (ii) and appropriate discount rates. Please refer to Note D, "Fair Value Measurements," for further information.

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 sales" 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.

In-process research and development that is acquired in a transaction that does not qualify as a business combination under U.S. GAAP and that does not have an alternative future use is recorded to "Research and development expenses" in the period in which it is acquired.

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. As noted in *Basis of Presentation* above, the Company has one operating segment, pharmaceuticals, which is its only reporting unit.

Deconsolidation

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.

Discontinued Operations

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.

Embedded Derivatives

Embedded derivatives are required to be bifurcated from the host instruments and recorded at fair value if the derivatives are not clearly and closely related to the host instruments on the date of issuance. The Company did not have any material embedded derivatives that required bifurcation recorded on its consolidated balance sheets as of December 31, 2020 and 2019, respectively.

Hedging Activities

The Company recognizes the fair value of hedging instruments that are designated and qualify as hedging instruments pursuant to U.S. GAAP, foreign currency forward contracts, as either assets or liabilities on the consolidated balance sheets. Changes in the fair value of these instruments are recorded each period in "Accumulated other comprehensive 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 "Prepaid expenses and other current assets" or "Other assets," and "Other current liabilities" or "Other long-term liabilities," respectively, on the Company's consolidated balance sheets depending on the remaining period until their contractual maturity. Realized gains and losses for the effective portion of such contracts are recognized in "Product revenues, net" in the consolidated statement of operations in the same period that it recognizes the product revenues that were impacted by the hedged foreign exchange rate changes. 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 also enters into foreign currency forward contracts with contractual maturities of less than one month designed to mitigate the effect of changes in foreign exchange rates on monetary assets and liabilities including intercompany balances. These contracts are not designated as hedging instruments pursuant to U.S. GAAP. Realized gains and losses for such contracts are recognized in "Other income (expense), net" in the consolidated statement of operations each period.

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. The Company's exit and disposal activities have primarily been associated with the Company's facilities, but also have included the termination of employees in some cases. The Company's initial estimate of its liabilities for net ongoing costs associated with its facility obligations are recorded at fair value on the cease use date. On a quarterly basis, the Company evaluates and adjusts these liabilities as appropriate for changes in circumstances. Changes to the Company's estimate of these liabilities are recorded as additional restructuring expenses (credits). These costs are included in "Restructuring expense (income)" on the Company's consolidated statements of operations.

Comprehensive Income

Comprehensive income consists of net income 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 disclosures, the Company records provisions for or benefits from income taxes related to the unrealized gains and losses on foreign currency forward contracts and certain marketable securities. The Company does not record provisions for or benefits from income taxes 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 majority of the Company's operations occur in entities that have the U.S. dollar denominated as their functional currency. The assets and liabilities of the Company's entities with functional currencies other than the U.S. dollar are translated into U.S. dollars at rates of exchange in effect at the end of the year. Revenue and expense amounts for these entities 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 loss." Net foreign currency exchange transaction losses, which are included in "Other income (expense), net" on the Company's consolidated statement of operations, were $16.1 million, $5.2 million and $1.1 million for 2020, 2019 and 2018, respectively. These net foreign currency exchange losses are presented net of the impact of the foreign currency forward contracts designed to mitigate their effect on the Company's consolidated statement of operations.

Net Income Per Share Attributable to Vertex Common Shareholders

Basic and diluted net income per share attributable to Vertex common shareholders are presented in conformity with the two-class method required for participating securities. Shares of unvested restricted stock granted under the Company's Amended and Restated 2006 Stock and Option Plan had 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 were considered participating securities under the two-class method. In 2020 and 2019, the Company did not have a significant amount of restricted stock outstanding under this plan: therefore, the two-class method did not impact its basic and diluted net income per share attributable to Vertex common shareholders for the years ended December 31, 2020 and 2019.

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. 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 income 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 had been issued but had not yet vested, if any. Diluted net income 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.

Recently Adopted Accounting Standards

Internal-Use Software

In 2018, the Financial Accounting Standards Board ("FASB") issued ASU 2018-15, *Intangibles—Goodwill and Other—Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract* ("ASU 2018-15"), which clarifies the accounting for implementation costs in cloud computing arrangements. ASU 2018-15 became effective on January 1, 2020. The adoption of ASU 2018-15 resulted in an insignificant amount of additional assets recorded on the Company's consolidated balance sheet.

Fair Value Measurement

In 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework-Changes to the Disclosure Requirements for Fair Value Measurement* ("ASU 2018-13"), which modifies the disclosure requirements for fair value measurements. ASU 2018-13 became effective on January 1, 2020. The Company adoption of ASU 2018-13 resulted in additional disclosures related to the Company's Level 3 inputs. Please refer to Note D, "Fair Value Measurements," for further information.

Credit Losses

In 2016, the FASB issued ASU 2016-13, which requires entities to record expected credit losses for certain financial instruments, including trade receivables, as an allowance that reflects the entity's current estimate of credit losses expected to be incurred. For available-for-sale debt securities in unrealized loss positions, ASU 2016-13 requires allowances to be

recorded instead of reducing the amortized cost of the investment. ASU 2016-13 became effective on January 1, 2020. The adoption of ASU 2016-13 did not have a significant impact on the Company's consolidated financial statements.

Leases

On January 1, 2019, the Company adopted ASC 842 using the modified-retrospective method. Until December 31, 2018, the Company applied build-to-suit accounting and was the deemed owner of its leased corporate headquarters in Boston and research site in San Diego, for which it was recognizing depreciation expense over the buildings' useful lives and imputed interest on the corresponding construction financing lease obligations. Under the amended guidance that became effective January 1, 2019, the Company accounts for these buildings as finance leases, resulting in increased depreciation expense over the respective lease terms of approximately 15 years, which are significantly shorter than the buildings' useful lives of 40 years. The amended guidance also results in a reduction in imputed interest expense in the initial years of each finance lease term. As of January 1, 2019, the Company recorded a cumulative effect adjustment to increase its "Accumulated deficit" by $40.3 million related to the adjustments to its build-to-suit leases. Please refer to "Leases" above for further information.

Revenue Recognition

On January 1, 2018, the Company adopted ASC 606, using the modified retrospective adoption method for all contracts that were not completed as of the date of adoption. Based on the Company's review of existing customer contracts as of January 1, 2018, the Company concluded that the only significant impact that the adoption of ASC 606 had on its consolidated financial statements related to shipments of ORKAMBI under early access programs in France. Prior to the adoption of ASC 606, the Company did not recognize revenue on the proceeds received from sales of ORKAMBI under early access programs in France because the price was not fixed or determinable based on the status of ongoing pricing discussions. As of January 1, 2018, the Company recorded a cumulative effect adjustment to its accumulated deficit of $8.3 million related to the adoption of ASC 606, which primarily represented the Company's estimated amount of consideration it expected to retain related to these shipments that would not be subject to a significant reversal in amounts recognized, net of costs previously deferred related to these shipments.

Equity Investments

On January 1, 2018, the Company adopted ASU 2016-01, *Recognition and Measurement of Financial Assets and Financial Liabilities* ("ASU 2016-01"), using the required modified-retrospective adoption method. Under ASU 2016-01, equity investments (except those accounted for under the equity method of accounting or those that result in consolidation of an investee) are measured at fair value with changes in fair value recognized in net income. As of January 1, 2018, the Company held publicly traded equity investments and equity investments accounted for under the cost method. As a result, in 2018, the Company recorded a $25.1 million cumulative effect adjustment to "Accumulated deficit" related to its publicly traded equity investments equal to the unrealized gain, net of tax, that was recorded in "Accumulated other comprehensive loss" as of December 31, 2017.

Recently Issued Accounting Standards

Income Taxes

In 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740)* ("ASU 2019-12"), which simplifies the accounting for income taxes. ASU 2019-12 was effective on January 1, 2021. The Company does not expect the adoption of ASU 2019-12 to have a significant impact on its consolidated financial statements.

B. Collaborative Arrangements

The Company has entered into numerous agreements pursuant to which it collaborates with third parties on research, development and commercialization programs, including in-license and out-license agreements.

In-license Agreements

The Company has entered into a number of license agreements in order to advance and obtain access to technologies and services related to its research and early-development activities. The Company is generally required to make an upfront payment upon execution of the license agreement; development, regulatory and commercialization milestones payments upon the achievement of certain product research, development and commercialization objectives; and royalty payments on future sales, if any, of commercial products resulting from the collaboration.

Pursuant to the terms of its in-license agreements, the Company's collaborators typically lead the discovery efforts and the Company leads all preclinical, development and commercialization activities associated with the advancement of any drug candidates and funds all expenses.

The Company typically can terminate its in-license agreements by providing advance notice to its collaborators; the required length of notice is dependent on whether any product developed under the license agreement has received marketing approval. The Company's license agreements may be terminated by either party for a material breach by the other, subject to notice and cure provisions. Unless earlier terminated, these license agreements generally remain in effect until the date on which the royalty term and all payment obligations with respect to all products in all countries have expired.

CRISPR Therapeutics AG

In 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 had the exclusive right to license certain targets. In the fourth quarter of 2019, the Company paid an aggregate of $30.0 million to exclusively license three CRISPR-Cas9-based targets, including CF, pursuant to the CRISPR Agreement. The Company recorded the $30.0 million total option payment to "Research and development expenses" in the fourth quarter of 2019. For each of the three targets that the Company elected to license, CRISPR has the potential to receive up to an additional $410.0 million in development, regulatory and commercial milestones as well as royalties on net product sales.

In 2017, the Company entered into a co-development and co-commercialization agreement with CRISPR pursuant to the terms of the CRISPR Agreement, under which the Company and CRISPR are co-developing and will co-commercialize CTX001 (the "CTX001 Co-Co Agreement") for the treatment of hemoglobinopathies, including treatments for sickle cell disease and beta thalassemia. As part of the collaboration, the Company and CRISPR share equally all development costs and potential worldwide revenues related to potential hemoglobinopathy treatments. The Company concluded that the CTX001 Co-Co Agreement is a cost-sharing arrangement, which results in the net impact of the arrangement being recorded in "Research and development expenses" in its consolidated statements of operations. During the years ended December 31, 2020, 2019 and 2018, the net expense related to the CTX001 Co-Co Agreement was $50.6 million, $30.1 million and $19.7 million, respectively.

In July 2019, the Company entered into a separate strategic collaboration and license agreement (the "CRISPR DMD/DM1 Agreement") with CRISPR. Pursuant to this agreement, the Company received an exclusive worldwide license to CRISPR's existing and future intellectual property for Duchenne muscular dystrophy ("DMD") and myotonic dystrophy type 1 ("DM1") and the Company made an upfront payment of $175.0 million to CRISPR. The Company concluded that it did not have any alternative future use for the acquired in-process research and development and recorded the upfront payment to "Research and development expenses" in the third quarter of 2019. In 2020, the Company recorded $25.0 million to "Research and development expenses" related to a pre-clinical milestone earned by CRISPR under the CRISPR DMD/DM1 Agreement. CRISPR has the potential to receive up to an additional $800.0 million in research, development, regulatory and commercial milestones for the DMD and DM1 programs as well as royalties on net product sales. CRISPR has the option to co-develop and co-commercialize all DM1 products globally and forego the milestones and royalties associated with the

DM1 program. The Company funds all expenses associated with the collaboration except for research costs for specified guide RNA research conducted by CRISPR, which the Company and CRISPR share equally.

Kymera Therapeutics Inc.

In May 2019, the Company entered into a strategic research and development collaboration agreement with Kymera Therapeutics Inc. ("Kymera") to advance small molecule protein degraders against multiple targets. Kymera's proprietary platform technology is being applied in the collaboration activities in exchange for an upfront payment of $50.0 million. The Company has the exclusive right to license up to six protein targets, for each of which Kymera may receive up to $170.0 million in payments, including development, regulatory and commercial milestones as well as royalties on net product sales. In addition to the upfront payment, the Company purchased $20.0 million of Kymera's preferred stock. The Company determined that the fair value of its investment in Kymera's preferred stock, which did not have a readily determinable fair value, approximated $20.0 million. The preferred stock converted to common stock when Kymera became a publicly traded company in 2020.

The Company determined that substantially all of the fair value of the Kymera collaboration agreement was attributable to in-process research and development and no substantive processes were acquired that would constitute a business. The Company concluded that it did not have any alternative future use for the acquired in-process research and development and recorded the $50.0 million upfront payment to "Research and development expenses" in 2019.

Moderna, Inc.

In 2016, the Company entered into a strategic collaboration and licensing agreement with Moderna, Inc. ("Moderna"), pursuant to which the parties are seeking to identify and develop messenger ribonucleic acid ("mRNA") therapeutics for the treatment of CF.

In September 2020, the Company entered into a new strategic collaboration and licensing agreement with Moderna (the "2020 Moderna Agreement") aimed at the discovery and development of lipid nanoparticles and mRNAs that can deliver gene-editing therapies to lung cells for the treatment of CF. Pursuant to the 2020 Moderna Agreement, Moderna received an upfront payment of $75.0 million and is eligible to receive up to $380.0 million in development, regulatory and commercial milestones as well as royalties on net product sales. The Company determined that substantially all of the fair value of the 2020 Moderna Agreement was attributable to in-process research and development and no substantive processes were acquired that would constitute a business. The Company concluded that it did not have any alternative future use for the acquired in-process research and development and recorded the upfront payment to "Research and development expenses" in the third quarter of 2020.

Other In-License Agreements

In addition to the collaborative arrangements described above, the Company has entered into additional in-license agreements that it does not consider to be individually significant to its consolidated financial statements. In addition to the payments described above, the Company recorded upfront, option and milestone payments totaling $84.6 million in 2020, $63.3 million in 2019 and $46.9 million in 2018 to "Research and development expenses" which included a $40.0 million upfront payment to Skyhawk Therapeutics, Inc. ("Skyhawk") in 2020.

For Skyhawk and several other in-license agreements that are not individually significant to the Company's consolidated financial statements, the Company determined that substantially all of the fair value of each individual agreement was attributable to in-process research and development and no substantive processes were acquired that would constitute a business. The Company concluded that it did not have any alternative future use for the acquired in-process research and development associated with the agreements and recorded the related portion of the upfront payments to "Research and development expenses." Please refer to Note D, "Fair Value Measurements," and Note E, "Marketable Securities and Equity Investments," for further information regarding the Company's investments in its collaborators.

Variable Interest Entities (VIEs)

The Company licensed rights to certain drug candidates from these third-party collaborators, which has resulted in the consolidation of the third-parties' financial statements into the Company's consolidated financial statements as VIEs for

certain periods of time. Most recently, the Company deconsolidated the financial statements of BioAxone from its consolidated financial statements as of December 31, 2018. The Company has not consolidated a VIE into its financial statements since December 31, 2018.

BioAxone Biosciences, Inc.

In 2014, the Company entered into a license and collaboration agreement (the "BioAxone Agreement") with BioAxone, which resulted in the consolidation of BioAxone as a VIE.

In October 2018, the Company announced it would stop clinical development of VX-210 and terminate the Phase 2b clinical trial of VX-210 based on the recommendation of the clinical trial's Data Safety Monitoring Board and the Company's review of interim data. In December 2018, the Company notified BioAxone of its intent to terminate the BioAxone Agreement and executed a release that immediately allowed BioAxone to control development of its neurological programs other than VX-210 without the Company's consent. As a result of this decision, the Company recorded a $29.0 million impairment charge related to VX-210 that was attributable to noncontrolling interest.

As a result, the Company deconsolidated BioAxone as of December 31, 2018 because it determined that it no longer was the primary beneficiary of BioAxone as it no longer had the power to direct the significant activities of BioAxone. The net impact of the deconsolidation was not material to the Company's consolidated statement of operations. The Company's net loss attributable to noncontrolling interest for the year ended December 31, 2018 was $9.8 million.

Out-license Agreements

The Company has entered into licensing agreements pursuant to which it has out-licensed rights to certain drug candidates to third-party collaborators. Pursuant to these out-license agreements, the Company's 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 agreements, the Company's collaborators may be required to make upfront payments, milestone payments upon the achievement of certain product research and development objectives and may also be required to pay royalties on future sales, if any, of commercial products resulting from the collaboration. The termination provisions associated with these collaborations are generally the same as those described above related to the Company's in-license agreements.

Merck KGaA, Darmstadt, Germany

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

The Oncology Agreement provided for an upfront payment from the Licensee to the Company of $230.0 million, which was recorded as "Collaborative and royalty revenues," under the multiple element arrangement accounting guidance that was applicable in 2017. All of the Company's activities related to the Oncology Agreement were substantially complete as of December 31, 2017.

In December 2018, the Company entered into an agreement with Merck KGaA, Darmstadt, Germany (the "DNA-PK Agreement") whereby the Company licensed the two lead Vertex DNA-PK compounds from its DNA-PK program for use in the field of gene integration for six specific indications. In exchange for this exclusive worldwide license to research, develop and commercialize the DNA-PK program for the specified indications within the field of gene integration, the Company made an upfront payment of $65.0 million. Merck KGaA, Darmstadt, Germany has the potential to receive additional milestones, primarily related to approval and reimbursement in various markets, as well as royalties on net product sales.

The Company evaluated the DNA-PK Agreement and concluded it represents a modification of the Oncology Agreement pursuant to ASC 606. As of December 2018, when the Company entered into the DNA-PK Agreement, the Company had

completed its obligations under the Oncology Agreement, but the Oncology Agreement was an open contract pursuant to ASC 606 since the Company could receive future royalty payments from the commercialization of the licensed programs under the Oncology Agreement.

In applying ASC 606, the Company determined that the license granted under the DNA-PK Agreement is distinct from the license granted by the Company under the Oncology Agreement since the license to the two lead Vertex DNA-PK compounds is capable of being distinct as the Company is able to benefit from the license via its ability to internally develop and commercialize the two lead Vertex DNA-PK compounds in the six named indications in the field of gene-editing, and the license is not dependent on Merck KGaA, Darmstadt, Germany providing any specialized services to the Company. In addition, the license to the two lead Vertex DNA-PK compounds granted to the Company under the DNA-PK Agreement is distinct from the license granted by the Company under the Oncology Agreement as the rights conveyed in the licenses differ and both parties have the ability to commercially benefit from the licenses on their own. Furthermore, the consideration attributable to the license of the two lead Vertex DNA-PK compounds represents fair value. Therefore, the Company determined it should account for the DNA-PK Agreement as a separate agreement.

The Company determined that substantially all of the fair value of the DNA-PK Agreement was attributable to a single in-process research and development asset that did not constitute a business. The Company concluded that it did not have any alternative future use for the acquired in-process research and development and recorded the $65.0 million payment to “Research and development expenses” in 2018 accordingly.

Janssen Pharmaceuticals, Inc.

In 2014, the Company entered into an agreement with Janssen Pharmaceuticals, Inc. (“Janssen”). In the third quarter of 2020, Janssen exercised its right to terminate its exclusive worldwide license to develop and commercialize certain drug candidates for the treatment of influenza, based on Phase 3 clinical trial results for pimodivir.

Cystic Fibrosis Foundation

The Company has a research, development and commercialization agreement that was originally entered into in 2004 with the Cystic Fibrosis Foundation, as successor in interest to the Cystic Fibrosis Foundation Therapeutics, Inc. This agreement was most recently amended in 2016. Pursuant to the agreement, as amended, the Company 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, including elexacaftor, and tiered royalties ranging from single digits to sub-teens on covered compounds first synthesized and/or tested during a research term on or before February 28, 2014, including KALYDECO (ivacaftor), ORKAMBI (lumacaftor in combination with ivacaftor) and SYMDEKO/SYMKEVI (tezacaftor in combination with ivacaftor). For combination products, such as ORKAMBI, SYMDEKO/SYMKEVI and TRIKAFTA/KAFTRIO (elexacaftor/tezacaftor/ivacaftor and ivacaftor), sales are allocated equally to each of the active pharmaceutical ingredients in the combination product.

C. Earnings Per Share

Basic net income per share attributable to Vertex common shareholders is based upon the weighted-average number of common shares outstanding during the period. Diluted net income per share attributable to Vertex common shareholders utilizing the treasury-stock method 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 following table sets forth the computation of basic and diluted net income per share for the periods ended:

	2020	2019	2018
	(in thousands, except per share amounts)		
Basic net income attributable to Vertex per common share calculation:			
Net income attributable to Vertex common shareholders	$ 2,711,647	$ 1,176,810	$ 2,096,896
Less: Undistributed earnings allocated to participating securities	—	—	(501)
Net income attributable to Vertex common shareholders—basic	$ 2,711,647	$ 1,176,810	$ 2,096,395
Basic weighted-average common shares outstanding	259,841	256,728	254,292
Basic net income attributable to Vertex per common share	$ 10.44	$ 4.58	$ 8.24
Diluted net income attributable to Vertex per common share calculation:			
Net income attributable to Vertex common shareholders	$ 2,711,647	$ 1,176,810	$ 2,096,896
Less: Undistributed earnings allocated to participating securities	—	—	(492)
Net income attributable to Vertex common shareholders—diluted	$ 2,711,647	$ 1,176,810	$ 2,096,404
Weighted-average shares used to compute basic net income per common share	259,841	256,728	254,292
Effect of potentially dilutive securities:			
Stock options	1,801	2,231	2,913
Restricted stock units (including PSUs) and restricted stock	1,741	1,700	1,963
Employee stock purchase program	13	14	17
Weighted-average shares used to compute diluted net income per common share	263,396	260,673	259,185
Diluted net income attributable to Vertex per common share	$ 10.29	$ 4.51	$ 8.09

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

	2020	2019	2018
	(in thousands)		
Stock options	312	2,833	2,217
Unvested restricted stock units (including PSUs) and restricted stock	257	6	5

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 determine the fair value of the Company's financial 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. The Company maintains strategic investments separately from the investment policy that governs its other cash, cash equivalents and marketable securities as described in Note E, "Marketable Securities and Equity Investments." Additionally, the Company utilizes foreign currency forward contracts intended to mitigate the effect of changes in foreign exchange rates on its consolidated statement of operations.

During the three years ended December 31, 2020, the Company did not record any other-than-temporary impairment charges related to its financial assets.

The following tables set forth the Company's financial assets and liabilities subject to fair value measurements by level within the fair value hierarchy (and does not include $2.8 billion and $2.3 billion of cash as of December 31, 2020 and 2019, respectively):

	As of December 31, 2020				As of December 31, 2019			
		Fair Value Hierarchy				Fair Value Hierarchy		
	Total	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3
	(in thousands)							
Financial instruments carried at fair value (asset position):								
Cash equivalents:								
Money market funds	$ 3,141,053	$ 3,141,053	$ —	$ —	$ 791,039	$ 791,039	$ —	$ —
Corporate debt securities	—	—	—	—	6,070	—	6,070	—
Commercial paper	—	—	—	—	29,472	—	29,472	—
Marketable securities:								
Corporate equity securities	195,781	15,650	180,131	—	282,084	261,797	20,287	—
Government-sponsored enterprise securities	80,063	80,063	—	—	12,733	12,733	—	—
Corporate debt securities	231,598	—	231,598	—	301,799	—	301,799	—
Commercial paper	163,268	—	163,268	—	102,356	—	102,356	—
Prepaid expenses and other current assets:								
Foreign currency forward contracts	—	—	—	—	9,725	—	9,725	—
Total financial assets	$ 3,811,763	$ 3,236,766	$ 574,997	$ —	$ 1,535,278	$ 1,065,569	$ 469,709	$ —
Financial instruments carried at fair value (liability position):								
Other current liabilities:								
Foreign currency forward contracts	$ (59,184)	$ —	$ (59,184)	$ —	$ (5,533)	$ —	$ (5,533)	$ —
Long-term contingent consideration	(189,600)	—	—	(189,600)	(176,500)	—	—	(176,500)
Other long-term liabilities:								
Foreign currency forward contracts	(4,283)	—	(4,283)	—	(1,821)	—	(1,821)	—
Total financial liabilities	$ (253,067)	$ —	$ (63,467)	$ (189,600)	$ (183,854)	$ —	$ (7,354)	$ (176,500)

Please refer to Note E, "Marketable Securities and Equity Investments," for the carrying amount and related unrealized gains (losses) by type of investment.

Fair Value of Corporate Equity Securities

The Company maintains strategic investments in corporate equity securities separately from the investment policy that governs its other cash, cash equivalents and marketable securities. The Company classifies its investments in publicly traded companies as "Marketable securities" on its consolidated balance sheets. Generally, the Company's investments in the common stock of these publicly traded companies are valued based on Level 1 inputs because they have readily determinable fair values. However, certain of the Company's investments in publicly traded companies have been or continue to be valued based on Level 2 inputs due to transfer restrictions associated with these investments. During the year ended December 31, 2020, the Company transferred the fair value of one of its strategic investments in a publicly traded company from Level 2 to

Level 1 upon the expiration of transfer restrictions associated with this investment. Please refer to Note E, "Marketable Securities and Equity Investments," for further information on these investments.

Fair Value of Contingent Consideration

In 2019, the Company acquired Exonics Therapeutics, Inc. ("Exonics"), a privately-held company focused on creating transformative gene-editing therapies to repair mutations that cause DMD and other severe neuromuscular diseases, including DM1. The Company's Level 3 contingent consideration liabilities are related to $678.3 million of development and regulatory milestones potentially payable to Exonics' former equity holders. The Company bases its estimates of the probability of achieving the milestones relevant to the fair value of contingent payments on industry data attributable to rare diseases. The discount rates used in the valuation model for contingent payments, which were between 0.4% and 1.9% as of December 31, 2020, 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. Due to the uncertainties associated with development and commercialization of drug candidates in the pharmaceutical industry and the effects of changes in other assumptions including discount rates, the Company expects its estimates regarding the fair value of contingent consideration to change in the future, resulting in adjustments to the fair value of the Company's contingent consideration liabilities, and the effect of any such adjustments could be material.

The following table represents a rollforward of the fair value of the Company's contingent consideration liabilities:

	Year Ended December 31, 2020
	(in thousands)
Balance at December 31, 2019	$ 176,500
Increase in fair value of contingent payments	13,100
Balance at December 31, 2020	$ 189,600

The "Increase in fair value of contingent payments" in the table above was primarily due to changes in market interest rates.

E. Marketable Securities and Equity Investments

A summary of the Company's cash equivalents and marketable securities, which are recorded at fair value (and do not include $2.8 billion and $2.3 billion of cash as of December 31, 2020 and 2019, respectively), is shown below:

	As of December 31, 2020				As of December 31, 2019			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(in thousands)							
Cash equivalents:								
Money market funds	$ 3,141,053	$ —	$ —	$ 3,141,053	$ 791,039	$ —	$ —	$ 791,039
Corporate debt securities	—	—	—	—	6,070	—	—	6,070
Commercial paper	—	—	—	—	29,470	3	(1)	29,472
Total cash equivalents	$ 3,141,053	$ —	$ —	$ 3,141,053	$ 826,579	$ 3	$ (1)	$ 826,581
Marketable securities:								
Government-sponsored enterprise securities	$ 80,046	$ 17	$ —	$ 80,063	$ 12,689	$ 44	$ —	$ 12,733
Corporate debt securities	231,263	377	(42)	231,598	301,458	391	(50)	301,799
Commercial paper	163,286	19	(37)	163,268	102,240	121	(5)	102,356
Total marketable debt securities	474,595	413	(79)	474,929	416,387	556	(55)	416,888
Corporate equity securities	51,427	144,354	—	195,781	113,829	168,255	—	282,084
Total marketable securities	$ 526,022	$ 144,767	$ (79)	$ 670,710	$ 530,216	$ 168,811	$ (55)	$ 698,972

Available-for-sale debt securities were classified on the Company's consolidated balance sheets as follows at fair value:

	December 31,	
	2020	2019
	(in thousands)	
Cash and cash equivalents	$ 3,141,053	$ 826,581
Marketable securities	474,929	416,888
Total	$ 3,615,982	$ 1,243,469

Available-for-sale debt securities by contractual maturity were as follows:

	December 31,	
	2020	2019
	(in thousands)	
Matures within one year	$ 3,526,185	$ 1,137,942
Matures after one year through five years	89,797	105,527
Total	$ 3,615,982	$ 1,243,469

The Company has a limited number of available-for-sale debt securities in insignificant loss positions as of December 31, 2020, which it does not intend to sell and has concluded it will not be required to sell before recovery of the amortized costs for the investments at maturity. The Company did not record any charges for other-than-temporary declines in the fair value of available-for-sale debt securities or gross realized gains or losses in 2020, 2019 or 2018.

The Company records changes in the fair value of its investments in corporate equity securities to "Other income (expense), net" in the Company's consolidated statements of operations. During the three years ended December 31, 2020, the Company's net unrealized gains on corporate equity securities held at the conclusion of each period were as follows:

	2020	2019	2018
	(in thousands)		
Net unrealized gains	$ 136,167	$ 143,175	$ 2,558

During the years ended December 31, 2020 and 2019, the Company sold the common stock of publicly traded companies, which were primarily sales of its investment in CRISPR, resulting in the following:

	2020	2019
	(in thousands)	
Proceeds received	$ 437,567	$ 94,936
Weighted-average cost basis	$ 103,332	$ 29,825

During the year ended December 31, 2018, the Company did not sell any common stock of publicly traded companies.

As of December 31, 2020, the carrying value of the Company's equity investments without readily determinable fair values, which are recorded in "Other assets" on its consolidated balance sheets, was $20.8 million.

F. Accumulated Other Comprehensive Income (Loss)

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

	Foreign Currency Translation Adjustment	Unrealized Holding Gains (Losses), Net of Tax			Total
		On Available-For-Sale Debt Securities	On Equity Securities	On Foreign Currency Forward Contracts	
	(in thousands)				
Balance as of December 31, 2017	$ (21,031)	$ (594)	$ 25,069	$ (15,016)	$ (11,572)
Other comprehensive income before reclassifications	8,855	58	—	25,664	34,577
Amounts reclassified from accumulated other comprehensive income (loss)	—	—	—	1,774	1,774
Net current period other comprehensive income	8,855	58	—	27,438	36,351
Amounts reclassified to accumulated deficit pursuant to adoption of new accounting standard	949	—	(25,069)	—	(24,120)
Balance as of December 31, 2018	$ (11,227)	$ (536)	$ —	$ 12,422	$ 659
Other comprehensive income before reclassifications	10,332	1,039	—	11,513	22,884
Amounts reclassified from accumulated other comprehensive income (loss)	—	—	—	(25,516)	(25,516)
Net current period other comprehensive income (loss)	10,332	1,039	—	(14,003)	(2,632)
Balance as of December 31, 2019	$ (895)	$ 503	$ —	$ (1,581)	$ (1,973)
Other comprehensive loss before reclassifications	(14,783)	(169)	—	(54,467)	(69,419)
Amounts reclassified from accumulated other comprehensive income (loss)	—	—	—	2,912	2,912
Net current period other comprehensive loss	(14,783)	(169)	—	(51,555)	(66,507)
Balance as of December 31, 2020	$ (15,678)	$ 334	$ —	$ (53,136)	$ (68,480)

G. Hedging

Foreign currency forward contracts - Designated as hedging instruments

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 recognizes realized gains and losses for the effective portion of such contracts in "Product revenues, net" in its consolidated statements of operations in the same period that it recognizes the product revenues that were impacted by the hedged foreign exchange rate changes.

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 were to determine 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, 2020, all hedges were determined to be highly effective.

Prior to the adoption of ASU 2017-12 on January 1, 2019, the Company did not record any ineffectiveness related to its foreign currency forward contracts that were designated as hedging instruments in the year ended December 31, 2018. ASU 2017-12 eliminated the requirement to separately measure and report hedge ineffectiveness.

The Company considers the impact of its counterparties' credit risk on the fair value of the foreign currency forward contracts. As of December 31, 2020 and December 31, 2019, credit risk did not change the fair value of the Company's foreign currency forward contracts.

The following table summarizes the notional amount in U.S. dollars of the Company's outstanding foreign currency forward contracts designated as cash flow hedges under U.S. GAAP:

	As of December 31,	
	2020	2019
Foreign Currency	(in thousands)	
Euro	$ 745,099	$ 501,197
British pound sterling	160,427	87,032
Australian dollar	99,922	89,705
Canadian dollar	86,468	50,452
Total foreign currency forward contracts	$ 1,091,916	$ 728,386

Foreign currency forward contracts - Not designated as hedging instruments

The Company also enters into foreign currency forward contracts with contractual maturities of less than one month that are designed to mitigate the effect of changes in foreign exchange rates on monetary assets and liabilities, including intercompany balances. These contracts are not designated as hedging instruments under U.S. GAAP. The Company recognizes realized gains and losses for such contracts in "Other income (expense), net" in its consolidated statements of operations each period. As of December 31, 2020, the notional amount of the Company's outstanding foreign currency forward contracts where hedge accounting under U.S. GAAP is not applied was $198.9 million.

During the three years ended December 31, 2020, the Company recognized the following related to foreign currency forward contacts in its consolidated statements of operations:

	December 31,		
	2020	2019	2018
	(in thousands)		
Designated as hedging instruments - Reclassified from AOCI			
Product revenues, net	$ (3,714)	$ 32,546	$ (1,252)
Not designated as hedging instruments			
Other income (expense), net	$ 22,113	$ (4,838)	$ (623)
Total reported in the Consolidated Statement of Operations			
Product revenues, net	$ 6,202,783	$ 4,160,726	$ 3,038,325
Other income (expense), net	$ 296,420	$ 192,177	$ (790)

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

As of December 31, 2020			
Assets		**Liabilities**	
Classification	**Fair Value**	**Classification**	**Fair Value**
	(in thousands)		
Prepaid expenses and other current assets	$ —	Other current liabilities	$ (59,184)
Other assets	—	Other long-term liabilities	(4,283)
Total assets	$ —	Total liabilities	$ (63,467)

As of December 31, 2019			
Assets		**Liabilities**	
Classification	**Fair Value**	**Classification**	**Fair Value**
	(in thousands)		
Prepaid expenses and other current assets	$ 9,725	Other current liabilities	$ (5,533)
Other assets	—	Other long-term liabilities	(1,821)
Total assets	$ 9,725	Total liabilities	$ (7,354)

As of December 31, 2020, the Company expects amounts that are related to foreign exchange forward contracts designated as cash flow hedges under U.S. GAAP recorded in "Prepaid expenses and other current assets" and "Other current liabilities" to be reclassified to earnings within twelve months.

The following table summarizes the potential effect of offsetting derivatives by type of financial instrument designated as cash flow hedges under U.S. GAAP on the Company's consolidated balance sheets:

	As of December 31, 2020				
	Gross Amounts Recognized	**Gross Amounts Offset**	**Gross Amounts Presented**	**Gross Amounts Not Offset**	**Legal Offset**
Foreign currency forward contracts			**(in thousands)**		
Total assets	$ —	$ —	$ —	$ —	$ —
Total liabilities	(63,467)	—	(63,467)	—	(63,467)

	As of December 31, 2019				
	Gross Amounts Recognized	**Gross Amounts Offset**	**Gross Amounts Presented**	**Gross Amounts Not Offset**	**Legal Offset**
Foreign currency forward contracts			**(in thousands)**		
Total assets	$ 9,725	$ —	$ 9,725	$ (7,354)	$ 2,371
Total liabilities	(7,354)	—	(7,354)	7,354	—

H. Inventories

Inventories consisted of the following:

	As of December 31,	
	2020	**2019**
	(in thousands)	
Raw materials	$ 46,232	$ 26,247
Work-in-process	161,324	107,021
Finished goods	73,221	34,234
Total	$ 280,777	$ 167,502

I. Property and Equipment

Property and equipment, net consisted of the following:

	As of December 31,	
	2020	2019
	(in thousands)	
Buildings and improvements	$ 876,091	$ 713,412
Furniture and equipment	346,698	317,567
Leasehold improvements	234,585	175,769
Computers and software	258,612	230,872
Land	33,128	—
Total property and equipment, gross	1,749,114	1,437,620
Less: accumulated depreciation	(790,580)	(692,540)
Total property and equipment, net	$ 958,534	$ 745,080

The Company recorded depreciation expense of $109.5 million, $106.9 million and $72.4 million in 2020, 2019 and 2018, respectively. The Company's finance lease amortization is included in depreciation expense.

In the third quarter of 2020, the Company purchased its continuous manufacturing facility located near its corporate headquarters in Boston, Massachusetts from its former landlord for $155.3 million in cash. The Company's December 31, 2020 consolidated balance sheet reflects the following: (i) classification of the building within "Property and equipment, net" with a 40 year useful life, (ii) derecognition of the previously recorded insignificant right-of-use asset and operating lease liability for the facility and (iii) a finance lease for the land on which the facility is constructed.

J. Intangible Assets and Goodwill

Intangible Assets

As of December 31, 2020 and 2019, the Company had $400.0 million of in-process research and development intangible assets classified as "Intangible assets" on its consolidated balance sheet. In 2019, the Company recorded $387.0 million and $13.0 million of in-process research and development intangible assets related to its acquisitions of Semma Therapeutics, Inc. ("Semma") and Exonics, respectively. In 2018, the Company recorded an intangible asset impairment charge of $29.0 million related to VX-210 that was licensed from BioAxone in 2014. Please refer to Note B, "Collaborative Arrangements," for further information regarding the events and circumstances associated with this impairment charge.

Goodwill

As of December 31, 2020 and December 31, 2019, goodwill of $1.00 billion was recorded on the Company's consolidated balance sheet. During 2019, the Company recorded goodwill of $554.6 million and $397.1 million related to its acquisitions of Semma and Exonics, respectively.

K. Additional Balance Sheet Detail

Accrued expenses consisted of the following:

	As of December 31,	
	2020	2019
	(in thousands)	
Product revenue accruals	$ 781,903	$ 641,368
Payroll and benefits	169,387	159,464
Research, development and commercial contract costs	136,704	105,663
Royalty payable	165,404	98,578
Tax related accruals	104,173	72,293
Other	47,400	39,546
Total	$ 1,404,971	$ 1,116,912

Other current liabilities consisted of the following:

	As of December 31,	
	2020	2019
	(in thousands)	
Contract liabilities	$ 191,519	$ 62,332
Fair value of cash flow hedges	59,184	5,533
Finance lease liabilities	42,434	38,794
Other	24,286	23,646
Total	$ 317,423	$ 130,305

The cash, cash equivalents and restricted cash balances at the beginning and ending of each period presented in the Company's consolidated statements of cash flows consisted of the following:

	As of December 31,			
	2020	2019	2018	2017
	(in thousands)			
Cash and cash equivalents	$ 5,988,187	$ 3,109,322	$ 2,650,134	$ 1,665,412
Prepaid expenses and other current assets	658	8,004	4,910	2,114
Other assets	—	3,355	3,209	—
Cash, cash equivalents and restricted cash per consolidated statement of cash flows	$ 5,988,845	$ 3,120,681	$ 2,658,253	$ 1,667,526

The Company's restricted cash, if any, is included in "Prepaid expenses and other current assets" and "Other assets" on its consolidated balance sheets.

L. Leases

Finance Leases

The Company's finance lease assets and liabilities primarily relate to its corporate headquarters in Boston and research site in San Diego (the "Buildings"). These Buildings are classified as finance leases because the present value of the sum of the lease payments associated with the Buildings exceeds substantially all of the fair value of the Buildings. The Company also has outstanding finance leases for equipment and land.

Pursuant to ASC 842, which was adopted on January 1, 2019, the Company's finance lease assets are amortized to depreciation expense using the straight-line method over the remaining lease term; and the Company records imputed interest expense associated with its finance lease liabilities. In 2018, prior to the adoption of ASC 842, the Company applied build-to-

suit accounting and was deemed for accounting purposes to be the owner of the Buildings, for which it recognized depreciation expense over the Buildings 40 years useful lives and imputed interest expense on the corresponding financing lease obligations.

Corporate Headquarters

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 in Boston, Massachusetts for a term of 15 years. Base rent payments commenced in December 2013, and will continue through December 2028. The Company utilizes this initial period as its lease term. The Company has an option to extend the lease term for an additional ten years.

San Diego Lease

In 2015, the Company entered into a lease agreement pursuant to which the Company leases approximately 170,000 square feet of office and laboratory space in San Diego, California for a term of 16 years. Base rent payments commenced in the second quarter of 2019, and will continue through May 2034. The Company utilizes this initial period as its lease term. The Company has an option to extend the lease term for up to two additional five-year terms. The Company placed this building into service in the second quarter of 2018.

Operating Leases

The Company's operating leases relate to its real estate leases that are not classified as finance leases.

Cell and Genetic Therapies Lease

In 2019, the Company entered into an agreement to lease approximately 269,000 square feet of office and laboratory space near its corporate headquarters in Boston, Massachusetts. The lease agreement includes an initial term of 15 years plus a period to install leasehold improvements, with an option to extend the lease term for up to two additional ten-year periods. Base rent payments will commence in the fourth quarter of 2021. The Company has utilized the initial period, which commenced in the third quarter of 2020 upon occupation of the building, as its lease term. As of December 31, 2020, the Company recorded a right-of-use asset of $253.5 million and an operating lease liability of $286.6 million related to the lease agreement on its consolidated balance sheet.

Please refer to the Company's accounting policy, *Leases*, in Note A, "Nature of Business and Accounting Policies," for further information on the accounting treatment for the Company's finance and operating leases.

Aggregate Lease Information Related to the Application of ASC 842

The following information is disclosed in accordance with ASC 842, which became effective January 1, 2019. The components of lease cost recorded in the Company's consolidated statement of operations were as follows:

	2020	2019
Operating lease cost	$ 23,128	$ 11,972
Finance lease cost		
Amortization of leased assets	51,223	49,778
Interest on lease liabilities	50,188	52,839
Variable lease cost	30,776	27,997
Sublease income	(4,021)	(6,391)
Net lease cost	$ 151,294	$ 136,195

The Company's variable lease cost during 2020 and 2019 primarily related to operating expenses, taxes and insurance associated with its finance leases. The Company's sublease income during 2020 and 2019 primarily related to subleases for an insignificant portion of the Company's corporate headquarters.

The Company's leases are included on its consolidated balance sheets as follows:

	As of December 31,	
	2020	2019
	(in thousands)	
Finance leases		
Property and equipment, net	$ 431,193	$ 445,336
Total finance lease assets	$ 431,193	$ 445,336
Other current liabilities	$ 42,434	$ 38,795
Long-term finance lease liabilities	539,042	538,576
Total finance lease liabilities	$ 581,476	$ 577,371
Operating leases		
Operating lease assets	$ 325,564	$ 88,202
Total operating lease assets	$ 325,564	$ 88,202
Other current liabilities	$ 10,521	$ 11,504
Long-term operating lease liabilities	350,463	84,292
Total operating lease liabilities	$ 360,984	$ 95,796

Maturities of the Company's finance and operating lease liabilities as of December 31, 2020 were as follows:

Year	Finance Leases	Operating Leases	Total
		(in thousands)	
2021	$ 85,470	$ 15,266	$ 100,736
2022	90,020	34,119	124,139
2023	88,185	34,663	122,848
2024	93,434	34,113	127,547
2025	93,421	31,564	124,985
Thereafter	416,455	320,684	737,139
Total lease payments	866,985	470,409	1,337,394
Less: tenant allowance	—	(36,051)	(36,051)
Less: amount representing interest	(285,509)	(73,374)	(358,883)
Present value of lease liabilities	$ 581,476	$ 360,984	$ 942,460

The weighted-average remaining lease terms and discount rates related to the Company's leases were as follows:

	As of December 31,	
	2020	2019
Weighted-average remaining lease term (in years)		
Finance leases	11.58	9.74
Operating leases	14.10	9.70
Weighted-average discount rate		
Finance leases	8.36 %	9.04 %
Operating leases	2.28 %	3.75 %

Supplemental cash flow information related to the Company's leases was as follows:

	2020	2019
	(in thousands)	
Cash paid for amounts included in the measurement of lease liabilities		
Operating cash flows from operating leases	$ 16,254	$ 10,650
Operating cash flows from finance leases	$ 48,908	$ 50,527
Financing cash flows from finance leases	$ 42,275	$ 39,185
Right-of-use assets obtained in exchange for lease obligations		
Operating leases *	$ 293,604	$ 34,605
Finance leases	$ 33,128	$ —

* 2019 includes $33.7 million acquired in 2019 pursuant to the Company's acquisitions of Semma and Exonics.

Additional Lease Information Related to the Application of ASC 840

Rental expense was $17.3 million during the year ended December 31, 2018, which is disclosed in accordance with ASC 840, *Leases (Topic 840)*, which was applicable during the year ended December 31, 2018.

M. Common Stock, Preferred Stock and Equity Plans

Common Stock and Preferred Stock

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, 2020 and 2019, the Company had no shares of preferred stock issued or outstanding.

Share Repurchase Programs

During 2018, the Company's Board of Directors approved a share repurchase program (the "2018 Share Repurchase Program"), pursuant to which the Company was authorized to repurchase up to $500.0 million of its common stock between February 1, 2018 and December 31, 2019. During the years ended December 31, 2019 and 2018, the Company repurchased 832,186 and 2,093,891 shares, respectively, of its common stock under the 2018 Share Repurchase Program for an aggregate of $150.0 million and $350.0 million, respectively, including commissions and fees. As of June 30, 2019, the Company had repurchased the entire $500.0 million it was authorized to repurchase of its common stock under the 2018 Share Repurchase Program.

In July 2019, the Company's Board of Directors approved a second share repurchase program (the "2019 Share Repurchase Program"), pursuant to which the Company was authorized to repurchase up to $500.0 million of its common stock between August 1, 2019 and December 31, 2020. During the years ended December 31, 2020 and 2019, the Company repurchased 2,058,962 and 213,548 shares, respectively, of its common stock under the 2019 Share Repurchase Program for an aggregate of $464.0 million and $36.0 million, respectively, including commissions and fees. As of December 31, 2020, the Company had repurchased the entire $500.0 million it was authorized to repurchase of its common stock under the 2019 Share Repurchase Program.

In November 2020, the Company's Board of Directors approved a third share repurchase program (the "2020 Share Repurchase Program"), pursuant to which the Company is authorized to repurchase up to $500.0 million of its common stock

by December 31, 2022. In the fourth quarter of 2020, the Company repurchased 345,897 shares of its common stock under the 2020 Share Repurchase Program for an aggregate of $75.1 million including commissions and fees. The Company expects to fund further repurchases of its common stock through a combination of cash on hand and cash generated by operations. As of December 31, 2020, there was a total of $424.9 million remaining for repurchases of its common stock under the 2020 Share Repurchase Program.

Under the 2020 Share Repurchase Program, the Company is authorized to purchase shares from time to time through open market or privately negotiated transactions. Such purchases are made pursuant to Rule 10b5-1 plans or other means as determined by the Company's management and in accordance with the requirements of the SEC.

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 nonstatutory stock options ("NSOs"), incentive stock options ("ISOs"), restricted stock units ("RSUs") including performance-based RSUs ("PSUs"), restricted stock ("RSs"), 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, 2020	
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, RSU and PSU	7,231,859	13,385,321
2006 Stock and Option Plan	Employees, Non-employee Directors and Consultants	NSO, RS and RSU	383,818	—
		Total	7,615,677	13,385,321

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, 2020, the stock and option plan under which the Company is authorized to make 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. In 2019 and 2018, the Company's shareholders approved increases in the number of shares authorized for issuance pursuant to the 2013 Stock and Option Plan of (i) 5,000,000 shares in 2019 and (ii) 8,000,000 shares in 2018.

During the three years ended December 31, 2020, 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, 2020, 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.

Stock Options

The following table summarizes information related to the outstanding and exercisable options during the year ended December 31, 2020:

	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, 2019	6,272	$ 134.92		
Granted	23	$ 286.27		
Exercised	(1,883)	$ 121.42		
Forfeited	(174)	$ 165.39		
Expired	—	$ —		
Outstanding at December 31, 2020	4,238	$ 140.47	6.34	$ 397,211
Exercisable at December 31, 2020	2,894	$ 125.83	5.73	$ 313,936

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 the last business day of 2020, which was $233.91 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 2020, 2019 and 2018 was $255.0 million, $325.9 million and $258.2 million, respectively. The total cash received by the Company as a result of employee stock option exercises during 2020, 2019 and 2018 was $228.2 million, $317.8 million and $263.4 million, respectively.

The following table summarizes information about stock options outstanding and exercisable at December 31, 2020:

	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)
$36.28–$40.00	60	0.85	$ 38.06	60	$ 38.06
$40.01–$60.00	154	1.73	$ 47.07	154	$ 47.07
$60.01–$80.00	97	3.25	$ 74.53	97	$ 74.54
$80.01–$100.00	991	5.34	$ 88.93	937	$ 89.07
$100.01–$120.00	127	4.07	$ 109.24	127	$ 109.22
$120.01–$140.00	271	4.71	$ 129.49	270	$ 129.50
$140.01–$160.00	715	7.05	$ 155.49	415	$ 155.42
$160.01–$180.00	578	7.47	$ 168.40	312	$ 166.01
$180.01–$200.00	1,222	7.85	$ 185.31	499	$ 184.92
$200.01–$286.27	23	9.42	$ 286.27	23	$ 286.27
Total	4,238	6.34	$ 140.47	2,894	$ 125.83

Restricted Stock Units (excluding PSUs) and Restricted Stock

The following table summarizes the restricted stock unit and restricted stock activity of the Company during the year ended December 31, 2020:

	Restricted Stock Units (excluding PSUs)		Restricted Stock	
	Number of Shares	Weighted-average Grant-date Fair Value	Number of Units	Weighted-average Grant-date Fair Value
	(in thousands)	(per share)	(in thousands)	(per share)
Unvested at December 31, 2019	3,131	$ 163.61	92	$ 91.97
Granted	1,244	$ 258.45	—	$ —
Vested	(1,443)	$ 159.10	(92)	$ 91.97
Cancelled	(210)	$ 193.84	—	$ —
Unvested at December 31, 2020	2,722	$ 206.99	—	$ —

The total fair value of restricted stock units that vested during 2020, 2019 and 2018 (measured on the date of vesting) was $370.3 million, $178.2 million and $104.8 million, respectively. The total fair value of restricted stock that vested during 2020, 2019 and 2018 (measured on the date of vesting) was $21.4 million, $70.7 million and $114.5 million, respectively.

Performance-based RSUs (PSUs)

The potential range of shares issuable pursuant to the Company's PSU awards range from 0% to 200% of the target shares based on financial and non-financial measures. Fifty percent of PSUs that could be earned have a one-year performance period with the amount actually earned dependent upon the Company's financial performance and with vesting of the earned shares in three equal installments over a three-year period. The remaining 50% of PSUs that could be earned have a three-year performance period with the amount actually earned dependent upon the achievement of multiple clinical development milestones and with the earned shares cliff vesting at the end of the three-year performance period.

The following table summarizes the PSU activity of the Company during the year ended December 31, 2020:

	Performance-Based RSU	
	Number of Units	Weighted-average Grant-date Fair Value
	(in thousands)	(per share)
Unvested at December 31, 2019 (1)	734	$ 143.21
Granted (2)	547	$ 241.38
Vested	(577)	$ 114.11
Cancelled	(48)	$ 194.46
Unvested at December 31, 2020	656	$ 202.06

(1) "Unvested" represents the Company's PSUs at target to the extent performance has not been certified plus the actual number of shares that continue to be subject to service conditions for which the performance has been achieved and certified.

(2) "Granted" represents (i) the target number of shares issuable for grants during 2020 and (ii) any change in the number of shares issuable pursuant to outstanding PSUs based on performance certification during 2020.

The total fair value of PSUs that vested during 2020, 2019 and 2018 (measured on the date of vesting) was $138.5 million, $73.3 million and $23.2 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, 2020, there were 1,996,321 shares of common stock authorized for issuance pursuant to the ESPP.

In 2020, the following shares were issued to employees under the ESPP:

	Year Ended December 31, 2020 (in thousands, except per share amount)
Number of shares	203,055
Average price paid per share	$ 167.93

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. The Company pays matching contributions in the form of cash. For the years ended December 31, 2020, 2019 and 2018, the Company contributed approximately $19.2 million, $15.8 million and $13.9 million to the plan, respectively.

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 units, including PSUs, and restricted stock 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 effect of stock-based compensation expense during the three years ended December 31, 2020 was as follows:

	2020	2019	2018
	(in thousands)		
Stock-based compensation expense by line item:			
Cost of sales	$ 5,579	$ 5,575	$ 4,543
Research and development expenses	262,690	224,558	203,112
Sales, general and administrative expenses	161,192	130,356	117,392
Total stock-based compensation expense included in costs and expenses	429,461	360,489	325,047
Income tax effect	(146,959)	(124,225)	—
Total stock-based compensation included in costs and expenses, net of tax	$ 282,502	$ 236,264	$ 325,047

The Company maintained a valuation allowance on the majority of its NOLs and other deferred tax assets until December 31, 2018. Therefore, there was no "Income tax effect" of stock-based compensation expense for the year ended December 31, 2018.

The stock-based compensation expense by type of award during the three years ended December 31, 2020 was as follows:

	2020	2019	2018
	(in thousands)		
Stock-based compensation expense by type of award:			
Restricted stock units (including PSUs) and restricted stock	$ 360,364	$ 254,276	$ 207,845
Stock options	59,722	96,737	107,854
ESPP share issuances	12,984	11,196	9,933
Stock-based compensation expense related to inventories	(3,609)	(1,720)	(585)
Total stock-based compensation expense included in costs and expenses	$ 429,461	$ 360,489	$ 325,047

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 as of December 31, 2020, by type of award and the weighted-average period over which that expense is expected to be recognized:

	As of December 31, 2020	
	Unrecognized Expense	Weighted-average Recognition Period
	(in thousands)	(in years)
Type of award:		
Restricted stock units (including PSUs) and restricted stock	$ 401,100	1.88
Stock options	$ 62,392	1.77
ESPP share issuances	$ 11,333	0.59

Stock Options

In each of the three years ended December 31, 2020, the Company issued stock options to its non-employee directors. In 2019 and 2018, the Company issued stock options with service conditions, which were generally the vesting periods of the awards, to its employees. 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 2020, 2019 and 2018 had a weighted-average grant-date fair value per share of $88.37, $61.32 and $60.83, respectively.

The fair value of each option granted during 2020, 2019 and 2018 was estimated on the date of grant using the Black-Scholes option pricing model with the following weighted-average assumptions:

	2020	2019	2018
Stock options granted	22,636	1,520,743	2,297,328
Expected stock price volatility	35.87%	36.99%	40.50%
Risk-free interest rate	0.43%	2.32%	2.61%
Expected term of options (in years)	4.67	4.27	4.55
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 the 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 Units and Performance-based Restricted Stock Units

The Company awards restricted stock units with service conditions, which are generally the vesting periods of the awards. As of December 31, 2020, the Company did not have any unvested restricted stock awards remaining, which it awarded until 2016.

The Company grants PSUs to certain members of senior management. Half of the PSUs contain financial goals as the performance metric and the other half contain non-financial goals. A target number of shares is established for each award, however the actual number of shares that are issued when an award vests may range from zero to 200% of the target amount depending upon the level of achievement of the applicable performance metric. 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 likely level 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 likely level of achievement.

Employee Stock Purchase Plan

The weighted-average fair value of each purchase right granted during 2020, 2019 and 2018 was $65.88, $47.79 and $44.04, respectively. The following table reflects the weighted-average assumptions used in the Black-Scholes option pricing model for 2020, 2019 and 2018:

	2020	2019	2018
Expected stock price volatility	37.70%	33.43%	36.51%
Risk-free interest rate	0.11%	2.08%	2.36%
Expected term (in years)	0.71	0.74	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. Income Taxes

The components of income before provision for (benefit from) income taxes during the three years ended December 31, 2020 consisted of the following:

	2020	2019	2018
	(in thousands)		
United States	$ 2,885,423	$ 1,263,379	$ 812,086
Foreign	231,375	131,540	(211,845)
Income before provision for (benefit from) income taxes	$ 3,116,798	$ 1,394,919	$ 600,241

The components of the provision for (benefit from) income taxes during the three years ended December 31, 2020 consisted of the following:

	2020	2019	2018
		(in thousands)	
Current taxes:			
Federal	$ 71,377	$ —	$ 772
Foreign	37,582	37,194	15,600
State	18,851	13,528	9,018
Total current taxes	127,810	50,722	25,390
Deferred taxes:			
Federal	510,220	184,312	(1,105,053)
Foreign	(239,579)	(24,797)	(364,919)
State	6,700	7,872	(42,280)
Total deferred taxes	277,341	167,387	(1,512,252)
Provision for (benefit from) income taxes	$ 405,151	$ 218,109	$ (1,486,862)

A reconciliation of the provision for (benefit from) income taxes as computed by applying the U.S. federal statutory rate of 21% for the three years ended December 31, 2020 to the provision for (benefit from) income taxes is as follows:

	2020	2019	2018
		(in thousands)	
Income before provision for (benefit from) income taxes	$ 3,116,798	$ 1,394,919	$ 600,241
Expected provision for income taxes	654,528	292,933	126,051
State taxes, net of federal benefit	18,596	8,478	8,680
Foreign income tax rate differential	5,433	6,178	23,427
Tax credits	(55,824)	(59,459)	(52,629)
Benefit from income taxes attributable to valuation allowances	17,384	(2,672)	(1,563,169)
Tax rate change	(37,688)	—	—
Stock compensation (benefit), shortfalls and cancellations	(70,628)	(56,324)	(49,044)
Officer's compensation	13,079	10,666	8,310
Long-term intercompany receivable write-off	(53,821)	—	—
Deconsolidation of VIE	—	—	(9,390)
Uncertain tax positions	39,808	14,070	15,431
Inter-entity transfer of intellectual property rights	(209,000)	—	—
U.S. deemed dividend	71,727	79	64
Other	11,557	4,160	5,407
Provision for (benefit from) income taxes	$ 405,151	$ 218,109	$ (1,486,862)

The Company is subject to U.S. federal, state, and foreign income taxes. The Company's provision for income taxes during the years ended December 31, 2020 and 2019, has increased compared to historical amounts due to the release of the Company's valuation allowance on the majority of its net operating losses ("NOLs") and other deferred tax assets as of December 31, 2018. Starting in 2019, the Company began recording a provision for income taxes approximating the statutory rates on its pre-tax income. The Company's effective tax rate of 13% for 2020 was lower than the U.S. statutory rate primarily due to (i) discrete tax benefits associated with an intra-entity transfer of intellectual property rights to the United Kingdom ("U.K."), the write-off of a long-term intercompany receivable, and an increase in the U.K.'s corporate tax rate; and (ii) excess tax benefits related to stock-based compensation. The impact of these items was partially offset by a U.S. deemed dividend. The Company's effective tax rate of 16% for 2019 was lower than the U.S. statutory rate primarily due to excess tax benefits related to stock-based compensation and research and development tax credits. The Company utilized substantially all of its remaining previously benefited U.S. NOLs in 2020. As a result, a larger portion of the Company's tax provision will represent a cash tax payable in future periods.

In the second quarter of 2020, the Company completed an intra-entity transfer of intellectual property rights to the U.K., resulting in a deferred tax benefit of $209.0 million. The Company expects to be able to utilize the deferred tax asset resulting from the intra-entity transfer.

In 2018, the change in the "Benefit from income taxes attributable to valuation allowances" was primarily related to the release of the Company's valuation allowances on the majority of its NOLs and other deferred tax assets related to the U.S. and the U.K. The Company released these valuation allowances after determining it was more likely than not that its deferred tax assets would be realized in the future based on positive evidence, including significant cumulative consolidated and U.S. income over the three years ended December 31, 2018, revenue growth, clinical trial data from the Company's triple combination regimens, competitor clinical progress and expectations regarding future profitability, and negative evidence, including the potential impact of competition on the Company's projections and cumulative losses in one of the jurisdictions.

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,	
	2020	2019
	(in thousands)	
Deferred tax assets:		
Net operating loss	$ 140,563	$ 512,256
Tax credit carryforwards	406,120	549,543
Intangible assets	507,484	275,290
Deferred revenues	20,962	18,833
Stock-based compensation	89,203	85,199
Accrued expenses	47,326	44,367
Finance lease liabilities	118,749	119,160
Operating lease assets	65,046	13,114
Other	987	8,596
Gross deferred tax assets	1,396,440	1,626,358
Valuation allowance	(213,750)	(205,192)
Total deferred tax assets	1,182,690	1,421,166
Deferred tax liabilities:		
Property and equipment	(116,955)	(101,235)
Acquired intangibles	(87,025)	(87,160)
Unrealized gain	(17,553)	(28,838)
Operating lease liabilities	(63,310)	(13,118)
Other	(15,068)	—
Net deferred tax assets	$ 882,779	$ 1,190,815

On a periodic basis, the Company reassesses the valuation allowance on its deferred income tax assets, weighing positive and negative evidence to assess the recoverability of the deferred tax assets. As of December 31, 2020, the Company maintained a valuation allowance of $213.8 million related primarily to U.S. state and foreign tax attributes.

As of December 31, 2020, the Company had NOL carryforwards of $97.4 million, which are subject to annual utilization limitations, and tax credits of $249.2 million for U.S. federal income tax purposes. As of December 31, 2020, the Company had NOL carryforwards of $708.2 million and tax credits of $179.1 million for U.S. state income tax purposes. The U.S. federal NOLs may be carried forward indefinitely, with the exception of $29.1 million that will begin to expire in 2030. The state NOL carryforwards and tax credits expire at various dates through 2040 and may be used to offset future state income tax liabilities. As of December 31, 2020, the Company had foreign net operating loss carryforwards of $521.6 million, including $10.6 million that were subject to expiration at various dates through 2040 and $511.0 million that had an indefinite carryforward period.

Unrecognized tax benefits during the three years ended December 31, 2020 were as follows:

	2020	2019	2018
		(in thousands)	
Balance at beginning of the period	$ 33,920	$ 19,549	$ 3,814
Increases related to current period tax positions	26,653	14,407	9,704
Increases related to prior period tax positions	26,732	598	6,031
Decreases related to prior period tax positions	—	(156)	—
Settlement with tax authorities	—	(478)	—
Statute of limitations expiration	(657)	—	—
Balance at end of period	$ 86,648	$ 33,920	$ 19,549

As of December 31, 2020, the Company has classified $48.1 million and $38.5 million of its unrecognized tax benefits as credits to "Deferred tax assets" and "Accrued expenses," respectively, on its consolidated balance sheet.

The Company has reviewed the tax positions taken, or to be taken, in its tax returns for all tax years currently open to examination by a taxing authority. Unrecognized tax benefits represent the aggregate tax effect of differences between tax return positions and the benefits recognized in the consolidated financial statements. As of December 31, 2020, 2019 and 2018, the Company had $75.8 million, $33.9 million and $19.5 million, respectively, of net unrecognized tax benefits, which would affect the Company's tax rate if recognized. The Company does not expect that its unrecognized tax benefits will materially change within the next twelve months. The Company accrues interest and penalties related to unrecognized tax benefits as a component of its "Provision for (benefit from) income taxes." The Company did not recognize any material interest or penalties related to uncertain tax positions during the three years ended December 31, 2020.

In March 2020, the Coronavirus Aid, Relief, and Economic Security Act (the "CARES Act") was signed into law. The CARES Act includes provisions relating to several aspects of corporate income taxes. The CARES Act did not have a significant impact on the Company's provision for income taxes.

As of December 31, 2020, foreign earnings, which were not significant, have been retained by the Company's foreign subsidiaries for indefinite reinvestment. Upon repatriation of those earnings, in the form of dividends or otherwise, the Company could be subject to withholding taxes payable to the various foreign countries.

The Company files U.S. 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 U.S. or any other major taxing jurisdiction for years before 2011, except where the Company has NOLs or tax credit carryforwards that originate before 2011. The Company has various income tax audits ongoing at any time throughout the world.

P. Commitments and Contingencies

Revolving Credit Facilities

The Company and certain of its subsidiaries have entered into two credit agreements (the "Credit Agreements") with Bank of America, N.A., as administrative agent and the lenders referred to therein (the "Lenders"). The Credit Agreements were not drawn upon at closing and the Company has not drawn upon them to date. Amounts drawn pursuant to the Credit Agreements, if any, will be used for general corporate purposes. Any amounts borrowed under the Credit Agreements will bear interest, at the Company's option, at either a base rate or a Eurocurrency rate, in each case plus an applicable margin based on the Company's consolidated leverage ratio (the ratio of the Company's total consolidated funded indebtedness to the Company's consolidated EBITDA for the most recently completed four fiscal quarter period).

In September 2019, the Company and certain of its subsidiaries entered into a $500.0 million unsecured revolving facility (the "2019 Credit Agreement") with the Lenders, which matures on September 17, 2024. The 2019 Credit Agreement superseded the Company's credit agreement entered into in 2016 with Bank of America, N.A serving in the same capacity. Under the 2019 Credit Agreement, the applicable margins on base rate loans range from 0.125% to 0.500% and the

applicable margins on Eurocurrency loans range from 1.125% to 1.500%. The 2019 Credit Agreement provides a sublimit of $50.0 million for letters of credit.

In September 2020, the Company and certain of its subsidiaries entered into a $2.0 billion unsecured revolving facility (the "2020 Credit Agreement") with the Lenders, which matures on September 18, 2022. Under the 2020 Credit Agreement, the applicable margins on base rate loans range from 0.500% to 0.875% and the applicable margins on Eurocurrency loans range from 1.500% to 1.875%. The 2020 Credit Agreement does not support the issuance of letters of credit.

Subject to satisfaction of certain conditions, the Company may request that the borrowing capacity for each of the Credit Agreements be increased by an additional $500.0 million. Any amounts borrowed pursuant to the Credit Agreements are guaranteed by certain of the Company's existing and future domestic subsidiaries, subject to certain exceptions.

The Credit Agreements contain customary representations and warranties and affirmative and negative covenants, including financial covenants to maintain (x) subject to certain limited exceptions, a consolidated leverage ratio of 3.50 to 1.00, subject to an increase to 4.00 to 1.00 following a material acquisition and (y) a consolidated interest coverage ratio of 2.50 to 1.00, in each case measured on a quarterly basis. As of December 31, 2020, the Company was in compliance with the covenants described above. The Credit Agreements also contain 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.

Direct costs related to the Credit Agreements, which were not material to the Company's financial statements, were deferred and recorded over the term of the Credit Agreements.

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, 2020 or 2019.

Q. 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:

	2020	2019	2018
		(in thousands)	
TRIKAFTA/KAFTRIO	$ 3,863,824	$ 420,105	$ —
SYMDEKO/SYMKEVI	628,577	1,417,668	768,657
ORKAMBI	907,512	1,331,891	1,262,166
KALYDECO	802,870	991,062	1,007,502
Total product revenues, net	$ 6,202,783	$ 4,160,726	$ 3,038,325

Revenues by Geographic Location

Net product revenues are attributed to countries based on the location of the customer. Collaborative and royalty revenues are attributed to countries based on the location of the Company's subsidiary associated with the collaborative arrangement related to such revenues. Total revenues from external customers and collaborators by geographic region consisted of the following:

	2020	2019	2018
		(in thousands)	
United States	$ 4,829,282	$ 3,062,555	$ 2,365,079
Outside of the United States			
Europe	1,126,460	885,762	543,179
Other	249,941	214,504	139,339
Total revenues outside of the United States	1,376,401	1,100,266	682,518
Total revenues	$ 6,205,683	$ 4,162,821	$ 3,047,597

Significant Customers

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

	Percent of Total Gross Product Revenues			Percent of Accounts Receivable	
	Year Ended December 31,			As of December 31,	
	2020	2019	2018	2020	2019
McKesson Corporation	20 %	17 %	14 %	14 %	22 %
Accredo/Curascript	15 %	14 %	14 %	10 %	15 %
Walgreen Co.	14 %	15 %	20 %	10 %	14 %
Lloyds Pharmacy*	<10%	<10%	<10%	19 %	<10%

*A wholly-owned subsidiary of McKesson Corporation in the U.K.

Long-lived Assets by Location

Long-lived assets by location consisted of the following:

	As of December 31,	
	2020	2019
	(in thousands)	
United States	$ 1,207,748	$ 768,572
Outside of the United States		
United Kingdom	61,462	57,383
Other	14,888	7,327
Total long-lived assets outside of the United States	76,350	64,710
Total long-lived assets	$ 1,284,098	$ 833,282

R. Quarterly Financial Data (unaudited)

The following tables set forth the Company's quarterly financial data for the two years ended December 31, 2020:

	Three Months Ended			
	March 31, 2020	June 30, 2020	September 30, 2020	December 31, 2020
	(in thousands, except per share amounts)			
Revenues:				
Product revenues, net	$ 1,515,107	$ 1,524,485	$ 1,536,271	$ 1,626,920
Collaborative and royalty revenues	—	—	2,000	900
Total revenues	1,515,107	1,524,485	1,538,271	1,627,820
Costs and expenses:				
Cost of sales	162,497	184,520	186,182	203,101
Research and development expenses (1)	448,528	420,928	493,497	466,584
Sales, general and administrative expenses	182,258	191,804	184,551	211,843
Change in fair value of contingent consideration	1,600	9,200	1,800	500
Total costs and expenses	794,883	806,452	866,030	882,028
Income from operations	720,224	718,033	672,241	745,792
Interest income	12,576	4,243	3,100	2,320
Interest expense	(14,136)	(13,871)	(13,856)	(16,288)
Other (expense) income, net (2)	(61,130)	116,365	84,386	156,799
Income before provision for income taxes	657,534	824,770	745,871	888,623
Provision for (benefit from) income taxes (3)	54,781	(12,500)	78,437	284,433
Net income attributable to Vertex	$ 602,753	$ 837,270	$ 667,434	$ 604,190
Amounts per share attributable to Vertex common shareholders:				
Net income:				
Basic	$ 2.32	$ 3.22	$ 2.56	$ 2.32
Diluted	$ 2.29	$ 3.18	$ 2.53	$ 2.30
Shares used in per share calculations:				
Basic	259,815	259,637	260,392	260,038
Diluted	263,515	263,403	264,079	263,106

	Three Months Ended			
	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019
	(in thousands, except per share amounts)			
Revenues:				
Product revenues, net (4)	$ 857,253	$ 940,380	$ 949,828	$ 1,413,265
Collaborative and royalty revenues	1,182	913	—	—
Total revenues	858,435	941,293	949,828	1,413,265
Costs and expenses:				
Cost of sales	95,092	135,740	131,914	185,012
Research and development expenses (1)	339,490	379,091	555,948	480,011
Sales, general and administrative expenses	147,045	156,502	159,674	195,277
Change in fair value of contingent consideration	—	—	2,959	1,500
Total costs and expenses	581,627	671,333	850,495	861,800
Income from operations	276,808	269,960	99,333	551,465
Interest income	15,615	18,076	17,628	12,359
Interest expense	(14,868)	(14,837)	(14,548)	(14,249)
Other income (expense), net (2)	42,610	53,939	(31,747)	127,375
Income before provision for income taxes	320,165	327,138	70,666	676,950
Provision for income taxes	51,534	59,711	13,148	93,716
Net income attributable to Vertex	$ 268,631	$ 267,427	$ 57,518	$ 583,234
Amounts per share attributable to Vertex common shareholders:				
Net income:				
Basic	$ 1.05	$ 1.04	$ 0.22	$ 2.26
Diluted	$ 1.03	$ 1.03	$ 0.22	$ 2.23
Shares used in per share calculations:				
Basic	255,695	256,154	256,946	258,003
Diluted	260,175	259,822	260,473	262,108

1. The Company incurred research and development expenses of $75.0 million related to its 2020 Moderna Agreement in the third quarter of 2020 and $175.0 million related to its CRISPR DMD/DM1 Agreement in the third quarter of 2019. See Note B, “Collaborative Arrangements.”

2. In 2020 and 2019, “Other income (expense), net” was primarily related to changes in the fair value of the Company’s investments in corporate equity securities, and from sales of certain corporate equity securities. See Note E, “Marketable Securities and Equity Investments.”

3. In the second quarter of 2020, the Company completed an intra-entity transfer of intellectual property rights to the U.K., resulting in a deferred tax benefit of $209.0 million. See Note O, “Income Taxes.”

4. In the fourth quarter of 2019, the Company updated its transaction price and recognized net product revenues of $155.8 million related to prior period ORKAMBI sales upon reaching a reimbursement agreement with the French government for ORKAMBI, including ORKAMBI distributed through early access programs. See Note A, “Nature of Business and Accounting Policies.”

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

JOINT DEVELOPMENT AND COMMERCIALIZATION AGREEMENT

BETWEEN

VERTEX PHARMACEUTICALS INCORPORATED

VERTEX PHARMACEUTICALS (EUROPE) LIMITED

AND

CRISPR THERAPEUTICS AG

CRISPR THERAPEUTICS LIMITED

CRISPR THERAPEUTICS, INC.

TRACR HEMATOLOGY LTD.

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JOINT DEVELOPMENT AND COMMERCIALIZATION AGREEMENT

This JOINT DEVELOPMENT AND COMMERCIALIZATION AGREEMENT (this "**Agreement**") is entered into as of December 12, 2017 (the "**Effective Date**") by and between, on the one hand, **Vertex Pharmaceuticals Incorporated**, a corporation organized and existing under the laws of The Commonwealth of Massachusetts ("**Vertex Parent**"), and **Vertex Pharmaceuticals (Europe) Limited**, a private limited liability company organized under the laws of England and Wales ("**Vertex UK**" and, together with Vertex Parent, "**Vertex**") and, on the other hand, **CRISPR Therapeutics AG**, a corporation organized under the laws of Switzerland ("**CRISPR AG**"), **CRISPR Therapeutics, Inc.**, a corporation organized under the laws of the state of Delaware ("**CRISPR Inc.**"), **CRISPR Therapeutics Limited**, a corporation organized under the laws of England and Wales ("**CRISPR UK**"), and **TRACR Hematology Ltd**, a UK limited company ("**Tracr**" and together with CRISPR AG, CRISPR Inc. and CRISPR UK, **CRISPR**"). Vertex and CRISPR each may be referred to herein individually as a "**Party**" or collectively as the "**Parties**."

RECITALS

WHEREAS, the Parties and certain of their Affiliates (as defined below) have entered into that certain Strategic Collaboration, Option and License Agreement dated as of October 26, 2015, as amended by that certain Amendment No. 1 by and between the Parties dated as of the Effective Date (the "**Collaboration Agreement**");

WHEREAS, pursuant to the Collaboration Agreement, Vertex and CRISPR are conducting a strategic collaboration focused on exploring potential targets related to certain diseases and creating therapeutics using gene editing [***], including the CRISPR/Cas System, to treat such diseases, including the Products (as defined below);

WHEREAS, pursuant to Section 4.1.1 of the Collaboration Agreement, Vertex has obtained an Option (as defined therein) with respect to [***], and the execution of this Agreement constitutes the exercise by Vertex of the Option with respect to [***] that becomes a Collaboration Target;

WHEREAS, the Parties agree that [***] under the Collaboration Agreement; and

WHEREAS, the Parties desire to enter into this Agreement in accordance with Section 6.1.2(c) of the Collaboration Agreement in order for the Parties to jointly develop and commercialize the Shared Products and to conduct additional research with respect to the Follow-On Products (as defined below).

NOW, THEREFORE, in consideration of the respective covenants, representations, warranties and agreements set forth herein, the Parties hereto agree as follows:

ARTICLE 1

DEFINITIONS

For purposes of this Agreement, the following capitalized terms will have the meanings set forth in this ARTICLE 1. Capitalized terms used but not defined herein will have their respective meanings set forth in the Collaboration Agreement.

1.1. "**Agreement**" has the meaning set forth in the Preamble.

1.2. "**Alliance Manager**" has the meaning set forth in Section 2.6.1.

1.3. "[***] **Arbitration**" means [***] style arbitration in accordance with the arbitration procedure set forth on Schedule A.

1.4. [***].

1.5. [***].

1.6. "[***] **Third Party Agreement**" has the meaning set forth in Section 10.7.2.

1.7. [***].

1.8. [***].

1.9. "**Calendar Quarter**" means the respective periods of three consecutive calendar months ending on March 31, June 30, September 30 or December 31, during the Co-Co Agreement Term, or the applicable part thereof during the first or last calendar quarter of the Co-Co Agreement Term.

1.10. "**Calendar Year**" means any calendar year ending on December 31, or the applicable part thereof during the first or last year of the Co-Co Agreement Term.

1.11. "**Challenging Party**" has the meaning set forth in Section 14.2.3.

1.12. "**Clinical Operations Study Lead**" has the meaning set forth in Section 3.2.2.

1.13. "**CMO**" means contract manufacturing organization.

1.14. "**CRO**" means contract research organization.

1.15. "**Co-Co Agreement Term**" means the period commencing on the Effective Date and ending on the expiration of this Agreement pursuant to Section 14.1, unless terminated earlier as provided herein.

1.16. "**Collaboration Agreement**" has the meaning set forth in the Recitals.

1.17. "**Combination Product**" has the meaning set forth in Section 1.82.

1.18. "**Commercialization Costs**" [***]:

1.18.1. [***];

1.18.2. [***];

1.18.3. [***];

1.18.4. [***];

1.18.5. [***];

1.18.6. [***];

1.18.7. [***];

1.18.8. [***]

1.18.9. [***].

Commercialization Costs will exclude all of the payments set forth in Section 7.1 of the Collaboration Agreement, Research Costs, Development Costs, Manufacturing Costs, Medical Affairs Costs, Quality Costs, Other Out-of-Pocket Costs and Expenses attributable to general corporate activities, executive management, investor relations, treasury services, business development, corporate government relations, external financial reporting and other overhead activities.

1.19. "**Competitive Program**" has the meaning set forth in Section 1.20.

1.20. "**Competitor**" means any pharmaceutical company that is conducting a research, development or commercial program for a product that is intended to (a) [***], (b) [***] or (c) [***] (each of (a)-(c), a "**Competitive Program**") [***].

1.21. "**CRISPR**" has the meaning set forth in the Preamble.

1.22. "**CRISPR Background Know-How**" means any Know-How, other than Joint Program Know-How and CRISPR Program Know-How, that (a) [***] and (b) [***].

1.23. "**CRISPR Background Patents**" means any Patent, other than a Joint Program Patent, CRISPR Program Patent or CRISPR Platform Technology Patent that (a) [***] and (b) [***].

1.24. "**CRISPR In-License Agreements**" means CRISPR's or its Affiliates' agreements with Third Party licensors or sellers listed on Schedule E, which Schedule shall be updated upon the designation of any Follow-On Product as a Shared Product under this Agreement, to include any agreements pursuant to which CRISPR or its Affiliates have in-licensed or acquired any Licensed CRISPR Technology with respect to such Shared Product.

1.25. "**CTA**" means a clinical trial application submitted to a Regulatory Authority, the submission and approval of which is necessary to initiate or conduct clinical testing of a pharmaceutical product in humans in the jurisdiction of such Regulatory Authority.

1.26. "**Development Budget**" has the meaning set forth in Section 3.1.1.

1.27. "**Development Costs**" [***]:

1.27.1. [***];

1.27.2. [***];

1.27.3. [***];

1.27.4. [***];

1.27.5. [***];

1.27.6. [***].

[***].

1.28. "**Distributor**" means a Third Party to whom either Party grants a right to sell or distribute a Shared Product, which Third Party does not make payments to the granting Party that are calculated on the basis of a percentage of, or profit share on, such Third Party's sales of Shared Products.

1.29. "**Dollar**" means the United States Dollar.

1.30. "**Effective Date**" has the meaning set forth in the Preamble.

1.31. "**Exclusive License**" has the meaning set forth in Section 10.2.1.

1.32. "**Executive Officers**" means the Chief Executive Officer of CRISPR, initially Samarth Kulkarni, and the Chief Operating Officer of Vertex, initially Ian Smith.

1.33. "**Expenses**" means Out-of-Pocket Costs and FTE Costs.

1.34. "**Follow-On Agent**" means a product comprising (a) [***], or (b) [***].

1.35. "**Follow-On Product**" means any pharmaceutical product, medical therapy, preparation, substance, or formulation comprising or employing, in whole or in part, a Follow-On Agent, but excluding the Initial Shared Product.

1.36. "**Follow-On Research Plan**" has the meaning set forth in Section 3.1.2.

1.37. "**FTE**" means one employee full-time for one year or more than one person working the equivalent of a full-time person, working directly on performing activities under the Global Development Plan, the Follow-On Research Plan, the Medical Affairs Plan, the Manufacturing Plan, the Quality Agreement, any Global Commercialization Plan or any Regional Commercialization Plan, as applicable, where "full-time" is considered [***] hours for one Calendar Year. No additional payment will be made with respect to any individual who works more than [***] hours per Calendar Year and any individual who devotes less than [***] hours per Calendar Year will be treated as an FTE on a pro rata basis based upon the actual number of hours worked divided by [***].

1.38. "**FTE Costs**" means the product of (a) the number of FTEs (proportionately, on a per-FTE basis) used by a Party or its Affiliates in directly performing activities assigned to such Party under and in accordance with the Global Development Plan, the Follow-On Research Plan, the Medical Affairs Plan, the Manufacturing Plan, the Quality Agreement, any Global Commercialization Plan or any Regional Commercialization Plan, as applicable, and (b) the FTE Rate.

1.39. "**Global Brand Strategy**" has the meaning set forth in Section 5.3.1.

1.40. "**Global Commercialization Budget**" has the meaning set forth in Section 5.2.

1.41. "**Global Commercialization Plan**" has the meaning set forth in Section 5.2.

1.42. "**Global Communication Strategy**" has the meaning set forth in Section 5.3.2.

1.43. "**Global Development Plan**" has the meaning set forth in Section 3.1.1.

1.44. "**Global Manufacturing Plan**" has the meaning set forth in Section 6.2.

1.45. "**Global Market Access and Value Strategy**" has the meaning set forth in Section 5.3.3.

1.46. "**Global Pricing Strategy**" has the meaning set forth in Section 5.3.4.

1.47. "**Global Safety Database**" has the meaning set forth in Section 8.2.

1.48. [***].

1.49. [***].

1.50. [***].

1.51. "**ICH**" means The International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use.

1.52. "[***] **Agreement**" means [***], as originally executed and as the same may be amended, restated or modified from time to time in accordance with its terms.

1.53. "**IND Transfer Date**" has the meaning set forth in Section 3.3.1(b).

1.54. "**Initial Clinical Trials**" means the first-in-human study of the Initial Shared Product in subjects with beta-thalassemia and the first-in-human study of the Initial Shared Product in subjects with sickle cell disease.

1.55. "**Initial Shared Product**" means the [***].

1.56. "**Integrated Budget**" means the annual overall budget for activities performed under this Agreement, which shall include the amounts set forth in each of the Research Budget, the Development Budget, the Global Commercialization Budget, the Medical Affairs Budget and the Manufacturing Budget for the applicable Calendar Year.

1.57. "**JCC**" has the meaning set forth in Section 2.4.1.

1.58. "**JDC**" has the meaning set forth in Section 2.3.1.

1.59. "**JMC**" has the meaning set forth in Section 2.5.1.

1.60. "**JSC**" has the meaning set forth in Section 2.1.1.

1.61. "**Knowledge**" means the [***] of [***] after [***].

1.62. "**Lead Commercialization Party**" has the meaning set forth in Section 5.1.

1.63. "**Licensed CRISPR Know-How**" means (a) CRISPR Background Know-How, (b) CRISPR Program Know-How and (c) CRISPR's interest in the Joint Program Know-How.

1.64. "**Licensed CRISPR Patents**" means (a) CRISPR Background Patents, (b) CRISPR Platform Technology Patents, (c) CRISPR Program Patents and (d) CRISPR's interest in the Joint Program Patents.

1.65. "**Licensed CRISPR Technology**" means, subject to Section 10.2.3 and Section 10.7.2, any and all Licensed CRISPR Patents and Licensed CRISPR Know-How.

1.66. "**Licensed Vertex Know-How**" means (a) any [***], that (i) [***] and (ii) [***], (b) [***] and (c) the [***].

1.67. "**Licensed Vertex Patents**" means (a) [***] that (i) [***] and (ii) [***], (b) the [***] and (c) the [***].

1.68. "**Licensed Vertex Technology**" means, subject to Section 10.3.3 and Section 10.7.2, any and all Licensed Vertex Patents and Licensed Vertex Know-How.

1.69. "**Major [***] Countries**" means the [***].

1.70. "**Manufacture**", "**Manufactured**" or "**Manufacturing**" means activities directed to making, having made, producing, manufacturing, processing, filling, finishing, packaging, labeling, quality control testing and quality assurance release, shipping or storage of a Product (including any [***] that comprise such Product).

1.71. "**Manufacturing Budget**" has the meaning set forth in Section 6.2.

1.72. "**Manufacturing Costs**" means [***]

1.73. "[***]" has the meaning set forth in Section 6.1.

1.74. "**Manufacturing Working Group**" has the meaning set forth in Section 6.2.

1.75. "**Medical Affairs Activities**" means responding to external inquiries or complaints, the planning for and conduct of investigator sponsored Clinical Trials not included in the Global Development Plan, medical education, speaker programs, advisory boards, thought leader activities, educational grants and fellowships, local country government affairs, phase 3b Clinical Trials, phase IV/post-Regulatory Approval Clinical Trials, generating health economics and outcomes research data from patient reported outcomes, prospective observational studies and retrospective observational studies, and economic models and reimbursement dossiers, deployment of MSLs, medical affairs clinical trial management, doctors in field (other than MSLs), scientific publications and medical communications.

1.76. "**Medical Affairs Budget**" has the meaning set forth in ARTICLE 4.

1.77. "**Medical Affairs Costs**" means all Expenses incurred by the Parties in connection with the conduct of Medical Affairs Activities in accordance with the Medical Affairs Plan and the Medical Affairs Budget.

1.78. "**Medical Affairs Plan**" has the meaning set forth in ARTICLE 4.

1.79. "**MSL**" means medical science liaisons.

1.80. "**Net Loss**" means, for a given period, Net Sales in the Territory plus Sublicense Revenue less Program Expenses, where the result is a negative number.

1.81. "**Net Profit**" means, for a given period, Net Sales in the Territory plus Sublicense Revenue less Program Expenses, where the result is a positive number.

1.82. "**Net Sales**" means the gross invoiced price for Shared Products sold by a Party or its Affiliates (the "**Selling Party**") to Third Parties, less the following deductions from such gross amounts:

(a) [***];

(b) [***];

(c) [***];

(d) [***];

(e) [***].

Generally, only items that are deducted from the Selling Party's gross invoiced sales price of Shared Product(s), as included in the Selling Party's published financial statements and that are in accordance with GAAP, applied on a consistent basis, will be deducted from such gross invoiced sales price for purposes of the calculation of Net Sales. However, compulsory payments required by federal or state governments based upon sales volume or market share of Shared Products (but for clarity excluding taxes on the Selling Party's net income), to the extent borne by the Selling Party, will be deducted from "Net Sales" regardless of its classification in the Selling Party's published financial statements; *provided* that any such deduction will be limited to that share of such compulsory payment proportional to the share of the total sales volume or market share of the Selling Party used to compute the compulsory payment represented by applicable Net Sales of Shared Products.

A qualifying amount may be deducted only once regardless of the number of the preceding categories that describe such amount. If a Selling Party makes any adjustment to such deductions after the associated Net Sales have been reported pursuant to this Agreement, the adjustments will be reported with the next Summary Statement. Sales between or among a Party, its Affiliates and Sublicensees will be excluded from the computation of Net Sales if such sales are not intended for end use, but Net Sales will include the subsequent final sales to Third Parties by a Party or any such Affiliates or Sublicensees. A Shared Product will not be deemed to be sold if the Shared Product is provided free of charge to a Third Party in reasonable quantities as a sample consistent with industry standard promotional and sample practices. [***].

If a sale, transfer or other disposition with respect to Shared Products involves consideration other than cash or is not at arm's length, then the Net Sales from such sale, transfer or other disposition will be calculated on the [***].

Solely for purposes of calculating Net Sales, if a Party or its Affiliates or any permitted Sublicensee sells a Shared Product in the form of a combination product

containing a Shared Product and one or more other therapeutically or prophylactically active ingredients or delivery devices (whether combined in a single formulation or package, as applicable, or formulated separately but packaged under a single label approved by a Regulatory Authority and sold together for a single price) (a "**Combination Product**"), Net Sales of such Combination Product will be calculated by multiplying actual Net Sales of such Combination Product as determined in the first paragraph of the definition of "Net Sales" by the fraction A/(A+B) where [***]. The weighted average invoice prices referenced above will be calculated with reference to the prevailing prices during the applicable Calendar Quarter in those top selling countries that equate to [***]% of Net Sales of the applicable Shared Product in the Territory, with the prices weighted in the calculation to reflect the actual relative sales value of the Shared Product in each of the countries to which the calculation relates. If it is not possible to determine the fraction A/(A+B) based on the criteria specified in the preceding sentence (*e.g.*, if a Shared Product component is not sold separately), the Parties shall determine Net Sales for the Shared Product in such Combination Product in good faith by mutual agreement [***].

1.83. "**Non-Challenging Party**" has the meaning set forth in Section 14.2.3.

1.84. "**Opt-Out**" has the meaning set forth in Section 14.3.1.

1.85. "**Opt-Out Product**" has the meaning set forth in Section 14.3.1.

1.86. "**Opt-Out Royalties**" has the meaning set forth in Section 14.3.1.

1.87. "**Other Out-of-Pocket Costs**" means:

1.87.1. [***];

1.87.2. [***];

1.87.3. [***];

1.87.4. [***].

1.88. "**Party**" or "**Parties**" has the meaning set forth in the Preamble.

1.89. "**Patent Challenge**" has the meaning set forth in Section 14.2.3.

1.90. "**Patent Costs**" means all Expenses reasonably allocated to the Shared Products for the prosecution, maintenance and enforcement of Patents that Cover the Shared Products.

1.91. "**Pharmacovigilance Agreement**" has the meaning set forth in Section 8.1.

1.92. "**Physician Lead**" has the meaning set forth in Section 3.2.2.

1.93. "**Product**" means a Shared Product or a Follow-On Product.

1.94. "[***] **Claim**" means a claim in any Patent that [***].

1.95. "**Program Expenses**" [***].

1.96. "**Project Team**" has the meaning set forth in Section 3.2.1.

1.97. "**Quality Agreement**" has the meaning set forth in Section 3.3.6.

1.98. "**Quality Costs**" mean all Expenses incurred by the Parties and their respective Affiliates in conducting the activities set forth in the Quality Agreement.

1.99. "**Reconciliation Report**" has the meaning set forth in Section 7.6.

1.100. "**Regional Commercialization Plan**" has the meaning set forth in Section 5.2.

1.101. "**Research Budget**" has the meaning set forth in Section 3.1.2.

1.102. "**Research Costs**" [***].

1.103. "[***]" has the meaning set forth in Section 6.1.

1.104. "[***]" has the meaning set forth in Section 6.1.

1.105. **"**[***]" has the meaning set forth in Section 12.6.

1.106. "**Selling Party**" has the meaning set forth in Section 1.82.

1.107. "**Shared Product**" means (a) the Initial Shared Product and (b) if any Follow-On Product is deemed to be a Shared Product pursuant to Section 3.5, such Follow-On Product.

1.108. "**Shared Target**" means (a) [***], (b) [***], (c) the [***], (d) [***] and (e) [***] [***] Target added as a Collaboration Target under the Collaboration Agreement.

1.109. "**Specified Regulatory Activities**" [***].

1.110. "**Subcontract**" has the meaning set forth in ARTICLE 9.

1.111. "**Subcontractor**" has the meaning set forth in ARTICLE 9.

1.112. "**Sublicense Revenue**" [***].

1.113. "**Sublicensee**" means an Affiliate or Third Party, other than a Distributor, to whom either Party (or a Sublicensee or Affiliate) licenses or sublicenses such Party's rights under the Licensed CRISPR Technology or the Licensed Vertex

Technology, in each case, with respect to a Shared Product during the Co-Co Agreement Term.

1.114. "**Summary Statement**" has the meaning set forth in Section 7.5.

1.115. "**Terminated Product**" has the meaning set forth in Section 14.4.

1.116. "**Third Party Obligations**" means any non-financial encumbrances, obligations, restrictions, or limitations imposed by a [***] that are required to be passed through to a sublicensee of the [***], as applicable, and relate to a Product or a Shared Target, including field or territory restrictions, covenants, diligence obligations or limitations pertaining to enforcement of intellectual property rights.

1.117. "**Trademark**" means all trademarks, service marks, trade names, brand names, sub-brand names, trade dress rights, product configuration rights, certification marks, collective marks, logos, taglines, slogans, designs or business symbols and all words, names, symbols, colors, shapes, designations or any combination thereof that function as an identifier of source or origin or quality, whether or not registered, and all statutory and common law rights therein, and all registrations and applications therefor, together with all goodwill associated with, or symbolized by, any of the foregoing.

1.118. "**Vertex**" has the meaning set forth in the Preamble.

1.119. "**Vertex In-License Agreements**" means Vertex's or its Affiliates' agreements with Third Party licensors or sellers listed on Schedule F, which Schedule shall be updated upon the designation of any Follow-On Product as a Shared Product under this Agreement, to include any agreements pursuant to which Vertex or its Affiliates have in-licensed or acquired any Licensed Vertex Technology with respect to such Shared Product.

1.120. "**Vertex Parent**" has the meaning set forth in the Preamble.

1.121. "**Vertex UK**" has the meaning set forth in the Preamble.

ARTICLE 2

GOVERNANCE

2.1. **Joint Steering Committee**.

2.1.1. **Formation**. Within [***] Business Days after the Effective Date, the Parties will establish a joint steering committee (the "**JSC**") to provide high-level oversight and decision-making regarding the activities of the Parties under this Agreement. The JSC will be comprised of [***] representatives from each Party, or such other number of equal representatives as the Parties may mutually agree upon. The JSC will

conduct its responsibilities hereunder in good faith and with reasonable care and diligence. The JSC will meet at least once each Calendar Quarter, or as otherwise mutually agreed by the Parties in writing, on such dates and at such times and places as agreed to by the members of the JSC, and will use good faith efforts to conduct any such meeting in person. The purpose of the JSC will be to provide the members periodic updates regarding progress of activities pursuant to this Agreement and to address the matters set forth in Section 2.1.2. Each Party will be responsible for its own expenses relating to attendance at or participation in JSC meetings.

2.1.2. **Responsibilities**. The JSC will:

(a) review and oversee the overall global Development, Manufacture and Commercialization of the Shared Products and the Research of the Follow-On Products in the Field;

(b) oversee the JDC, JCC, JMC, Patent Coordinators, the Parties' commercial representatives prior to the establishment of the JCC, and any other committees and working groups established with respect to the Products and resolving matters on which the JDC, JCC, JMC, Patent Coordinators, commercial representatives or such committees and working groups are unable to reach consensus;

(c) review and discuss any amendments or updates to the Global Development Plan submitted by the JDC;

(d) review and discuss the initial Follow-On Research Plan, and any amendments or updates thereto, submitted by the JRC;

(e) review and discuss any amendments or updates to the Global Manufacturing Plan submitted by the JMC;

(f) review and discuss the initial Global Commercialization Plan for each Shared Product and any amendments or updates thereto submitted by the JCC;

(g) upon recommendation by the JRC, and in consultation with the JDC, determine whether each Follow-On Product will be designated as a Shared Product under this Agreement;

(h) review and attempt to resolve any disputes regarding [***];

(i) compile, discuss and approve the Integrated Budget no later than [***] of each Calendar Year; and

(j) perform such other duties as are specifically assigned to the JSC under this Agreement.

2.2. **Joint Research Committee**.

2.2.1. **Generally**. The JRC established under the Collaboration Agreement will, in addition to its obligations under the Collaboration Agreement, provide oversight and decision-making regarding the Research activities of the Parties with respect to Follow-On Products under this Agreement. The provisions of Section 3.1.1 of the Collaboration Agreement will apply with respect to meetings of the JRC. For clarity, any decisions to be made by the JRC under this Agreement will be subject to Section 2.8 of this Agreement, and not Section 3.1.3 of the Collaboration Agreement.

2.2.2. **Responsibilities**. The JRC will:

(a) oversee the Research of the Follow-On Products by the Parties in the Field in the Territory;

(b) prepare, discuss and approve, in consultation with the JDC, the initial Follow-On Research Plan (including the Research Budget) and any amendments or updates thereto, and submit such initial Follow-On Research Plan and such amendments or updates to the JSC for review and discussion;

(c) submit the approved updated Research Budget for the subsequent Calendar Year to the JSC for inclusion in the Integrated Budget no later than [***] of each Calendar Year;

(d) review and attempt to resolve any disputes regarding the protocol for any non-clinical study conducted under the Global Development Plan or the Follow-On Research Plan;

(e) submit recommendations to the JSC regarding the advisability of designating a Follow-On Product as a Shared Product under this Agreement;

(f) review, discuss and approve any proposed use of a Subcontractor to conduct a Party's activities under the Follow-On Research Plan, where the applicable Subcontract is anticipated to entail payments in excess of $[***], as set forth in ARTICLE 9; and

(g) perform such other duties as are specifically assigned to the JRC under this Agreement or as may be delegated to the JRC by the JSC.

2.2.3. **Discontinuation of the JRC**. Notwithstanding anything to the contrary in the Collaboration Agreement, the JRC will disband with respect to this Agreement upon mutual agreement of the Parties following the completion of all substantive Research activities with respect to the Follow-On Products under this Agreement, but shall be reestablished if either or both Parties desires to engage in additional Research activities with respect to any Follow-On Product.

2.3. **Joint Development Committee**.

2.3.1. **Formation**. Within [***] Business Days after the Effective Date, the Parties will establish a joint development committee (the "**JDC**") to provide oversight and decision-making regarding the Development activities of the Parties under this Agreement. The JDC will be comprised of [***] representatives from each Party, or such other number of equal representatives as the Parties may mutually agree upon. The JDC will conduct its responsibilities hereunder in good faith and with reasonable care and diligence. The JDC will meet at least once each Calendar Quarter, or as otherwise mutually agreed by the Parties, on such dates and at such times and places as agreed to by the members of the JDC, and will use good faith efforts to conduct any such meeting in person. The purpose of the JDC will be to facilitate and provide the members periodic updates regarding progress of Development activities pursuant to this Agreement and to address the matters set forth in Section 2.3.2. Each Party will be responsible for its own expenses relating to attendance at or participation in JDC meetings.

2.3.2. **Responsibilities**. The JDC will:

(a) oversee the Development of the Shared Products and the Research strategy for the Follow-On Products by the Parties in the Field in the Territory;

(b) review, discuss and approve the initial Global Development Plan (including the Development Budget) and any updates or amendments thereto proposed by the Project Team, and submit such Global Development Plan, updates or amendments to the JSC for review and discussion;

(c) submit the approved updated Development Budget for the subsequent Calendar Year to the JSC for inclusion in the Integrated Budget no later than [***] of each Calendar Year;

(d) oversee the Project Team and attempt to resolve any matters on which the Project Team is unable to reach consensus;

(e) review, discuss and approve clinical and regulatory strategic options for the Shared Products as proposed by the Project Team;

(f) review, discuss and approve the first IND for the Initial Shared Product to be submitted to the applicable Regulatory Authorities in accordance with Section 3.3.1(c);

(g) review and consult with the JRC regarding the initial Follow-On Research Plan and any updates or amendments thereto proposed by the JRC;

(h) inform and provide guidance to the JSC regarding any quality or compliance-related risks with respect to the Development of the Products;

(i) provide guidance to the Project Team with respect to pre-clinical and clinical quality matters for the Products;

(j) review, discuss and approve regulatory activities for the Shared Products proposed by the Project Team, including determining the strategy with respect to each material Regulatory Filing or material regulatory interaction with respect to the Shared Products;

(k) allocate responsibilities for the conduct of Clinical Trials under the Global Development Plan to the Parties, which allocation will be consistent with Section 3.2 and Section 3.3.2;

(l) review, discuss and approve changes to the Project Team membership in accordance with Section 3.2;

(m) review and attempt to resolve any disputes regarding the protocol or statistical analysis plan for any Clinical Trial conducted under the Global Development Plan;

(n) provide guidance to the JSC regarding the advisability of designating a Follow-On Product as a Shared Product under this Agreement;

(o) develop and agree upon the Medical Affairs Plan for the Shared Products and determine the number of MSLs to be deployed in each jurisdiction in the Territory;

(p) consult with the JMC in connection with its oversight of the Manufacturing Working Group with respect to matters relating to the pre-clinical or clinical Manufacture of the Products;

(q) consult with the JMC in connection with its oversight of the pre-clinical and clinical Manufacture of the Products in the Field in the Territory;

(r) consult with the JMC in connection with its review and discussion of any updates to the Global Manufacturing Plan, including the Manufacturing Budget, proposed by the Manufacturing Working Group;

(s) consult with the JMC in connection with its review, discussion and approval of the Manufacturing process, and any changes thereto, for each Shared Product;

(t) consult with the JMC and the Manufacturing Working Group in connection with their review of Manufacturing quality matters for the Products and its oversight of Manufacturing quality matters set forth in the Quality Agreement;

(u) consult with the JMC in connection with its review of the results of regulatory and environmental, health and safety inspections and audits related to the Manufacture of the Products and its review and discussions of steps taken by CRISPR to address any deficiencies noted;

(v) review, discuss and approve any proposed use of a Subcontractor to conduct a Party's activities under the Global Development Plan or the Quality Agreement, where the applicable Subcontract is anticipated to entail payments in excess of $[***], as set forth in ARTICLE 9; and

(w) perform such other duties as are specifically assigned to the JDC under this Agreement or as may be delegated to the JDC by the JSC.

2.3.3. **Discontinuation of the JDC**. The JDC will disband upon mutual agreement of the Parties following the completion of all substantive Research and Development activities under this Agreement, but shall be reestablished if either or both Parties desires to engage in additional Research or Development activities with respect to any Product.

2.4. **Joint Commercialization Committee**.

2.4.1. **Formation**. Within [***] days following Establishment of POC for a Shared Product, the Parties will establish a joint commercialization committee (the "**JCC**") to provide oversight and decision-making regarding the Commercialization activities of the Parties under this

Agreement, *provided* that, prior to establishment of the JCC, commercial representatives of the Parties will meet on an *ad hoc* basis, as reasonably requested by either Party, to discuss commercial matters for the Shared Products; and *provided*, *further*, that any dispute between such commercial representatives with regard to any commercial matter for a Shared Product shall be referred to the JSC for resolution. The JCC will be comprised of [***] representatives from each Party, or such other number of equal representatives as the Parties may mutually agree upon. The JCC will conduct its responsibilities hereunder in good faith and with reasonable care and diligence. The JCC will meet at least once each Calendar Quarter, or as otherwise mutually agreed by the Parties, on such dates and at such times and places as agreed to by the members of the JCC, and will use good faith efforts to conduct any such meeting in person. The purpose of the JCC will be to facilitate and provide the members periodic updates regarding progress of Commercialization activities pursuant to this Agreement and to address the matters set forth in Section 2.4.2. Each Party will be responsible for its own expenses relating to attendance at or participation in JCC meetings.

2.4.2. **Responsibilities**. The JCC will:

(a) oversee the Commercialization of the Shared Products by the Parties in the Field in the Territory;

(b) develop and approve a Global Commercialization Plan for each Shared Product and submit such Global Commercialization Plan to the JSC for review and discussion;

(c) amend the Global Commercialization Plan for each Shared Product on an annual basis (or more frequently as needed), approve such amendments and submit such updated Global Commercialization Plans to the JSC for review and discussion;

(d) review, discuss and approve the initial Regional Commercialization Plans for each Shared Product and any amendments or updates thereto submitted by Parties;

(e) select product Trademarks for each Shared Product throughout the world consistent with the Global Brand Strategy;

(f) advise the JMC in connection with its oversight of the Manufacturing Working Group with respect to matters relating to the commercial Manufacture of the Shared Products;

(g) advise the JMC in connection with its oversight of the commercial Manufacture of the Shared Products in the Field in the Territory;

(h) advise the JMC in connection with its review and discussion of any updates to the Global Manufacturing Plan, including the Manufacturing Budget, proposed by the Manufacturing Working Group;

(i) submit the approved updated Global Commercialization Budget for the subsequent Calendar Year to the JSC for inclusion in the Integrated Budget no later than [***] of each Calendar Year;

(j) advise the JMC in connection with its review, discussion and approval of the Manufacturing process, and any changes thereto, for each Shared Product;

(k) review, discuss and approve any proposed use of a Subcontractor to conduct a Party's activities under a Global Commercialization Plan, where the applicable Subcontract is anticipated to entail payments in excess of $[***], as set forth in ARTICLE 9; and

(l) perform such other duties as are specifically assigned to the JCC under this Agreement or as may be delegated to the JCC by the JSC.

2.5. **Joint Manufacturing Committee**.

2.5.1. **Formation**. Within [***] Business Days after the Effective Date, the Parties will establish a joint manufacturing committee (the "**JMC**") to provide oversight and decision-making regarding the Manufacture of pre-clinical, clinical and commercial supply of the Products under this Agreement. The JMC will be comprised of [***] representatives from each Party, or such other number of equal representatives as the Parties may mutually agree upon. The JMC will conduct its responsibilities hereunder in good faith and with reasonable care and diligence. The JMC will meet on a [***] basis for the first [***] after the Effective Date, or as otherwise mutually agreed by the Parties, and, thereafter, at least once each Calendar Quarter, or as otherwise mutually agreed by the Parties, on such dates and at such times and places as agreed to by the members of the JMC, and will use good faith efforts to conduct any such meeting in person. The purpose of the JMC will be to facilitate and provide the members periodic updates regarding progress of Manufacturing activities pursuant to this Agreement and to address the matters set forth in Section 2.5.2. Each Party will be responsible for its own expenses relating to attendance at or participation in JMC meetings.

2.5.2. **Responsibilities**. The JMC will:

(a) consistent with the provisions of Section 6.2, designate the team leader and other members of the Manufacturing Working Group, which team leader and members shall be chosen from among the personnel of the Parties having relevant experience, and allocate the respective roles on the Manufacturing Working Group among such members;

(b) review on a periodic basis and make any necessary changes to the team leader and other members of the Manufacturing Working Group, or the allocation of roles among such members;

(c) oversee the Manufacturing Working Group, in consultation with the JDC, with respect to matters relating to the pre-clinical or clinical Manufacture of the Products;

(d) oversee the Manufacturing Working Group, in consultation with the JCC, with respect to matters relating to the commercial Manufacture of the Products;

(e) oversee the Manufacturing Working Group, in consultation with the JDC, with respect to Manufacturing quality matters for the Products;

(f) oversee the Manufacturing Working Group, in consultation with the JDC, with respect to the review of the results of regulatory and environmental, health and safety inspections and audits related to the Manufacture of the Products and the review and discussion of steps taken by CRISPR to address any deficiencies noted;

(g) oversee the Manufacture of the Products in the Field in the Territory, in consultation with the JDC or JCC, as applicable;

(h) allocate responsibilities for Manufacturing activities with respect to the Products in the Field in the Territory between the Parties;

(i) review, discuss and approve, in consultation with the JDC or the JCC, as applicable, the initial Global Manufacturing Plan, including the Manufacturing Budget, and any updates or amendments thereto proposed by the Manufacturing Working Group, and submit such Global Manufacturing Plan, updates or amendments to the JSC for review and discussion;

(j) submit the approved updated Manufacturing Budget for the subsequent Calendar Year to the JSC for inclusion in the Integrated Budget no later than [***] of each Calendar Year;

(k) review, discuss and approve the Manufacturing process for each Shared Product proposed by the Manufacturing Working Group, and review, discuss and approve any changes to such Manufacturing process proposed by the Manufacturing Working Group, in each case, in consultation with the JDC or JCC, as applicable;

(l) review, discuss and approve any recommendations of the Manufacturing Working Group regarding capacity planning, supply plans and supply continuity planning for the Products;

(m) select and approve each CMO and contract testing facility to be engaged with respect to each phase of the Manufacture of any Product [***];

(n) determine whether any Manufacturing technology transfer between the Parties is necessary;

(o) review, discuss and approve any proposed use of a Subcontractor to conduct a Party's activities under the Global Manufacturing Plan, where the applicable Subcontract is anticipated to entail payments in excess of $[***], as set forth in ARTICLE 9; and

(p) perform such other duties as are specifically assigned to the JMC under this Agreement or as may be delegated to the JMC by the JSC.

2.6. **Alliance Managers**.

2.6.1. **Appointment**. Each Party will appoint a representative of such Party to act as its alliance manager under this Agreement (each, an "**Alliance Manager**"). Each Party may replace its Alliance Manager at any time by written notice to the other Party.

2.6.2. **Specific Responsibilities**. The Alliance Managers will serve as the primary contact point between the Parties for the purpose of providing each Party with information regarding the other Party's activities pursuant to this Agreement and will have the following responsibilities:

(a) schedule meetings of the JSC, JDC, JCC, and JMC and circulate draft written minutes from each meeting within 14 days after

each such meeting to the applicable committee, all other committees and the Project Team;

(b) facilitate the flow of information and otherwise promote communication, coordination and collaboration between the Parties;

(c) coordinate the various functional representatives of each Party, as appropriate, in developing and executing strategies and plans for the Products;

(d) provide a single point of communication for seeking consensus both internally within the respective Party's organization and between the Parties regarding key strategy and planning issues;

(e) coordinate and facilitate budget, finance and billing activities as overseen by the JSC, JDC, JCC, and JMC; and

(f) perform such other functions as requested by the JSC, JDC, JCC, or JMC.

2.7. **Other Committees**. The Parties may, by mutual agreement, form such other committees or working groups as may be necessary or desirable to facilitate the activities under this Agreement.

2.8. **Decision-Making**. The JSC, JDC, JCC, JMC, JRC and all other committees and working groups will operate by consensus with the goal being to leverage capabilities, minimize cost and maximize the chance of successfully Developing and Commercializing each Shared Product throughout the Territory in a commercially reasonable manner consistent with Applicable Laws and this Agreement. Disputes arising out of the JDC, JCC, JMC, JRC or any other committee or working group will be escalated to the JSC for resolution. Disputes arising at the JSC will be referred to the Executive Officers for resolution, whereupon the Executive Officers will meet in person if requested by either such Executive Officer and attempt in good faith to resolve such dispute by negotiation and consultation for a [***]-day period following such referral. If the Executive Officers do not resolve such dispute within such [***]-day period, such dispute shall be [***]. Notwithstanding anything to the contrary, none of the JSC, JDC, JCC, JMC, JRC or any other committee or working group will have the authority to amend or waive compliance with any of the terms of this Agreement. For clarity, with respect to the Global Development Plan, the Medical Affairs Plan, Global Manufacturing Plan or any Global Commercialization Plan or Regional Commercialization Plan, each Party shall have decision-making authority regarding its implementation of such Global Development Plan, Medical Affairs Plan, Global Manufacturing Plan, Global Commercialization Plan or Regional Commercialization Plan in its respective territory, in such Party’s sole discretion,

provided that such implementation is consistent with the then-approved applicable plan and budget, and any such implementation decision shall not be subject to dispute resolution by any committee or working group, escalation to the Executive Officers [***] pursuant to this Section 2.8.

ARTICLE 3

DEVELOPMENT

3.1. **Research and Development Plans**.

3.1.1. **Global Development Plan**. The JDC will oversee the Development of the Shared Products and the Research of Follow-On Products by the Parties in the Field in the Territory. The Shared Products will be Developed in accordance with a global development plan (the "**Global Development Plan**"), which will include the Development Budget (as defined below), which will be prepared by the Project Team within [***] days after the Effective Date and shall be approved by the JDC thereafter. Unless otherwise agreed by the Parties in writing, the Global Development Plan will at all times include a plan for the Development of the Shared Products in the Territory through Regulatory Approval, including a regulatory strategy, high-level study design criteria, an allocation of responsibilities between the Parties, timelines and a budget for activities conducted under the Global Development Plan (the "**Development Budget**"). Until such time as the initial Development Budget has been established in accordance with this Agreement, each Party will incur Program Expenses in a manner substantially consistent with the plans and budgets previously discussed by the Parties and such Program Expenses will be shared as provided in ARTICLE 7. On [***] basis (or more frequently as needed), the Project Team will update the Global Development Plan and will submit the updated Global Development Plan to the JDC for review and discussion. The JDC will review and discuss the updated Global Development Plan and submit such updated Global Development Plan to the JSC for review, discussion and approval.

3.1.2. **Follow-On Research Plan**. The Parties will conduct Research activities with respect to the Follow-On Products in accordance with a Follow-On research plan (the "**Follow-On Research Plan**"), including a budget for activities conducted under the Follow-On Research Plan (the "**Research Budget**"), the initial version of which will be prepared by the JRC in consultation with the JDC promptly following the Effective Date and submitted to the JSC for review, discussion and approval. In addition[***] basis (or more frequently as needed), the JRC in consultation with the JDC will update the Follow-On Research Plan and

will submit the updated Follow-On Research Plan to the JSC for review, discussion and approval. For clarity, all Research Costs with respect to the Follow-On Products shall be treated under this Agreement as part of Program Expenses, and not under Section 2.10 or Section 7.4 of the Collaboration Agreement.

3.2. **Project Team**.

3.2.1. **Formation; Responsibilities**. The Parties will establish a project team (the "**Project Team**") to oversee and coordinate activities under the Global Development Plan. The Project Team will include members from each function identified on Schedule C-1. The initial Project Team members are set forth on Schedule C-2. If a Project Team member is no longer available to serve on the Project Team, the Parties will meet and discuss an appropriate replacement for such Project Team member from either Party, taking into account each Party's expertise and resources in the relevant functional area. The appointment of the replacement Project Team member will require the JDC's approval. Any member of the Project Team who is not dedicated to the Products under this Agreement on a full-time basis must be sufficiently dedicated to such Products to permit such person to be reasonably and consistently available to participate in the activities of the Project Team. The Project Team will be responsible for: (i) defining clinical and regulatory strategic options for recommendation to the JDC; (ii) providing guidance on regulatory activities for recommendation to the JDC; (iii) preparing joint deliverables, including updates to the Global Development Plan for submission to the JDC; (iv) preparing study protocols and statistical analysis plans for approval in accordance with Section 3.3.2(b); (v) preparing regulatory documentation for recommendation to the JDC; (vi) proposing goals, budgets and timelines for joint Development activities to the JDC; (vii) driving execution and ensuring the progress of Development activities in accordance with the Global Development Plan; and (viii) such additional matters as may be determined by the JDC. The Project Team shall act by consensus, with each Party's representatives on the Project Team having collectively one vote. If the Project Team cannot reach consensus, the matter will be referred to the JDC for resolution.

3.2.2. **Physician Leads and Clinical Operations Study Leads**. Each Party will be responsible for designating its own physician leads (each, a "**Physician Lead**") and clinical operations study leads (each, a "**Clinical Operations Study Lead**"), subject to the approval of the JDC. [***] will initially appoint the Physician Lead for each Initial Clinical Trial; *provided* that (i) with respect to the Initial Clinical Trial for sickle cell disease, the Physician Lead appointed by [***] shall be responsible for

such Initial Clinical [***], and (ii) the Physician Leads for each Initial Clinical Trial will at all times cooperate to share information and oversee both Initial Clinical Trials in a collaborative manner. [***] will appoint the Clinical Operations Study Lead for the Initial Clinical Trial for beta-thalassemia and [***] will appoint the Clinical Operations Study Lead for the Initial Clinical Trial for sickle cell disease. With respect to each Clinical Trial other than an Initial Clinical Trial, the JDC will determine the roles and responsibilities of the Parties' respective Physician Leads and Clinical Operations Study Leads.

3.2.3. **Clinical Pharmacology**. [***] will be responsible for all clinical pharmacology matters with respect to the Shared Products, as further detailed in the Global Development Plan.

3.2.4. **Biostatistics**. [***] will initially be responsible for biostatistics matters with respect to the Shared Products including the performance of the biostatistics activities set forth in the Global Development Plan in accordance with the Global Development Plan. [***] upon [***], as determined by the JDC [***].

3.2.5. **Conduct; Reporting**. The Project Team will conduct its responsibilities under the Global Development Plan in good faith and with reasonable care and diligence. The Project Team will provide the JDC with periodic updates (but no less than quarterly) regarding the progress of activities pursuant to the Global Development Plan.

3.3. **Development Activities**.

3.3.1. **Regulatory Matters**.

(a) Regulatory activities will be jointly carried out by the Parties and the Project Team under the guidance of the JDC in accordance with this Section 3.3.1. The Party responsible for regulatory activities under this Section 3.3.1 will be responsible for keeping the Project Team apprised as to the status of such activities and consulting with the Project Team as provided herein and the Project Team will be responsible for keeping the JDC apprised as to the status of such activities and consulting with the JDC as provided herein. All regulatory activities will be conducted using [***] standard regulatory operating procedures and systems.

(b) All Regulatory Filings and Regulatory Approvals that relate to the Shared Products shall be filed by and held in the name of [***] or its designated Affiliates, *except* that: (i) [***] shall initially hold the [***] CTAs submitted for the first Shared Product for beta-thalassemia to Regulatory Authorities in the

[***] in the name of [***] or its designated Affiliates, and, unless the JDC otherwise determines that the transfer of such CTAs to [***] as provided herein [***], shall initiate transfer of such CTAs to [***] within [***] days after approval or rejection of such CTAs in any [***], and thereafter, unless otherwise agreed by the Parties in writing, such CTAs, and any subsequent CTA for a Shared Product, shall be held in the name of [***] or its designated Affiliate and [***] shall be the sponsor for the Initial Clinical Trials; (ii) [***] shall initially hold the first IND submitted for the first Shared Product to the FDA in the name of [***] or its designated Affiliates, and, unless the JDC otherwise determines that the transfer of such IND to [***] as provided herein [***], shall initiate transfer of such IND to [***] no later than [***] after such IND becomes effective or the FDA places a hold on such IND (the "**IND Transfer Date**"), and thereafter, unless otherwise agreed by the Parties in writing, such IND, and any subsequent IND for a Shared Product, shall be held in the name of [***] or its designated Affiliate; and (iii) [***] or its designated Affiliate, and thereafter [***] or its designated Affiliate. Each Party agrees to take such further actions as may be reasonably necessary to effect the transfers set forth in this Section 3.3.1(b). The Project Team will oversee, monitor and manage the transfers contemplated by this Section 3.3.1(b). A transfer initiated under this Section 3.3.1(b) will proceed without undue delay and shall not be halted, delayed or paused after it has been so initiated and each Party will use Commercially Reasonable Efforts to effectuate such transfer as soon as possible. Prior to the transfer of any Regulatory Filing to [***] under this Section 3.3.1(b), [***] will provide [***] with copies of all source documents related to such first three CTAs or such IND, and any updates thereto.

(c) The Parties acknowledge that, prior to the Effective Date, [***] submitted the [***] for the Initial Shared Product for beta-thalassemia to Regulatory Authorities in [***] in the name of [***] or its designated Affiliate, and the Parties acknowledge and agree that, after the Effective Date, [***] will submit a [***] for the Initial Shared Product for beta-thalassemia in [***] in the name of [***] or its designated Affiliate, in substantially the same form as the [***] such CTAs. With respect to the first IND for the Initial Shared Product to be submitted by [***] after the Effective Date as provided in Section 3.3.1(b), [***], in consultation with the Project Team and in accordance with the strategy approved by the JDC, will prepare such IND, and provide [***] with advance drafts of such IND, and any related

regulatory submissions or correspondence, that [***] plans to submit to the applicable Regulatory Authority as drafts are prepared and in all cases sufficiently in advance so as to afford [***] a meaningful opportunity to review such IND. [***] may provide comments regarding such IND, and related regulatory submissions or correspondence, prior to their submission, and [***] will incorporate any such comments. [***] will file such IND, and submit such related regulatory submissions or correspondence, only in the final form approved by the JDC. Thereafter, until such time that such CTAs and such IND are transferred to [***], [***] will oversee, monitor and manage all regulatory interactions and communications with Regulatory Authorities. [***] may provide comments regarding such interactions and correspondence, and [***] will incorporate any such comments. [***] will also provide [***] with final copies of all material submissions it makes to, and all material correspondence it receives from, a Regulatory Authority pertaining to such CTAs and such IND for the Initial Shared Product, within [***] Business Days after such submission or receipt. After [***] transfers such CTAs and IND to [***], [***] shall be responsible for all communications and correspondence with applicable Regulatory Authorities, consistent with Section 3.3.1(d).

(d) Following transfer of the [***] CTAs in beta-thalassemia and the first IND for the Initial Shared Product to [***], [***] shall use Commercially Reasonable Efforts, in consultation with [***], to seek to obtain Regulatory Approvals for the Shared Products in the Field and to maintain such Regulatory Approvals outside of the [***]. [***], [***] shall use Commercially Reasonable Efforts, in consultation with [***], to [***]. Subject to the terms of this Agreement, [***], in consultation with the Project Team and in accordance with the strategy approved by the JDC, will lead all regulatory activities, including all regulatory interactions and communications and determining the labeling strategy for the Shared Product, and will prepare and submit all Regulatory Filings with respect to the Shared Products to the appropriate Regulatory Authorities in the Territory, *provided* that [***] may review and comment on such strategies and submissions, which comments [***] will consider in good faith (and the Parties will discuss any material comments that are not incorporated or otherwise reflected in any of the foregoing), *provided, further,* that [***], in consultation with the Project Team and in accordance with the strategy approved by the JDC, will oversee, monitor and manage any such regulatory interactions,

communications and filings [***]. [***] will provide [***]with advance drafts of any material documents or other material correspondence pertaining to the Shared Products that [***] plans to submit to any Regulatory Authority as drafts are prepared and in all cases sufficiently in advance so as to afford [***] a meaningful opportunity to review such drafts. [***] may provide comments regarding such documents and other correspondence prior to their submission, which comments [***] will consider in good faith (and the Parties will discuss any material comments that are not incorporated or otherwise reflected in any of the foregoing); *provided that,* notwithstanding anything to the contrary set forth in this Agreement, with respect to any Specified Regulatory Activities to be performed by or on behalf of [***], unless otherwise required by Applicable Law [***] will not perform, and will prevent others from performing, any Specified Regulatory Activities [***]. Notwithstanding the foregoing, [***], in consultation with the Project Team and in accordance with the strategy approved by the JDC, will control all regulatory activities with respect [***] for each Shared Product [***] in accordance with the strategy approved by the JDC. [***] will provide [***] with advance drafts of any material documents or other material correspondence pertaining to the Shared Products that [***] plans to submit to any Regulatory Authority with respect [***] as drafts are prepared and in all cases sufficiently in advance so as to afford [***] a meaningful opportunity to review such drafts. [***] may provide comments regarding such documents and other correspondence prior to their submission, which comments [***] will consider in good faith (and the Parties will discuss any material comments that are not incorporated or otherwise reflected in any of the foregoing); *provided that*, notwithstanding anything to the contrary set forth in this Agreement, with respect to any Specified Regulatory Activities to be performed by or on behalf of [***], unless otherwise required by Applicable Law [***], [***] will not perform, and will prevent others from performing, any Specified Regulatory Activities [***]. Each Party will provide the other Party with copies of all material submissions it makes to, and material correspondence it receives from, a Regulatory Authority pertaining to a Regulatory Approval of the Shared Products within [***] Business Days after such submission or receipt. To the extent practicable, each Party will provide the other Party with reasonable advance notice of any meeting or teleconference with any Regulatory Authority with respect to the Shared Products. Subject to Applicable Law, the other Party will have the right to send [***] plus up to [***] additional representatives

of such Party to participate as observers in all material meetings, conferences and discussions by the responsible Party with Regulatory Authorities pertaining to Development of the Shared Products or Regulatory Approval of the Shared Products. Each Party shall promptly respond (and in no event later than [***] Business Days) to any request from the other Party for additional information arising from, relating to or otherwise in connection with any of the regulatory matters described or contemplated in this Section 3.3.1.

3.3.2. **Clinical Trials**.

(a) The JDC will allocate responsibility between the Parties for the conduct of Clinical Trials and the various other Development activities addressed in the Global Development Plan, which allocation will be consistent with this Section 3.3.2 and Section 3.2. From and after the effective time of the transfer of the [***] Agreement to [***] contemplated by Section 3.3.2(h), all Clinical Trials will be conducted using [***] standard Clinical Trial operating procedures and systems.

(b) The Parties will cooperate to develop the protocol and statistical analysis plan for each Clinical Trial under the Global Development Plan and submit each such protocol and statistical analysis plan for review and approval by [***] internal joint protocol peer review committee, and a representative of [***] shall serve as co-chair of any such committee (or any sub-committee thereof) and shall have the right to fully participate in any such review and approval process and such co-chair shall have the right to invite a reasonable number of [***] representatives to participate in the activities of any such committee. Each protocol and statistical analysis plan will be deemed to be final following approval by [***] internal joint protocol peer review committee (as so described) with [***] consent. In the event of any dispute regarding any such protocol or statistical analysis plan, the Parties may submit such dispute to the JDC for resolution. [***].

(c) The Party whose representative is the Clinical Operations Study Lead for a Clinical Trial will have the responsibility for directing the packaging and labeling of clinical drug supplies for such Clinical Trial, unless otherwise agreed by the Parties in writing. In furtherance of the forgoing, the Clinical Operations Study Lead will coordinate with the Clinical Operations Program Lead and the Project Team when directing such labeling.

(d) The Parties will determine by mutual agreement how to implement and carry out the day-to-day operations with respect to Clinical Trials, including staffing, timelines, number and location of Clinical Trial sites, *provided* that such determinations shall at all times be consistent with the Global Development Plan (including the Development Budget) and this Agreement. The Clinical Operations Program Lead will oversee, manage and direct the day-to-day operations of the applicable Clinical Trial(s), consistent with the applicable Global Development Plan (including the Development Budget) and this Agreement. Without limiting the generality of the foregoing, the Clinical Operations Program Lead can direct employees, consultants and service providers of either Party and its Affiliates to perform day-to-day Clinical Trial activities consistent with the applicable Global Development Plan (including the Development Budget) and in accordance with approved processes, GCP and ICH requirements. In furtherance of the foregoing, each Party will support the authority of the Clinical Operations Program Lead by cause its employees, consultants and service providers to cooperate with the Clinical Operations Program Lead and act consistently with the Clinical Operations Program Lead's directions with respect to day-to-day Clinical Trial activities.

(e) With respect to each Initial Clinical Trial, and any subsequent Clinical Trial for which a Party engages a CRO, the other Party will have the right to review and approve all clinical trial agreement templates, confidential disclosure agreement templates and any other site-facing templates used by the applicable CRO in contracting with clinical trial sites, and any modifications or updates thereto, as well as any revisions thereto proposed by the applicable clinical trial sites. The Party engaging a CRO shall ensure that such CRO uses only clinical trial agreement templates, confidential disclosure agreement templates and other site-facing templates that have been reviewed and approved by the other Party in their final form. Any such clinical trial agreement template, confidentiality agreement template or other site-facing template shall provide that such clinical trial agreement is fully assignable to the other Party or its Affiliate without consent of the clinical trial site. In addition, prior to the commencement of each Initial Clinical Trial, each Party will obtain and provide to the other Party for review a copy of each clinical trial site's insurance policy with respect to such Initial Clinical Trial. Notwithstanding anything to the contrary, each Party will provide to the other Party with all standard operating procedures, audit results and other information received by such

Party under any CRO agreement, to the extent related to the Shared Products.

(f) [***] will be solely responsible for management of all Clinical Trial data with respect to the Shared Products, *provided* that [***] shall provide [***] and its designees with access to all Clinical Trial data as follows: (i) upon [***] reasonable request, provide [***] with [***] from [***] operational clinical database within [***] Business Day of generation of such reports (but in no event later than [***] Business Days after the date of [***] request); (ii) [***], in each case, [***] by [***] clinical management; (iii) [***]; (iv) access [***]; (v) an electronic copy of [***]; and (vi) [***] will provide [***], upon [***] reasonable request, [***] will provide [***] with [***] from [***] within [***] Business Day of [***] (but in no event later than [***] Business Days after the date of [***] request).

(g) The sponsor for each Clinical Trial under the Global Development Plan will be responsible for ensuring compliance with all Applicable Law.

(h) Promptly following the [***] under the first CTA and IND for the Initial Shared Products, [***] shall transfer and assign to [***] the [***] Agreement. Following such transfer, [***] may elect, subject to the terms hereof, to terminate the [***] Agreement and utilize [***] for the Initial Clinical Trial for beta-thalassemia unless the JDC determines that [***] then-existing internal clinical operations staff (or, if applicable, the clinical operations staff of [***] or the [***] Agreement would [***] will determine in its sole discretion whether the Initial Clinical Trial for sickle cell[***]disease will be conducted under the [***] Agreement or [***].

(i) Each Party shall promptly respond (and in no event later than [***] Business Days) to any request from the other Party for additional information arising from, relating to or otherwise in connection with any of the clinical trial matters (including Clinical Trial data) described or contemplated in this Section 3.3.2.

3.3.3. **Non-Clinical Studies**. [***] will be responsible for conducting all non-clinical studies and other Research with respect to the Products, in accordance with the Global Development Plan and the Follow-On Research Plan, as applicable, subject to the oversight of the JDC in accordance with Section 2.3.2(a). The Parties will cooperate to develop the protocol for each non-clinical study under the Global Development

Plan or the Follow-On Research Plan, as applicable, and submit each such protocol for review and approval pursuant to each Party's internal review process. Each protocol will be deemed to be final following approval under each Party's internal review process. The Parties shall coordinate to ensure that the same version of each protocol is approved by both Parties. In the event of any dispute regarding any such protocol, the Parties may submit such dispute to the JRC for resolution. [***] shall provide to [***] any interim or final data or results from each non-clinical study of a Product promptly following [***] receipt thereof.

3.3.4. **Independent Activities**. Each Party shall have the right to propose additional Clinical Trials for inclusion in the Global Development Plan. A Party proposing an additional Clinical Trial shall provide to the other Party, through the JDC, a summary and rationale for such additional Clinical Trial. If the other Party does not agree to include such additional Clinical Trial in the Global Development Plan, (a) [***] and (b) [***]; *provided* that neither Party may conduct any Clinical Trial that [***]. The non-requesting Party will not have the right to use the data resulting from any Clinical Trial conducted by one Party outside of the Global Development Plan as permitted under this Section 3.3.4 in a substantive manner as the basis for obtaining new or expanded Regulatory Approval for a Shared Product in the Field or for post-marketing Regulatory Filings or commercial purposes for a Shared Product in the Field; *provided* that, if such Party desires to use the data resulting from such Clinical Trial in a substantive manner as the basis for obtaining new or expanded Regulatory Approval for a Shared Product in the Field or for commercial purposes for a Shared Product in the Field, such Party shall so inform the requesting Party and shall reimburse the requesting Party for [***]% of the Expenses of such Clinical Trial that would, if such Clinical Trial were included in the Global Development Plan, have constituted Development Costs. If [***] is the non-requesting Party, following such reimbursement, [***] shall have the right to use the data resulting from such Clinical Trial for such purposes. If [***] is the non-requesting party, following such reimbursement, [***] shall have the right to direct [***] to use the data resulting from such Clinical Trial for such purposes in conducting its activities in accordance with Section 3.3.1, [***], to utilize such data in post-marketing Regulatory Filings. Upon the request of the Party conducting an additional Clinical Trial as permitted under this Section 3.3.4, the Manufacturing Working Group shall use Commercially Reasonable Efforts to Manufacture or have Manufactured, at the requesting Party's expense, clinical supplies for the additional Clinical Trial, but in any event, the Manufacturing Working Group shall not be required to supply clinical supplies for any Clinical Trial being conducted pursuant to this Section 3.3.4 [***].

3.3.5. **Briefing the JDC**. At each scheduled meeting of the JDC, each Party will provide detailed progress updates on activities conducted under the Global Development Plan and the Follow-On Research Plan, along with a summary of data associated with such activities, which updates and summaries will be provided to JDC members at least [***] days in advance of any JDC meeting. Such updates and summaries will be provided in a format mutually agreed to by the Parties.

3.3.6. **Quality Agreement**. As promptly as possible, but no later than [***] days after the Effective Date and in any case prior to the transfer of the first CTA for the Initial Shared Product to [***], the Parties will negotiate in good faith and agree on a quality agreement for the Products, including quality analysis and control criteria for the Manufacture of the Products, electronic system compliance, responsibilities for managing Clinical Trials and pre-clinical studies, and joint decision-making criteria (the "**Quality Agreement**"). The Quality Agreement will be consistent with the relevant provisions of the Pharmacovigilance Agreement.

3.4. **Diligence**. Each Party will use Commercially Reasonable Efforts to execute and to perform, or cause to be performed, the activities assigned to it in the Global Development Plan and the Follow-On Research Plan, and to cooperate with the other Party in carrying out the Global Development Plan and the Follow-On Research Plan in accordance with the timelines therein. Each Party and its Affiliates will conduct its Research and Development activities in good scientific manner and in compliance with Applicable Law. Notwithstanding anything to the contrary contained herein, a Party or its Affiliates will not be obligated to undertake or continue any Research or Development activities with respect to any Product if such Party (or any of its Affiliates) reasonably determines that performance of such Research or Development activity would violate Applicable Law or infringe or misappropriate a Third Party's intellectual property.

3.5. **Follow-On Products**. At any time during the Co-Co Agreement Term, either Party may propose to the other Party, through the JRC, to designate a Follow-On Product as an additional Shared Product under this Agreement. The JSC, taking into consideration the recommendations of the JRC and in consultation with the JDC, shall discuss and determine whether to designate such Follow-On Product as an additional Shared Product under this Agreement. Effective as of any such determination by the JSC, such Follow-On Product shall be deemed a Shared Product for all purposes under this Agreement. Notwithstanding anything to the contrary in this Agreement, any decision to designate a Follow-On Product as an additional Shared Product under this Agreement shall be made only by mutual agreement of the Parties through the JSC, and shall not be subject to any Third Party dispute resolution.

3.6. **Additional [***] Targets**. This Agreement constitutes the Joint Development and Commercialization Agreement for each of [***]. The Parties shall conduct Research activities with respect to each of [***] [***] [***] Target that is included as a Collaboration Target in accordance with the Follow-On Research Plan.

ARTICLE 4

MEDICAL AFFAIRS ACTIVITIES.

The Parties, acting through the JDC, will develop and agree upon a global medical affairs plan for the Shared Products that describes the Medical Affairs Activities to be conducted in the Territory, key tactics and strategies for implementing those activities, the relative responsibilities of the Parties and the associated budget for such activities (such plan, the "**Medical Affairs Plan**" and such budget, the "**Medical Affairs Budget**"). The Parties will update the Medical Affairs Budget on an annual basis no later than [***], and submit such updated Medical Affairs Budget to the JSC for inclusion in the Integrated Budget. CRISPR will lead and manage Medical Affairs Activities in the United States and Vertex will lead and manage Medical Affairs Activities outside of the United States, in each case, in accordance with the Medical Affairs Plan. The number of MSLs to be deployed in each jurisdiction with respect to a Shared Product will be determined by the JDC promptly after Establishment of POC for such Shared Product.

ARTICLE 5

COMMERCIALIZATION.

5.1. **Responsibilities**. CRISPR shall be the Commercializing lead for the Shared Products in the United States and Vertex shall be the Commercializing lead for the Shared Products outside of the United States. The Commercializing lead, with respect to the United States or outside of the United States, respectively, shall be referred to herein as the "Lead Commercialization Party" for such jurisdiction (as applicable, the "**Lead Commercialization Party**"). The Lead Commercialization Party with respect to a jurisdiction will have sole responsibility for the conduct of Commercialization activities with respect to each Shared Product in such jurisdiction in its sole discretion, subject to compliance with the approved Global Commercialization Plan, Global Commercialization Budget and Regional Commercialization Plan(s) for such Shared Product, and the provisions of this ARTICLE 5.

5.2. **Commercialization Plans**. The JCC will oversee the Commercialization of the Shared Products by the Parties in the Field in the Territory. No later than [***] prior to the anticipated launch of each Shared Product in the first country in the Territory, the JCC will develop and submit to the JSC for approval a global Commercialization plan (each, a "**Global Commercialization Plan**") that sets forth at a high level the Commercialization activities to be undertaken by the

Parties with respect to the Commercialization of such Shared Product in the Territory. The JCC will update each Global Commercialization Plan on an annual basis (or more frequently as needed) and submit it to the JSC for approval. Each Global Commercialization Plan will include (a) a Global Brand Strategy, (b) a Global Communication Strategy, (c) a Global Market Access and Value Strategy, (d) a Global Pricing Strategy, and (e) a budget for activities conducted under the Global Commercialization Plan (the "**Global Commercialization Budget**"). In addition, no later than [***] prior to the anticipated launch of each Shared Product in the applicable country, each Lead Commercialization Party will develop one or more regional or country-level Commercialization plans (each, a "**Regional Commercialization Plan**") for (a) in the case of CRISPR, the U.S. and (b) in the case of Vertex, the Major [***] Countries. Each Party will submit such Regional Commercialization Plans to the JCC for review and approval. Each Lead Commercialization Party will update its Regional Commercialization Plan(s) on an annual basis (or more frequently as needed) and submit them to the JCC for approval. Each such Regional Commercialization Plan must be consistent at all times with the then-current Global Commercialization Plan (including the Global Commercialization Budget) for the applicable Shared Product.

5.3. **Elements of Global Commercialization Plan**. Without limiting Section 5.2, for each Shared Product, the JCC will develop each of the following strategies and submit them to the JSC for approval as part of the Global Commercialization Plan in accordance with Section 5.2:

5.3.1. a global brand strategy for such Shared Product in the Territory, including a life cycle plan, launch sequencing, brand vision, positioning, key messaging, concept and imagery, Trademarks (including name and logos) and supporting market research (the "**Global Brand Strategy**");

5.3.2. a global communication strategy for such Shared Product in the Territory, including plans for the coordination of messages between the Parties, public relations, conferences and exhibitions and other external meetings and communications, publications and symposia, congress presence and internet activities (the "**Global Communication Strategy**");

5.3.3. a strategy for the managed markets and global market access for such Shared Product, including payer strategy and account management, global value proposition, evidence plan to support the global value proposition, and the global value dossier, including economic models with respect to the global value proposition as well as a strategy to comply with any government programs, including required pricing submissions and rebates or discounts (the "**Global Market Access and Value Strategy**"); and

5.3.4. a global pricing strategy for such Shared Product (including list price, targeted net pricing, sales-weighted average discounts and rebates, the approach to pricing with different types of accounts and plans, types of discounts and rebates) in the Territory (the "**Global Pricing Strategy**"), *provided* that the Lead Commercialization Party in each jurisdiction shall have responsibility for the implementation of such global pricing strategy, including negotiating pricing and reimbursement with governments and private payers, in such jurisdiction.

5.4. **Commercialization Activities**.

5.4.1. **Training**. The Lead Commercialization Party will prepare training programs and materials for employees and sales representatives with respect to the Shared Products in its respective jurisdiction, with the goal of ensuring compliance with all Applicable Laws and each Party's compliance policies. The Lead Commercialization Party will be solely responsible for training its employees and sales representatives in accordance with such training program, consistent with the Global Communication Strategy.

5.4.2. **Trademarks**. The JCC will select one or more product Trademarks for each Shared Product throughout the world consistent with the applicable Global Brand Strategy. Each Shared Product will be promoted and sold in the Territory under the applicable Trademarks.

5.4.3. **Field Sales**. The Lead Commercialization Party will have the sole right to promote the Shared Products (including performing sales calls) in its respective jurisdiction.

5.4.4. **Distribution and Patient Services**. The Lead Commercialization Party will be responsible for distribution and patient services for each Shared Product in its respective jurisdiction, including contracting with applicable service providers, such activities to be determined by the Lead Commercialization Party and included in the Regional Commercialization Plan(s) for such Shared Product.

5.4.5. **Booking Sales; Distribution**. The Lead Commercialization Party will have the sole right to invoice, sell and book all sales of each Shared Product in its respective jurisdiction and will be responsible for warehousing and distributing such Shared Product in its respective jurisdiction.

5.5. **Diligence**. CRISPR will use Commercially Reasonable Efforts to [***] the [***] in the [***]. Vertex will use Commercially Reasonable Efforts to [***] the [***] in the Major [***] Countries. Each Party and its Affiliates will conduct its Commercialization activities in compliance with Applicable Law and the relevant

Global Commercialization Plan. Notwithstanding anything to the contrary contained herein, a Party or its Affiliates will not be obligated to undertake or continue any Commercialization activities with respect to any Shared Product if such Party (or any of its Affiliates) reasonably determines that performance of such Commercialization activity would violate Applicable Law or infringe or misappropriate a Third Party's intellectual property.

ARTICLE 6

MANUFACTURING

6.1. **Manufacturing [***]**. During the period starting on the Effective Date and ending on the date that is [***] days after the Effective Date (the "**[***]**"), CRISPR shall cooperate with Vertex to [***], *provided* that [***], (b) [***], *provided* that, [***], and (c) [***].

6.2. **Manufacturing Working Group**. After the Effective Date, the JMC will establish a manufacturing working group (the "**Manufacturing Working Group**") to operationalize the Manufacture of the Products in accordance with a global manufacturing plan (the "**Global Manufacturing Plan**"), including the corresponding budget (the "**Manufacturing Budget**"), to be prepared by the Manufacturing Working Group within [***] days after the Effective Date and shall be approved by the JMC thereafter. The JMC will select the members of the Manufacturing Working Group as provided in Section 2.5.2(a) and in this Section 6.2. Unless otherwise mutually approved by the Parties in writing: (x) [***] will be the lead party on Manufacturing matters; *provided* that at all times at least [***]% of the members of the Manufacturing Working Group will be [***]representatives; (y) the leader of the Manufacturing Working Group will act as the Manufacturing Lead on the Project Team; and (z) a majority of the members of the Manufacturing Working Group shall be dedicated to the Manufacture of the Products under this Agreement on a full-time basis, unless otherwise mutually agreed by the Parties in writing; *provided*, *however*, that any member of the Manufacturing Working Group who is not dedicated to the Manufacture of the Products under this Agreement on a full-time basis must be sufficiently dedicated to such Manufacture to permit such person to be reasonably and consistently available to participate in the activities of the Manufacturing Working Group. The Manufacturing Working Group will report to the JMC, and will collaborate with the other functions on the Project Team. The Manufacturing Working Group's responsibilities will include: (a) on an [***] basis (or more frequently as needed), preparing updates to the Global Manufacturing Plan, including the Manufacturing Budget, and submitting such updates to the JMC for review, discussion and approval in accordance with Section 2.5.2(i); (b) developing plans to transfer Manufacturing-related Know-How between the Parties as needed to facilitate the Manufacture of the Products; (c) establishing standards applicable to each Party's Manufacturing activities and reviewing each

Party's performance against such standards; (d) conducting technical reviews; (e) making recommendations to the JMC regarding capacity planning, supply plans and supply continuity planning for the Products; (f) making recommendations to the JMC regarding the Manufacturing process for each Shared Product and any changes thereto; (g) sharing planning and budgeting information with the JMC, the JDC and JCC; (h) reviewing and sharing the results of regulatory and environmental, health and safety inspections and audits related to the Manufacture of the Products with the JMC; (i) managing CMOs conducting Manufacturing activities with respect to the Products and (j) conducting any technology transfer approved by the JMC and in accordance with Section 6.4. The Manufacturing Working Group shall use good faith efforts to reach consensus on the matters for which it is responsible, with each Party's representatives on the Manufacturing Working Group having collectively one vote; *provided* that if, despite the use of such good faith efforts for a reasonable period of time (taking into account the nature of the relevant dispute) the Parties representatives are unable to reach consensus on a given matter and such matter does not require the JMC's approval, [***] [***]; *provided that* [***].

6.3. **Responsibilities**. The Parties, in accordance with the allocation of responsibilities determined by the JMC, shall be responsible for Manufacturing or having Manufactured all pre-clinical, clinical and commercial supplies of the Products in accordance with the Global Manufacturing Plan and subject to the Manufacturing Budget, subject to the oversight of the Manufacturing Working Group and the JMC in consultation with the JDC or JCC, as applicable. The Party responsible for conducting activities under the Global Manufacturing Plan will be responsible for determining how to carry out the day-to-day operations with respect to such activities; *provided* such activities are conducted in accordance with the Global Manufacturing Plan, Manufacturing Working Group guidance and strategy and all Applicable Laws. The Parties, acting through the Manufacturing Working Group, will ensure the process for Manufacturing a Shared Product [***]. [***] will be responsible for contracting with any CMO with respect to the Manufacture of the Shared Products. If [***] determines to build out its own Manufacturing site, it shall so notify the JMC, and the JMC will determine whether to use such Manufacturing site for the Manufacture of the Products under this Agreement. If the JMC determines to use [***] Manufacturing site for the Manufacture of any Product under this Agreement, [***] will use Commercially Reasonable Efforts to ensure that such Manufacturing site contains reasonably adequate equipment and space dedicated to such Product. For clarity, if the JMC does not initially determine to use [***] Manufacturing site for the Manufacture of any Product under this Agreement, it may at any time thereafter determine to do so, *provided* that such Manufacturing site contains reasonably adequate equipment and space dedicated to such Product.

6.4. **Sharing of Manufacturing Information**. Subject to this Section 6.4, each Party shall, upon the other Party's request, provide to such other Party such information

as may be requested by such other Party with respect to the Manufacture of any Product under this Agreement for Development, Commercialization or Manufacturing purposes. Without limiting the foregoing, each Party will, within [***] Business Days of the other Party's request, provide to the requesting Party any information requested with respect to the non-requesting Party's Manufacturing activities, including site qualification and scale-up activities. Each Party shall, and shall cause its Affiliates to, [***]. Notwithstanding the foregoing, if the JMC determines that a CMO will Manufacture the Products, [***] shall directly transfer to such CMO any information Controlled by and in the possession of [***] or its Affiliate and reasonably necessary or useful to enable the Manufacture of such Products, *provided* that such transfer obligation shall not limit [***] obligations to transfer information directly to [***] pursuant to this Section 6.4.

6.5. **CMO Agreements**. Each Party will have the right to review and approve the terms of any agreement, including quality agreements, to be entered into between the other Party and a CMO or a contract testing facility with respect to the Manufacture of any Product, or any intermediate thereof, under this Agreement. No such agreement with a CMO or contract testing facility shall be entered into by a Party without the prior approval of the other Party.

ARTICLE 7

FINANCIAL TERMS; ALLOCATION OF NET PROFIT AND NET LOSS

7.1. **Upfront Payments**. Within four Business Days after the Effective Date, Vertex shall pay to CRISPR a non-refundable, non-creditable, upfront payment in the amount of Seven Million Dollars ($7,000,000). For clarity, CRISPR is solely responsible for all costs and expenses incurred by CRISPR or its Affiliates in connection with the Shared Products prior to the Effective Date.

7.2. **Milestone Payment**. Upon [***], Vertex will make a one-time, non-refundable, non-creditable payment to CRISPR of [***] ($[***]) within [***] days of receipt by Vertex of an invoice for such payment from CRISPR.

7.3. **Allocation**. Starting [***], and continuing through the Co-Co Agreement Term, each Party will be entitled to [***] or will bear [***], as applicable. Each Party will be solely responsible for any Program Expenses incurred by such Party between the Effective Date and [***], 2018. If either Party elects to Opt-Out (as defined below), the [***].

7.4. **Calculation**. [***].

7.5. **Payment of Expenses; Summary Statements**. Subject to reconciliation as provided in Section 7.6, the Party initially incurring Program Expenses will be responsible for and pay for all such Program Expenses so incurred. Each Party

will maintain the books and records referred to in Section 7.8. Each Party will accrue all Program Expenses, Sublicense Revenue and Net Sales in accordance with the terms and conditions hereof and in accordance with GAAP, *provided* that all Out-of-Pocket Costs under this Agreement will be deemed accrued at the time of invoice for purposes of the calculation and reconciliation of Net Profit or Net Loss under this Agreement. Within [***] Business Days after the end of each Calendar Quarter, each Party will submit to the other a written report reflecting the accrual of Program Expenses, Sublicense Revenue and Net Sales during the just-ended Calendar Quarter, except that each Party's submission for the last month of such Calendar Quarter will be a good faith estimate and not actual amounts (each, a "**Summary Statement**"). Within [***] days after the end of each Calendar Quarter, each Party will submit to the other an updated Summary Statement reflecting the actual accrual of Program Expenses, Sublicense Revenue and Net Sales for the last month of such Calendar Quarter, which Summary Statement will be certified as true and accurate by a representative of such Party that is a Vice President of Finance or more senior representative. Each Summary Statement (after the initial Summary Statement) will reflect an adjustment for the actual amount of the previous Calendar Quarter as needed, *provided* that, if, prior to preparation of a Summary Statement in accordance with the preceding sentence, a Party discovers that actual Program Expenses, Sublicense Revenue or Net Sales have deviated materially from any non-binding, good faith estimate of such Program Expenses, Sublicense Revenue or Net Sales submitted to the other Party in accordance with this Section 7.5 (including any deviation in any single Expense or in aggregate Sublicense Revenue or aggregate Net Sales, in each case, of more than $[***]), then such Party shall promptly notify the other Party of such deviation in advance of delivery of such Summary Statement. Any reporting and reconciliation of variances between estimated and actual Expenses may be delayed by a Calendar Quarter as reasonably necessary in light of a Party's internal reporting procedures. The Parties' respective Summary Statements will serve as the basis of the Reconciliation Reports prepared by [***] pursuant to Section 7.6. The Parties' respective finance departments, coordinated by the JDC, or JCC, as appropriate, will meet at least once per [***], or as otherwise mutually agreed by the Parties, to discuss any questions or issues arising from the Summary Statements, including the basis for the accrual of specific Program Expenses, review budgets and forecasts, and discuss reconciliation and reporting procedures.

7.6. **Reconciliation**. [***] will prepare a reconciliation report, as soon as practicable after the receipt of [***] updated Summary Statement, but in any event within [***] days after the end of each Calendar Quarter, accompanied by reasonable supporting documents and calculations sufficient to support each Party's financial reporting obligations, independent auditor requirements and obligations under the Sarbanes-Oxley Act, which reconciles the amounts accrued and reported in each Party's Summary Statement during such Calendar Quarter and the share of the Net Profits and Net Losses to be allocated to each of the Parties for such Calendar Quarter in accordance with Section 7.3 (such report, the "**Reconciliation**

Report"). Payment to reconcile Net Profit or Net Loss, as applicable, shall be made by the owing Party to the other Party within [***] days after such Reconciliation Report is complete.

7.7. **Cost Overruns**. If a Party's Research Costs, Development Costs, Manufacturing Costs, Medical Affairs Costs or Commercialization Costs in any Calendar Year are likely to exceed those set forth in the Research Budget, Development Budget, Manufacturing Budget, Medical Affairs Budget or Global Commercialization Budgets, as applicable, for all of its activities under the Follow-On Research Plan, Global Development Plan, Global Manufacturing Plan, Medical Affairs Plan or Global Commercialization Plans, as applicable, in such Calendar Year by [***], Development Budget, Manufacturing Budget, Medical Affairs Budget or Global Commercialization Budgets, as applicable, such Party will provide the other Party with an explanation for such excess Expenses, and such excess Expenses will be included in the Research Costs, Development Costs, Manufacturing Costs, Medical Affairs Costs or Commercialization Costs, as applicable, and, beginning [***], shared by the Parties as provided herein. To the extent a Party's Research Costs, Development Costs, Manufacturing Costs, Medical Affairs Costs or Commercialization Costs, as applicable, exceed those set forth in the Research Budget, Development Budget, Manufacturing Budget, Medical Affairs Budget or Global Commercialization Budgets, [***].

7.8. **Books and Records**. Each Party will keep and maintain accurate and complete records regarding Program Expenses, Sublicense Revenue and Net Sales, during the three preceding Calendar Years. Upon [***] days' prior written notice from the Auditing Party, the Audited Party will permit an independent certified public accounting firm of internationally recognized standing, selected by the Auditing Party and reasonably acceptable to the Audited Party, to examine the relevant books and records of the Audited Party and its Affiliates, as may be reasonably necessary to verify the Summary Statements and Reconciliation Reports. An examination by the Auditing Party under this Section 7.8 will occur not more than once in any Calendar Year and will be limited to the pertinent books and records for any Calendar Year ending not more than [***] months before the date of the request. The accounting firm will be provided access to such books and records at the Audited Party's facility or facilities where such books and records are normally kept and such examination will be conducted during the Audited Party's normal business hours. The Audited Party may require the accounting firm to sign a customary non-disclosure agreement before providing the accounting firm access to its facilities or records. Upon completion of the audit, the accounting firm will provide both the Auditing Party and the Audited Party a written report disclosing whether the applicable Summary Statements and Reconciliation Reports are correct or incorrect and the specific details concerning any discrepancies. No other information will be provided to the Auditing Party. If the report or information submitted by the Audited Party results in an underpayment or overpayment, the Party owing underpaid or overpaid amount will promptly pay

such amount to the other Party, and if, as a result of such inaccurate report or information, such amount is more than five percent of the amount that was owed, the Audited Party will reimburse the Auditing Party for the reasonable expense incurred by the Auditing Party in connection with the audit.

7.9. **Payment Method; Currency**.

7.9.1. All payments under this Agreement will be paid in U.S. Dollars, by wire transfer (a) in the case of payments to [***], by [***] to an account of [***] designated by [***] (which account CRISPR may update from time to time in writing) and (b) in the case of payments to [***], by [***]. to an account of [***] designated by [***] (which account [***] may update from time to time in writing).

7.9.2. If any amounts that are relevant to the determination of amounts to be paid under this Agreement or any calculations to be performed under this Agreement are denoted in a currency other than U.S. Dollars, then such amounts will be converted to their U.S. Dollar equivalent using the [***] of the official rate of exchange of such domestic currency as quoted by [***], for the Calendar Quarter for which the payment is made.

7.10. **Late Payment**. Any undisputed payments or portions thereof due hereunder that are not paid when due will accrue interest from the date due until paid at an annual rate equal to [***] plus [***] percent (or the maximum allowed by Applicable Law, if less).

7.11. **Payments To / From** [***]. Notwithstanding anything to the contrary set forth in this Agreement, (i) any payments to be made by any [***] under this Agreement shall be made by [***] only; and (ii) any payments to be made to any [***] under this Agreement shall be made to [***] only.

ARTICLE 8

ADVERSE EVENTS

8.1. **Pharmacovigilance Agreement**. [***] shall be responsible for all pharmacovigilance activities for the Shared Products in the Territory. Within [***] days after the Effective Date, the Parties will negotiate in good faith and will set forth in a pharmacovigilance agreement (the "**Pharmacovigilance Agreement**") mutually agreed terms and conditions for the processes and procedures for sharing safety information with respect to the Shared Products that are customary for agreements of this type. The Pharmacovigilance Agreement will include provisions establishing a joint disease area safety team led by [***] to oversee the conduct of the Parties' activities under the Pharmacovigilance Agreement and to coordinate the Parties' interactions with respect to pharmacovigilance activities.

8.2. **Global Safety Database**. [***] will establish and maintain the global database of safety information for each Shared Product (each, a "**Global Safety Database**"), including adverse events and pregnancy reports for each Shared Product, which will be used for regulatory reporting and responses to safety queries from Regulatory Authorities by both Parties. [***] will, and will cause its Affiliates to, transfer all adverse events information in its or their possession or control to the Global Safety Database within a mutually agreed period of time that provides Vertex with sufficient time for the preparation of required regulatory submissions.

8.3. **Risk Management and Signal Detection Activities**. [***] shall be primarily responsible for all signal detection and risk management activities for the Shared Products. These signal detection activities shall include, but are not limited to, proactive review and evaluation of all safety information from the applicable Global Safety Database (including Individual Case Safety Reports and aggregate safety information) and other sources (including the clinical trial databases, non-clinical data, and medical or scientific literature).

8.4. **Access to Safety Information**. The Parties will arrange for [***] to [***], with a format and periodicity agreed upon by both Parties. In response to [***] from [***], [***] will [***] to [***] within [***] Business Days of a request. In addition, [***] shall [***] to [***].

ARTICLE 9

SUBCONTRACTING

Each Party may subcontract the performance of any activities undertaken by such Party in accordance with the Global Development Plan, the Follow-On Research Plan, the Medical Affairs Plan, any Global Commercialization Plan or any Regional Commercialization Plan to one or more Third Parties (each such Third Party, a "**Subcontractor**") pursuant to a written agreement (a "**Subcontract**") in compliance with the terms of this Agreement and the Quality Agreement. Notwithstanding the foregoing, if either Party desires to subcontract any such activities, it will first discuss the matter with the other Party and reasonably consider using the other Party for such subcontracted activities, taking into account the capabilities of the other Party and potential impact on Expenses, as a potential alternative to subcontracting such activities to a Third Party. If, following such discussion, a Party still desires to subcontract the performance of any such activity to one or more Third Parties, it may proceed to do so, subject to Section 2.3.2(v), Section 2.4.2(k) or Section 2.5.2(o), as applicable, in the case of any such subcontract that the subcontracting Party reasonably anticipates will entail payments to the Subcontractor in excess of $[***] with respect to the subcontracted activities under this Agreement.

ARTICLE 10

LICENSE GRANTS

10.1. **Acknowledgment of Option Exercise**. Each Party acknowledges and agrees that, notwithstanding anything to the contrary in the Collaboration Agreement, effective as of the execution of this Agreement, Vertex is deemed to have exercised [***], without any further action on the part of either Party, [***].

10.2. **License Grants to Vertex**.

10.2.1. **Development and Commercialization Licenses**. Subject to the terms and conditions of this Agreement, CRISPR and, following the Subsidiary Transfer, the CRISPR Subsidiary, grants to Vertex UK and its Affiliates a co-exclusive (with CRISPR) license under CRISPR's and its Affiliates' interest in the Licensed CRISPR Technology, with the right to Sublicense through multiple tiers (subject to Section 10.5), to Research, Develop, Manufacture, have Manufactured, use, keep, sell, offer for sale, import, export and Commercialize Shared Products in the Field in the Territory (such license, the "**Exclusive License**"). As of the Effective Date, this Exclusive License supersedes and replaces the license grant set forth in Section 5.3.1 of the Collaboration Agreement solely with respect to the Shared Targets, and shall be deemed to be the "Exclusive License" under the Collaboration Agreement with respect to the Shared Targets.

10.2.2. **Research Licenses**. Subject to the terms and conditions of this Agreement, CRISPR and, following the Subsidiary Transfer, the CRISPR Subsidiary, grants to Vertex UK and its Affiliates a co-exclusive (with CRISPR) license under CRISPR's and its Affiliates' interest in the Licensed CRISPR Technology solely to conduct the activities set forth in the Follow-On Research Plan with respect to Follow-On Products in the Field in the Territory.

10.2.3. **License Conditions; Limitations**. Subject to Section 10.7.2, any rights and obligations hereunder, including the rights granted pursuant to the Exclusive License, are subject to and limited by any applicable [***] of CRISPR to the extent the provisions of such obligations or agreements are specifically disclosed to Vertex in writing: (a) with respect to [***] under a CRISPR In-License Agreement, prior to (i) the Effective Date, in the case of the Initial Shared Product, and (ii) the date of designation of a Follow-On Product as a Shared Product, in the case of any other Shared Product; and (b) with respect to [***] under a [***] for which CRISPR is the contracting Party, on or prior to the date on which such [***] becomes effective.

10.3. **License Grants to CRISPR**.

10.3.1. **Development and Commercialization Licenses**. Subject to the terms and conditions of this Agreement, Vertex grants to CRISPR a co-

exclusive (with Vertex and its Affiliates) license under Vertex's and its Affiliates' interest in the Licensed Vertex Technology, with the right to Sublicense through multiple tiers (subject to Section 10.5), to Research, Develop, Manufacture, have Manufactured, use, keep, sell, offer for sale, import, export and Commercialize Shared Products in the Field in the Territory.

10.3.2. **Research Licenses**. Subject to the terms and conditions of this Agreement, Vertex grants to CRISPR a co-exclusive (with Vertex and its Affiliates) license under Vertex's and its Affiliates' interest in the Licensed Vertex Technology solely to conduct the activities set forth in the Follow-On Research Plan with respect to Follow-On Products in the Field in the Territory.

10.3.3. **License Conditions; Limitations**. Subject to Section 10.7.2, any rights and obligation hereunder are subject to and limited by any applicable [***] of Vertex to the extent the provisions of such obligations or agreements are specifically disclosed to CRISPR in writing: (a) with respect to [***] under a Vertex In-License Agreement, prior to (i) the Effective Date, in the case of the Initial Shared Product, and (ii) the date of designation of a Follow-On Product as a Shared Product, in the case of any other Shared Product; and (b) with respect to [***] under a [***] for which Vertex is the contracting Party, on or prior to the date on which such [***] becomes effective.

10.4. **Licenses to Improvements**.

10.4.1. Subject to the terms and conditions of this Agreement, CRISPR, and, following the Subsidiary Transfer, to the extent necessary, the CRISPR Subsidiary, hereby grants to Vertex UK and its Affiliates a perpetual, irrevocable, non-exclusive, royalty-free, fully paid-up, worldwide, sublicensable license to all improvements or modifications to the Vertex Background Know-How or Vertex Background Patents, whether or not patentable, that arise in the course of performing activities under the Global Development Plan or the Follow-On Research Plan or in the course of Developing, Manufacturing or Commercializing a Product and are Controlled by CRISPR or its Affiliates to make, have made, use, sell, keep, offer for sale and import products other than Shared Products.

10.4.2. Subject to the terms and conditions of this Agreement, Vertex hereby grants to CRISPR a perpetual, irrevocable, non-exclusive, royalty-free, fully paid-up, worldwide, sublicensable license to all improvements or modifications to the CRISPR Platform Technology Patents, CRISPR Background Patents [***], Gene Editing System or CRISPR Background Know-How set forth on Schedule F to the Collaboration Agreement (as may be supplemented by mutual written agreement of the Parties from

time to time), whether or not patentable, that arise in the course of performing activities under the Global Development Plan or the Follow-On Research Plan or in the course of Developing, Manufacturing or Commercializing a Product and are Controlled by Vertex or its Affiliates to make, have made, use, sell, keep, offer for sale and import products other than Shared Products.

10.5. **Sublicensing**. Subject to the rights granted or retained by the Parties under this Agreement, either Party may Sublicense (through multiple tiers) to its Affiliates or Third Parties any and all rights granted to it by the other Party or retained by such Party with respect to the Research, Development, Manufacture and Commercialization of Shared Products, *provided* that neither Party may grant any such Sublicense (other than a Subcontract in accordance with the provisions of ARTICLE 9) in a [***] or [***] without the prior written consent of the other Party; and *provided*, *further*, that if either Party intends to Sublicense any such rights in any country, it will discuss the matter with the other Party and in good faith consider using the other Party to conduct any sublicensed activities. If a Party grants any such Sublicense it will remain responsible for its obligations under this Agreement and will be responsible for the performance of the relevant Sublicensee.

10.6. **No Implied Licenses**. All rights in and to Licensed CRISPR Technology not expressly licensed or assigned to Vertex under this Agreement or the Collaboration Agreement are hereby retained by CRISPR or its Affiliates. All rights in and to any Licensed Vertex Technology not expressly licensed to CRISPR under this Agreement or the Collaboration Agreement, are hereby retained by Vertex or its Affiliates. Except as expressly provided in this Agreement or the Collaboration Agreement, no Party will be deemed by estoppel or implication to have granted the other Party any licenses or other right with respect to any intellectual property.

10.7. **Third Party Agreements**.

10.7.1. **In-License Agreements**. Any financial obligations arising under any CRISPR In-License Agreement or Vertex In-License Agreement as a result of the Development, Manufacture or Commercialization of any Product by either Party, its Affiliates and Sublicensees under this Agreement will be included in [***].

10.7.2. **[***]**. If a Party believes, in its reasonable judgment, that it may be necessary to obtain rights under any [***] in order [***] such Party will promptly notify the other Party and [***]. Unless otherwise agreed by the Parties in writing, (a) if such [***] [***] and (b) [***] [***]. [***] (each, a "**[***]**") [***]. [***], the Parties will [***]. If it is [***] are [***], then the applicable Party shall [***], and the [***] shall be included as [***] under this Agreement. If, within [***] days [***], the

applicable Party has not [***], the other Party shall [***], and the [***] shall be included as [***] under this Agreement. If it is [***], then [***], *provided* that the [***] shall not be [***] and shall not be included as [***] under this Agreement unless otherwise mutually agreed by the Parties in writing. The [***] shall [***], and shall not [***].

10.8. **Trademarks**. The Lead Commercialization Party will own and retain all rights to all filed Trademarks for the Shared Products in their respective jurisdictions, and all goodwill associated with or attached thereto arising out of the use thereof by the Parties, their Affiliates and Sublicensees will inure to the benefit of such Lead Commercialization Party. Each non-Lead Commercialization Party, on behalf of itself and its Affiliates, will assign to the Lead Commercialization Party or its relevant Affiliate all right, title and interest in and to such Shared Product Trademarks and goodwill in the relevant jurisdictions. The non-Lead Commercialization Party will not contest, oppose or challenge the Lead Commercialization Party's ownership of such Shared Product Trademarks in the relevant jurisdictions. The Lead Commercialization Party will own rights to any Internet domain names incorporating any Trademark for the Shared Products, or any variation or part of any such Trademark, as its URL address or any part of such address in the applicable jurisdictions. The Lead Commercialization Party will use Commercially Reasonable Efforts to register, maintain and enforce the Trademarks for the Shared Products in the relevant jurisdictions. Notwithstanding anything to the contrary, if a single Trademark is used throughout the Territory with respect to a Shared Product, the Parties will mutually agree upon the ownership of such Shared Product Trademark in the Territory.

ARTICLE 11

INTELLECTUAL PROPERTY

The terms of the Collaboration Agreement will apply with respect to any and all Know-How and Patents discovered, developed, invented or created in connection with activities under this Agreement.

ARTICLE 12

REPRESENTATIONS AND WARRANTIES

12.1. **Representations and Warranties of Vertex**. Vertex hereby represents and warrants to CRISPR, as of the Effective Date, that:

12.1.1. each of Vertex Parent and Vertex UK is duly organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation or organization and has full corporate power and authority to enter into this Agreement and to carry out the provisions hereof;

12.1.2. each of Vertex Parent and Vertex UK (a) has the requisite power and authority and the legal right to enter into this Agreement and to perform its obligations hereunder and (b) has taken all requisite action on its part to authorize the execution and delivery of this Agreement and the performance of its obligations hereunder;

12.1.3. this Agreement has been duly executed and delivered on behalf of each of Vertex Parent and Vertex UK, and constitutes a legal, valid and binding obligation, enforceable against each of Vertex Parent and Vertex UK in accordance with the terms hereof;

12.1.4. the execution, delivery and performance of this Agreement by each of Vertex Parent and Vertex UK will not constitute a default under or conflict with any agreement, instrument or understanding, oral or written, to which either entity is a party or by which either entity is bound, or violate any law or regulation of any court, governmental body or administrative or other agency having jurisdiction over Vertex Parent or Vertex UK; and

12.1.5. each of Vertex Parent and Vertex UK has obtained all necessary consents, approvals and authorizations of all Governmental Authorities and other Persons or entities required to be obtained by it in connection with the execution and delivery of this Agreement.

12.2. **Representations and Warranties of CRISPR**. Each of the CRISPR Entities, jointly and severally, hereby represents and warrants to Vertex, as of the Effective Date, except as set forth on Schedule G, that:

12.2.1. each of CRISPR AG, CRISPR Inc., CRISPR UK and Tracr is duly organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation or organization and has full corporate power and authority to enter into this Agreement and to carry out the provisions hereof;

12.2.2. each of CRISPR AG, CRISPR Inc., CRISPR UK and Tracr (a) has the requisite power and authority and the legal right to enter into this Agreement and to perform its obligations hereunder and (b) has taken all requisite action on its part to authorize the execution and delivery of this Agreement and the performance of its obligations hereunder;

12.2.3. this Agreement has been duly executed and delivered on behalf of CRISPR, and constitutes a legal, valid and binding obligation, enforceable against it in accordance with the terms hereof;

12.2.4. the execution, delivery and performance of this Agreement by CRISPR will not constitute a default under or conflict with any agreement,

instrument or understanding, oral or written, to which it is a party or by which it is bound, or violate any law or regulation of any court, governmental body or administrative or other agency having jurisdiction over it;

12.2.5. CRISPR has obtained all necessary consents, approvals and authorizations of all Governmental Authorities and other Persons or entities required to be obtained by CRISPR in connection with the execution and delivery of this Agreement;

12.2.6. the Licensed CRISPR Technology constitutes all of the Patents and Know-How Controlled by CRISPR that are necessary to Research, Develop, Manufacture or Commercialize the Shared Products contemplated under this Agreement in the Field in the Territory;

12.2.7. CRISPR is the sole and exclusive owner or exclusive licensee of the CRISPR Platform Technology Patents and CRISPR Background Patents, all of which are free and clear of any liens, charges and encumbrances, and, as of the Effective Date, neither any license granted by CRISPR to any Third Party, nor any license granted by any Third Party to CRISPR, conflicts with the license grants to Vertex hereunder, and CRISPR is entitled to grant all rights and licenses (or sublicenses, as the case may be) under such Patents it purports to grant to Vertex under this Agreement;

12.2.8. **[***]**, the Research, Development, Manufacture, use, sale, offer for sale, supply or importation by **[***]**

12.2.9. there are no judgments or settlements against or owed by **[***]**, pending or threatened claims or litigation, in either case relating to the Licensed CRISPR Technology;

12.2.10. the CRISPR Platform Technology Patents and CRISPR Background Patents are, or, upon issuance, will be, **[***]**, **[***]**, **[***]** and

12.2.11. **[***]**, there are no Manufacturing capacity or Manufacturing process issues that **[***]** on the Manufacture of the Products.

12.3. **CRISPR Covenants**. Each of the CRISPR Entities, jointly and severally, hereby covenants to Vertex that, *except* as expressly permitted under this Agreement:

12.3.1. CRISPR will maintain and not breach any CRISPR In-License Agreements or **[***]** that provide a grant of rights from such Third Party to CRISPR that are Controlled by CRISPR and are licensed or may become subject to a license from CRISPR to Vertex for the Shared Products under this Agreement;

12.3.2. CRISPR will promptly notify Vertex of any material breach by one or more CRISPR Entities or a Third Party of any CRISPR In-License Agreements or [***] that provides a grant of rights from such Third Party to one or more CRISPR Entities and are licensed from CRISPR to Vertex under this Agreement, and in the event of a breach by [***], will [***]. CRISPR will [***] as soon as possible, but in no event later than the date on which [***];

12.3.3. it will not amend, modify or terminate any CRISPR In-License Agreement or [***] in a manner that would have an adverse effect on Vertex's rights hereunder without first obtaining Vertex's written consent, which consent may be withheld in Vertex's sole discretion;

12.3.4. it will not enter into any new agreement or other obligation with any Third Party, or amend an existing agreement with a Third Party, in each case that adversely restricts, limits or encumbers the rights granted to Vertex under this Agreement or the additional rights;

12.3.5. it will not, and will cause its Affiliates not to (a) license, sell, assign or otherwise transfer to any Person any Licensed CRISPR Technology (or agree to do any of the foregoing), *except* as will not adversely restrict, limit or encumber the rights granted to Vertex under this Agreement, or (b) incur or permit to exist, with respect to any Licensed CRISPR Technology, any lien, encumbrance, charge, security interest, mortgage, liability, grant of license to Third Parties or other restriction (including in connection with any indebtedness);

12.3.6. it will use Commercially Reasonable Efforts to obtain and maintain the requisite resources and expertise to perform its obligations hereunder;

12.3.7. all employees and Subcontractors of CRISPR performing Research or Development activities hereunder on behalf of CRISPR will be obligated to assign to CRISPR all right, title and interest in and to any inventions developed by them, whether or not patentable, or, solely with respect to Subcontractors, grant exclusive license rights to CRISPR with a right to grant sublicenses through multiple tiers;

12.3.8. it will not engage, in any capacity in connection with this Agreement, any Person who either has been debarred by the FDA, is the subject of a conviction described in Section 306 of the FD&C Act or is subject to any such similar sanction; and

12.3.9. CRISPR will inform Vertex in writing promptly if it or any Person engaged by CRISPR or any of its Affiliates who is performing services under this Agreement or any ancillary agreements is debarred or is the subject of a conviction described in Section 306 of the FD&C Act, or if

any action, suit, claim, investigation or legal or administrative proceeding is pending or, to CRISPR's Knowledge, is threatened, relating to the debarment or conviction of CRISPR, any of its Affiliates or any such Person performing services hereunder or thereunder.

12.4. **Vertex Covenants**. Vertex hereby covenants to CRISPR that, except as expressly permitted under this Agreement:

12.4.1. it will use Commercially Reasonable Efforts to obtain and maintain the requisite resources and expertise to perform its obligations hereunder;

12.4.2. Vertex will not engage, in any capacity in connection with this Agreement any Person who either has been debarred by the FDA, is the subject of a conviction described in Section 306 of the FD&C Act or is subject to any such similar sanction; and

12.4.3. Vertex will inform CRISPR in writing promptly if it or any Person engaged by Vertex or any of its Affiliates who is performing services under this Agreement or any ancillary agreements is debarred or is the subject of a conviction described in Section 306 of the FD&C Act, or if any action, suit, claim, investigation or legal or administrative proceeding is pending or, to Vertex's knowledge, is threatened, relating to the debarment or conviction of CRISPR, any of its Affiliates or any such Person performing services hereunder or thereunder.

12.5. **Disclaimer**. Except as otherwise expressly set forth in this Agreement, neither Party nor its Affiliates makes any representation or extends any warranty of any kind, either express or implied, including any warranty of merchantability or fitness for a particular purpose. Vertex and CRISPR understand that each Product is the subject of ongoing Research and Development and that neither Party can assure the safety, usefulness or commercial or technical viability of any Product.

12.6. **[***]**. Notwithstanding anything to the contrary in this Agreement, if it is [***] that [***] has [***] (a "**[***]**"), then (a) if [***] shall [***] The Parties acknowledge and agree that notwithstanding anything to the contrary in this Agreement, (i) a [***], and [***] or the [***] and (ii) [***].

ARTICLE 13

INDEMNIFICATION; INSURANCE

13.1. **Indemnification by Vertex**. Vertex will indemnify, defend and hold harmless each CRISPR Indemnified Party from and against any and all Liability that the CRISPR Indemnified Party may be required to pay to one or more Third Parties to the extent resulting from or arising out of:

13.1.1. [***];

13.1.2. [***];

except, in each case, to the extent CRISPR is required to indemnify Vertex pursuant to Section 13.2.

13.2. **Indemnification by CRISPR**. Each CRISPR Entity will jointly and severally indemnify, defend and hold harmless each Vertex Indemnified Party from and against any and all Liabilities that the Vertex Indemnified Party may be required to pay to one or more Third Parties to the extent resulting from or arising out of:

13.2.1. [***];

13.2.2. [***];

except, in each case, to the extent Vertex is required to indemnify CRISPR pursuant to Section 13.1.

13.3. **Procedure**. Each Party will notify the other Party in writing if it becomes aware of a claim for which indemnification may be sought hereunder. In case any proceeding (including any governmental investigation) will be instituted involving any Indemnified Party, such Indemnified Party will give prompt written notice of the indemnity claim to the Indemnifying Party and provide a copy to the Indemnifying Party of any complaint, summons or other written or verbal notice that the Indemnified Party receives in connection with any such claim. An Indemnified Party's failure to deliver written notice will relieve the Indemnifying Party of liability to the Indemnified Party under this ARTICLE 13 only to the extent such delay is prejudicial to the Indemnifying Party's ability to defend such claim. *Provided* that the Indemnifying Party is not contesting the indemnity obligation, the Indemnified Party will permit the Indemnifying Party to control any litigation relating to such claim and the disposition of such claim by negotiated settlement or otherwise and any failure to contest prior to assuming control will be deemed to be an admission of the obligation to indemnify. The Indemnifying Party will act reasonably and in good faith with respect to all matters relating to such claim and will not settle or otherwise resolve such claim without the Indemnified Party's prior written consent, which will not be withheld, delayed or conditioned unreasonably, other than settlements only involving the payment of monetary awards for which the Indemnifying Party will be fully-responsible. The Indemnified Party will cooperate with the Indemnifying Party in such Party's defense of any claim for which indemnity is sought under this Agreement, at the Indemnifying Party's sole cost and expense.

13.4. **Other Third Party Claims**. If a Third Party brings a claim of any nature arising out of [***] other than [***], the [***] will [***]. [***] will [***]. The [***] will [***]. The [***]. If [***].

13.5. **Insurance**.

13.5.1. **Coverage**. From and after the Effective Date, each Party will, at its sole cost and expense, procure and maintain the following policies, each naming the other Party and its Indemnified Parties as additional insureds:

(a) [***] in amounts not less than $[***] annual aggregate;

(b) [***] coverage in amounts not less than $[***];

(c) [***] in amounts not less than $[***] per incident and $[***] annual aggregate, which policy shall include [***], as applicable, and for [***]; and

(d) [***] (also called [***]) in amounts not less than $[***] per claim and annual aggregate, covering [***].

Each such policy will be [***].

13.5.2. **Evidence of Insurance**. Each Party will provide the other Party with evidence of the insurance required under this Section 13.5 upon the other Party's request. Each Party will provide the other Party with notice at least 30 days prior to the cancellation, non-renewal or material change in such insurance. The cancelling or non-renewing Party will obtain replacement insurance providing comparable coverage prior to the expiration of such 30-day period.

13.5.3. **Post-Termination Obligations**. Each Party will maintain the insurance required under this Section 13.5 beyond the expiration or termination of this Agreement for a reasonable period after the period during which either Party or its Affiliates or Sublicensees is Developing or Commercializing any Product, which in no event will be less than five years.

13.5.4. **Affiliates, Sublicensees and Distributors**. Each Party will (i) ensure that all applicable Affiliates of such Party are covered under such Party's insurance policies as described in Section 13.5.1 and (ii) require all of its Sublicensees and Distributors to comply with the provisions and obligations under this Section 13.5 as if such entity were such Party.

13.5.5. **No Limitation**. The minimum amounts of insurance coverage required under this Section 13.5 will not be construed to create a limit of liability with respect to a Party's indemnification obligations under Section 13.1 or 13.2, as applicable, or with respect to such Party's share of any Liabilities under Section 13.4.

13.5.6. **Self-Insurance**. Notwithstanding the foregoing, [***] may self-insure to the extent that it self-insures for its other activities.

13.6. **Limitation of Consequential Damages**. Except for (a) claims of a Third Party that are subject to indemnification under this ARTICLE 13, (b) claims arising out of a Party's willful misconduct, or (c) a Party's breach of ARTICLE 15, neither Party nor any of its Affiliates will be liable to the other Party or its Affiliates for any incidental, consequential, special, punitive or other indirect damages or lost or imputed profits or royalties, lost data or cost of procurement of substitute goods or services, whether liability is asserted in contract, tort (including negligence and strict product liability), indemnity or contribution, and irrespective of whether that Party or any representative of that Party has been advised of, or otherwise might have anticipated the possibility of, any such loss or damage.

ARTICLE 14

TERM; TERMINATION

14.1. **Co-Co Agreement Term; Expiration**. This Agreement is effective as of the Effective Date and, unless earlier terminated pursuant to the other provisions of this ARTICLE 14, will continue in full force and effect until there is no longer any Global Development Plan or Global Commercialization Plan contemplating Development or Commercialization of the Shared Products in the Territory.

14.2. **Termination of the Agreement**.

14.2.1. **Vertex's Termination for Convenience**. Vertex will be entitled to terminate this Agreement for convenience, in its entirety or with respect to one or more Shared Product(s), by providing CRISPR 90 days' written notice of such termination; *provided, however*, that if any termination under this Section 14.2.1 with respect to a Shared Product occurs after such Shared Product has received Marketing Approval, Vertex will provide CRISPR no less than 270 days' written notice of such termination.

14.2.2. **Termination for Material Breach**.

(a) **Vertex's Right to Terminate**. If CRISPR (or any CRISPR Entity(ies)) is in material breach of this Agreement, then Vertex may deliver notice of such material breach to CRISPR. If the breach is curable, CRISPR will have [***] days from the receipt of such notice to cure such breach (*except* to the extent such breach involves the failure to make a payment when due, which breach must be cured within [***] Business Days following receipt of such notice). If either CRISPR fails to cure such breach within such [***]-day or [***]-Business Day period, as

applicable, or the breach is not subject to cure, Vertex in its sole discretion may either (i) terminate this Agreement (A) if such breach relates solely to a particular Shared Product, with respect to the Shared Product affected by such breach or (B) if such breach relates to this Agreement as a whole, in its entirety, by providing written notice to CRISPR or (ii) elect to exercise the alternative remedy provisions set forth in Section 14.5 (in lieu of termination).

(b) **CRISPR's Right to Terminate**. If Vertex is in material breach of this Agreement, then CRISPR may deliver notice of such material breach to Vertex. If the breach is curable, Vertex will have [***] days following receipt of such notice to cure such breach (*except* to the extent such breach involves the failure to make a payment when due, which breach must be cured within [***] Business Days following receipt of such notice). If Vertex fails to cure such breach within the [***]-day or [***]-Business Day period, as applicable, or the breach is not subject to cure, CRISPR in its sole discretion may either (i) terminate this Agreement (A) if such breach relates solely to a particular Shared Product, with respect to the Shared Product affected by such breach or (B) if such breach relates to this Agreement as a whole, in its entirety, by providing written notice to Vertex or (ii) elect to exercise the alternative remedy provisions set forth in Section 14.5 (in lieu of termination).

(c) **Disputes Regarding Material Breach**. Notwithstanding the foregoing, if the Breaching Party in this Section 14.2.2 disputes in good faith the existence, materiality, or failure to cure of any such breach that is not a payment breach, and provides notice to the Non-Breaching Party of such dispute within the relevant cure period, the Non-Breaching Party will not have the right to terminate this Agreement in accordance with this Section 14.2.2, unless and until the relevant dispute has been resolved. It is understood and acknowledged that during the pendency of such dispute, all the terms and conditions of this Agreement will remain in effect and the Parties will continue to perform all of their respective obligations hereunder.

14.2.3. **Termination for Patent Challenge**. If a Party (the "**Challenging Party**") (A) commences or actively and voluntarily participates in any action or proceeding (including any Patent opposition or re-examination proceeding), or otherwise asserts any claim, challenging or denying the validity or enforceability of any claim of any Patent that is licensed to the Challenging Party under this Agreement or (B) actively and voluntarily

assists any other Person in bringing or prosecuting any action or proceeding (including any Patent opposition or re-examination proceeding) challenging or denying the validity or enforceability of any claim of any Patent that is licensed to the Challenging Party under this Agreement by the other Party (the "**Non-Challenging Party**") (each of (A) and (B), a "**Patent Challenge**"), then, to the extent permitted by Applicable Law, the Non-Challenging Party shall have the right, in its sole discretion, to give notice to the Challenging Party that the Non-Challenging Party may terminate the license(s) granted under such Patent to the Challenging Party [***] days following such notice, and, unless the Challenging Party withdraws or causes to be withdrawn all such challenge(s), or in the case of ex-parte proceedings, multi-party proceedings, or other Patent Challenges that the Challenging Party does not have the power to unilaterally withdraw or cause to be withdrawn, the Challenging Party ceases assisting any other party to such Patent Challenge and, to the extent the Challenging Party is a party to such Patent Challenge, it withdraws from such Patent Challenge within such [***]-day period, the Non-Challenging Party shall have the right to deem the Challenging Party to have exercised an Opt-Out with respect to any Shared Product(s) Covered by a Patent that is the subject of such Patent Challenge, by providing written notice thereof to the Challenging Party, in which case the provisions of Section 14.3 shall apply; *provided*, *however*, [***]. The foregoing right of the Non-Challenging Party shall not apply with respect to any Patent Challenge where the Patent Challenge is made in defense of an assertion of the relevant Patent that is first brought by the Non-Challenging Party against the Challenging Party. For the avoidance of doubt, any participation by the Challenging Party or its employees in any claim, challenge or proceeding in response to a subpoena or as required under a pre-existing agreement between the Challenging Party's employee(s) or consultant(s) and their prior employer(s) shall not constitute active and voluntary participation or assistance and shall not give rise to the Non-Challenging Party's right to deem the Challenging Party as having exercised an Opt-Out with respect to any Shared Product hereunder.

14.2.4. **Termination for Insolvency**. If CRISPR (or any CRISPR Entity(ies)) undergoes any Insolvency Event, then Vertex may terminate this Agreement in its entirety effective immediately upon written notice to CRISPR. If an Insolvency Event occurs with respect to CRISPR (or any CRISPR Entity(ies)):

(a) All rights and licenses now or hereafter granted by CRISPR to Vertex under or pursuant to this Agreement, including, for the avoidance of doubt, any Exclusive Licenses, are, for all purposes of Section 365(n) of the U.S. Bankruptcy Code, licenses of rights

to "intellectual property" as defined in the U.S. Bankruptcy Code. Upon the occurrence of any Insolvency Event with respect to CRISPR (or any CRISPR Entity(ies)), CRISPR agrees that Vertex, as licensee of such rights under this Agreement, will retain and may fully exercise all of its rights and elections under the U.S. Bankruptcy Code. CRISPR will, during the Co-Co Agreement Term, create and maintain current copies or, if not amenable to copying, detailed descriptions or other appropriate embodiments, to the extent feasible, of all intellectual property licensed under this Agreement. Each Party acknowledges and agrees that "embodiments" of intellectual property within the meaning of Section 365(n) include laboratory notebooks, cell lines, product samples and inventory, research studies and data, all Regulatory Approvals (and all applications for Regulatory Approval) and rights of reference therein, the Licensed CRISPR Technology and all information related to the Licensed CRISPR Technology. If (x) a case under the U.S. Bankruptcy Code is commenced by or against CRISPR (or any CRISPR Entity(ies)), (y) this Agreement is rejected as provided in the U.S. Bankruptcy Code, and (z) Vertex elects to retain its rights hereunder as provided in Section 365(n) of the U.S. Bankruptcy Code, CRISPR (in any capacity, including debtor-in-possession) and its successors and assigns (including a trustee) will:

(i) provide to Vertex all such intellectual property (including all embodiments thereof) held by CRISPR and such successors and assigns, or otherwise available to them, immediately upon Vertex's written request. Whenever CRISPR or any of its successors or assigns provides to Vertex any of the intellectual property licensed hereunder (or any embodiment thereof) pursuant to this Section 14.2.4(a)(i), Vertex will have the right to perform CRISPR's obligations hereunder with respect to such intellectual property, but neither such provision nor such performance by Vertex will release CRISPR from liability resulting from rejection of the license or the failure to perform such obligations; and

(ii) not interfere with Vertex's rights under this Agreement, or any agreement supplemental hereto, to such intellectual property (including such embodiments), including any right to obtain such intellectual property (or such embodiments) from another entity, to the extent provided in Section 365(n) of the U.S. Bankruptcy Code.

(b) All rights, powers and remedies of Vertex provided herein are in addition to and not in substitution for any and all other rights, powers and remedies now or hereafter existing at law or in equity (including the U.S. Bankruptcy Code) in the event of the commencement of a case under the U.S. Bankruptcy Code with respect to CRISPR. The Parties agree that they intend the following rights to extend to the maximum extent permitted by Applicable Law, and to be enforceable under U.S. Bankruptcy Code Section 365(n):

(i) the right of access to any intellectual property rights (including all embodiments thereof) of CRISPR, or any Third Party with whom CRISPR contracts to perform an obligation of CRISPR under this Agreement, and, in the case of any such Third Party, which is necessary for the Manufacture, use, sale, import or export of Shared Products; and

(ii) the right to contract directly with any Third Party to complete the contracted work.

14.3. **Opt-Out**.

14.3.1. On a Shared Product-by-Shared Product basis, after [***], either Party may opt out of this Agreement with respect to such Shared Product (the "**Opt-Out Product**") upon [***] days' notice to the other Party ("**Opt-Out**"). The other Party shall pay such opting out Party royalties on Net Sales (as defined in the Collaboration Agreement) of such Opt-Out Product ("**Opt-Out Royalties**") in accordance with this Section 14.3, and the terms of Sections 7.5.2, 7.5.3, 7.5.4 and 7.5.5 of the Collaboration Agreement shall apply to such royalties, *mutatis mutandis*. The applicable royalty rates shall be determined in accordance with the table set forth below based on the timing of the Opt-Out notice for the applicable Opt-Out Product. Upon the other Party's receipt of such notice, all rights and obligations under this Agreement with respect to the Opt-Out Product shall terminate, *except for* the obligations set forth in this Section 14.3.

Timing of Opt Out for an Opt-Out Product	Net Sales (in Dollars) for such Opt-Out Product in the Territory	Opt-Out Royalty Rates as a Percentage (%) of Net Sales of such Opt-Out Product
[***]	[***]	[***]
	[***]	[***]
	[***]	[***]
	[***]	[***]
[***]	[***]	[***]
	[***]	[***]
	[***]	[***]
	[***]	[***]

14.3.2. If the opting out Party is CRISPR, the Opt-Out Product shall be deemed a Product (as defined in the Collaboration Agreement) directed to a Collaboration Target other than a [***] under the Collaboration Agreement, and the terms and conditions of the Collaboration Agreement shall apply with respect to the Opt-Out Product, *provided* that, in lieu of the royalty rates payable under Section 7.5.1 of the Collaboration Agreement Vertex shall pay royalties at the rates set forth in this Section 14.3; and *provided*, *further*, that Vertex shall have no obligation to pay to CRISPR any milestone payment under Section 7.3 of the Collaboration Agreement with respect to such Opt-Out Product.

14.3.3. If the opting out Party is Vertex, the Parties shall negotiate in good faith a termination agreement for the Opt-Out Product, including the obligation to pay royalties as set forth in this Section 14.3 and the following provisions:

(a) CRISPR (acting directly or through one or more Affiliates or Sublicensees) will use Commercially Reasonable Efforts to [***] for the [***] in all [***]

(b) CRISPR (acting directly or through one or more Affiliates or Sublicensees) will use Commercially Reasonable Efforts to [***], the [***] in each [***] where [***];

(c) CRISPR will prepare a Development and Commercialization plan setting forth in reasonable detail (which detail shall be at least sufficient for Vertex to evaluate CRISPR's compliance with its obligations under this Agreement) CRISPR's plans for (a) the Development of the Opt-Out Product through [***] and (b) starting upon [***] for the Opt-Out Product and continuing thereafter until the expiration of the applicable Royalty Term, Commercialization of the Opt-Out Product, as appropriate for the

stage of the Opt-Out Product, including a launch plan for each [***]; and

(d) following the first sale of the Opt-Out Product giving rise to Net Sales (as defined in the Collaboration Agreement), within [***] days after the end of each Calendar Quarter, CRISPR will deliver a report to Vertex specifying on a country-by-country basis: [***]. All royalty payments due for each Calendar Quarter will be due and payable within [***] days after CRISPR's delivery of the applicable report.

14.3.4. Following any Opt-Out with respect to an Opt-Out Product, the opting out Party shall, within a reasonable time as mutually agreed by the Parties, (i) transfer to the other Party all Regulatory Filings with respect to such Opt-Out Product, (ii) conduct any technology transfer with respect to such Opt-Out Product as reasonably requested by the non-opting out Party and (iii) use reasonable efforts to transfer to the non-opting out Party any existing relationships with key vendors to the extent relating to such Opt-Out Product. The Expenses of all activities under this Section 14.3.4 shall be shared equally by the Parties.

14.3.5. If the opting out Party is conducting Manufacturing activities with respect to the Opt-Out Product at the time of such Opt-Out, the opting out Party will continue to supply the other Party's requirements of the Opt-Out Product, at the other Party's expense at cost of Manufacturing such Opt-Out Product, until such time as the Parties are able to complete a technology transfer of the applicable Manufacturing technology to the other Party or its designated CMO, and the other Party or such CMO is capable of supplying the other Party's requirements of the Opt-Out Product. The Expenses of technology transfer activities under this Section 14.3.5, including any Expenses incurred in establishing a CMO capable of Manufacturing the Opt-Out Products, shall be shared equally by the Parties.

14.3.6. For the avoidance of doubt, the allocation of [***] and [***] pursuant to Section [***] with respect to an Opt-Out Product shall terminate upon the effectiveness of the Opt-Out for such Opt-Out Product.

14.4. **Consequences of Expiration or Certain Terminations of the Agreement**. If this Agreement expires or is terminated by a Party with respect to one or more Shared Products (each, a "**Terminated Product**") in accordance with Section 14.2 at any time and for any reason, the following terms will apply with respect to each Terminated Product:

14.4.1. The Parties will return (or destroy, as directed by the other Party) all data, files, records and other materials containing or comprising the other

Party's Confidential Information with respect to the Terminated Product, unless such Confidential Information also relates to other products that are subject to the Collaboration Agreement or are necessary for a Party to exercise its rights under Section 14.3. Notwithstanding the foregoing, the Parties will be permitted to retain one copy of such data, files, records, and other materials for archival and legal compliance purposes.

14.4.2. Termination or expiration of this Agreement for any reason will be without prejudice to any rights or financial compensation that will have accrued to the benefit of a Party with respect to the Terminated Product prior to such termination or expiration. Such termination or expiration will not relieve a Party from obligations that are expressly indicated to survive the termination or expiration of this Agreement.

14.4.3. Except as may be necessary for a Party to exercise the rights set forth in Section 14.3, all licenses granted by a Party to the other Party under this Agreement with respect to the Terminated Product will terminate and each Party and its Affiliates will cease all Research, Development, Manufacture and Commercialization activities with respect to the Terminated Product.

14.4.4. Except as may be necessary for a Party to exercise the rights set forth in Section 14.3, Vertex will assign back to the CRISPR Entity designated by CRISPR AG any Patents assigned to Vertex under Section 8.1.3 of the Collaboration Agreement that relate to the Terminated Product to the extent that such Patents do not also relate to other products for which Vertex is retaining an exclusive license under the Collaboration Agreement.

14.4.5. Except as set forth in Section 14.3, neither Party will have any further rights or obligations with respect to the Terminated Product.

14.5. **Alternative Remedies for Material Breach**. If a Party has the right to terminate this Agreement in its entirety or with respect to one or more Shared Products for the other Party's material breach pursuant to Section 14.2.2, the non-breaching Party may elect, in lieu of exercising such right, to keep this Agreement in effect, in which case the provisions of Section 14.3 shall apply, [***]%.

14.6. **Survival**. The following provisions of this Agreement will survive any expiration or termination of this Agreement: ARTICLE 1, ARTICLE 7 (with respect to any amounts owed as of the time of expiration or termination or paid during the Co-Co Agreement Term), Section 10.1, Section 10.4, Section 10.6, ARTICLE 11, Section 12.5, Section 12.6, ARTICLE 13, Section 14.3, Section 14.4, Section 14.6, ARTICLE 15, Section 16.1, Sections 16.3-16.18.

ARTICLE 15

CONFIDENTIALITY

The terms of Article 12 of the Collaboration Agreement will apply with respect to any and all information disclosed by the Disclosing Party to the Receiving Party under this Agreement that meets the definition of Confidential Information under the Collaboration Agreement (including, for clarity, the terms of this Agreement).

ARTICLE 16

MISCELLANEOUS

16.1. **Assignment**. Neither this Agreement nor any interest hereunder will be assignable by either Party without the prior written consent of the other Party, *except* as follows: (a) Vertex, and subject to Section 16.2, CRISPR, may, subject to the terms of this Agreement, assign its rights and obligations under this Agreement by way of sale of itself or the sale of the portion of such Party's business to which this Agreement relates, through merger, sale of assets or sale of stock or ownership interest; *provided* that such sale is not primarily for the benefit of its creditors; and *provided*, *further*, that no CRISPR Entity may assign its rights and obligations hereunder unless all CRISPR Entities are assigning their rights and obligations hereunder to the same Third Party; and (b) either Party may assign its rights and obligations under this Agreement to any of its Affiliates; *provided* that such Party will remain liable for all of its rights and obligations under this Agreement. An assigning Party will promptly notify the other Party of any assignment or transfer under the provisions of this Section 16.1. This Agreement will be binding upon the successors and permitted assigns of the Parties and the name of a Party appearing herein will be deemed to include the names of such Party's successors and permitted assigns to the extent necessary to carry out the intent of this Agreement. Any assignment not in accordance with this Section 16.1 will be void.

16.2. **Change of Control**.

16.2.1. **Effects of Change of Control**.

(a) If during the Co-Co Agreement Term, any CRISPR Entity undergoes a Change of Control to a Competitor, then CRISPR shall [***].

(b) If during the Co-Co Agreement Term, Vertex undergoes a Change of Control to a Competitor, then Vertex shall [***].

16.3. **Force Majeure**. Each Party will be excused from the performance of its obligations under this Agreement to the extent that such performance is prevented

by Force Majeure and the nonperforming Party promptly provides notice of the prevention to the other Party. Such excuse will be continued so long as the condition constituting force majeure continues and the nonperforming Party uses Commercially Reasonable Efforts to remove the condition.

16.4. **Representation by Legal Counsel**. Each Party hereto represents that it has been represented by legal counsel in connection with this Agreement and acknowledges that it has participated in the drafting hereof. In interpreting and applying the terms and provisions of this Agreement, the Parties agree that no presumption will exist or be implied against the Party that drafted such terms and provisions.

16.5. **Notices**. All notices which are required or permitted hereunder will be in writing and sufficient if delivered personally, sent by nationally-recognized overnight courier or sent by electronic mail, confirmation of receipt requested, addressed as follows:

If to Vertex:

Vertex Pharmaceuticals Incorporated
Attn: Business Development
50 Northern Avenue
Boston, Massachusetts 02110
E-mail: phil_tinmouth@vrtx.com

with a copy to:

Vertex Pharmaceuticals Incorporated
Attn: Corporate Legal
50 Northern Avenue
Boston, Massachusetts 02110
E-mail: paige_goodwin@vrtx.com

and:

Ropes & Gray LLP
Attn: Marc A. Rubenstein
Prudential Tower
800 Boylston Street
Boston, Massachusetts 02199-3600
E-mail: marc.rubenstein@ropesgray.com

If to CRISPR:

CRISPR Therapeutics AG
Attn: Chief Executive Officer

Baarerstrasse 14
6300 Zug
Switzerland
Email: samarth.kulkarni@crisprtx.com

with a copy to:

Goodwin Procter LLP
Attn: Christopher Denn
100 Northern Avenue
Boston, Massachusetts 02210
E-mail: cdenn@goodwinlaw.com

or to such other address as the Party to whom notice is to be given may have furnished to the other Party in writing in accordance herewith. Any such notice will be deemed to have been given: (a) when delivered if personally delivered on a Business Day (or if delivered or sent on a non-business day, then on the next Business Day); (b) on receipt if sent by overnight courier; or (c) when confirmation of receipt is sent, if sent by electronic mail. Any notices required or permitted under this Agreement that are delivered by Vertex to CRISPR AG pursuant to this Section 16.5 shall be deemed properly delivered hereunder to each of CRISPR UK, CRISPR AG, CRISPR Inc. and Tracr.

16.6. **Amendment**. No amendment, modification or supplement of any provision of this Agreement will be valid or effective unless made in writing and signed by a duly authorized officer of each of Vertex Parent, Vertex UK and CRISPR AG, CRISPR Inc., CRISPR UK and Tracr.

16.7. **Waiver**. No provision of this Agreement will be waived by any act, omission or knowledge of a Party or its agents or employees except by an instrument in writing expressly waiving such provision and signed by a duly authorized officer of the waiving Party. The waiver by either of Vertex or CRISPR of any breach of any provision hereof by the other Party will not be construed to be a waiver of any succeeding breach of such provision or a waiver of the provision itself. Written waiver of any provision of this Agreement by of any one of the CRISPR Entities in accordance with this Section 16.7 shall be binding upon each of CRISPR UK, CRISPR AG, CRISPR Inc. and Tracr.

16.8. **Severability**. If any clause or portion thereof in this Agreement is for any reason held to be invalid, illegal or unenforceable, the same will not affect any other portion of this Agreement, as it is the intent of the Parties that this Agreement will be construed in such fashion as to maintain its existence, validity and enforceability to the greatest extent possible. In any such event, this Agreement will be construed as if such clause of portion thereof had never been contained in this Agreement, and there will be deemed substituted therefor such provision as will most nearly carry out the intent of the Parties as expressed in this Agreement to the fullest extent permitted by Applicable Law.

16.9. **Descriptive Headings**. The descriptive headings of this Agreement are for convenience only and will be of no force or effect in construing or interpreting any of the provisions of this Agreement.

16.10. **Export Control**. This Agreement is made subject to any restrictions concerning the export of products or technical information from the United States of America or other countries that may be imposed upon or related to CRISPR or Vertex from time to time. Each Party agrees that it will not export, directly or indirectly, any technical information acquired from the other Party under this Agreement or any products using such technical information to a location or in a manner that at the time of export requires an export license or other governmental approval, without first obtaining the written consent to do so from the appropriate Governmental Authority.

16.11. **Governing Law**. This Agreement, and all claims arising under or in connection therewith, will be governed by and interpreted in accordance with the substantive laws of The Commonwealth of Massachusetts, without regard to conflict of law principles thereof.

16.12. **Entire Agreement**. This Agreement, together with the Collaboration Agreement, constitutes and contains the complete, final and exclusive understanding and agreement of the Parties and cancels and supersedes any and all prior negotiations, correspondence, understandings and agreements, whether oral or written, between the Parties respecting the subject matter hereof and thereof.

16.13. **Independent Contractors**. Both Parties are independent contractors under this Agreement. Nothing herein contained will be deemed to create an employment, agency, joint venture or partnership relationship between the Parties hereto or any of their agents or employees, or any other legal arrangement that would impose liability upon one Party for the act or failure to act of the other Party. Neither Party will have any express or implied power to enter into any contracts or commitments or to incur any liabilities in the name of, or on behalf of, the other Party, or to bind the other Party in any respect whatsoever.

16.14. **Interpretation**. *Except* where the context expressly requires otherwise, (a) the use of any gender herein will be deemed to encompass references to either or both genders, and the use of the singular will be deemed to include the plural (and vice versa), (b) the words "include," "includes" and "including" will be deemed to be followed by the phrase "without limitation," (c) the word "will" will be construed to have the same meaning and effect as the word "shall," (d) any definition of or reference to any agreement, instrument or other document herein will be construed as referring to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein), (e) any reference herein to any Person will be construed to include the Person's successors and assigns, (f) the words "herein," "hereof" and "hereunder," and

words of similar import, will be construed to refer to this Agreement in its entirety and not to any particular provision hereof, (g) all references herein to Sections, Schedules or Exhibits will be construed to refer to Sections, Schedules or Exhibits of this Agreement, and references to this Agreement include all Schedules and Exhibits hereto, (h) the word "notice" will mean notice in writing (whether or not specifically stated) and will include notices, consents, approvals and other written communications contemplated under this Agreement, (i) provisions that require that a Party, the Parties or any committee hereunder "agree," "consent" or "approve" or the like will require that such agreement, consent or approval be specific and in writing, whether by written agreement, letter, approved minutes or otherwise (but excluding e-mail and instant messaging), (j) references to any specific law, rule or regulation, or article, section or other division thereof, will be deemed to include the then-current amendments thereto or any replacement or successor law, rule or regulation thereof and (k) the term "or" will be interpreted in the inclusive sense commonly associated with the term "and/or."

16.15. **No Third Party Rights or Obligations**. No provision of this Agreement will be deemed or construed in any way to result in the creation of any rights or obligations in any Person not a Party to this Agreement.

16.16. **Further Actions**. Each Party agrees to execute, acknowledge and deliver such further instruments, and to do all such other acts, as may be necessary or appropriate in order to carry out the purposes and intent of this Agreement.

16.17. **Counterparts**. This Agreement may be executed in two counterparts, each of which will be an original and both of which will constitute together the same document. Counterparts may be signed and delivered by facsimile or digital transmission (.pdf), each of which will be binding when received by the applicable Party.

16.18. **CRISPR Entities**. Notwithstanding anything to the contrary in this Agreement:

16.18.1. CRISPR UK, CRISPR AG, CRISPR Inc. and Tracr shall be jointly and severally liable to Vertex for all obligations of CRISPR under this Agreement;

16.18.2. Breach or violation of any representation, warranty covenant or other obligation of CRISPR under this Agreement may result from, be caused by or arise from the act or omission of any one or more of the CRISPR Entities;

16.18.3. Any particular right or interest of CRISPR under this Agreement shall only be exercisable once by the first CRISPR Entity to exercise such right or interest hereunder on behalf of CRISPR (*i.e.*, Vertex shall not be liable to more than one CRISPR Entity with respect to any particular

right or interest of CRISPR hereunder, including any payment obligations of Vertex hereunder); and

16.18.4. Any consent or approval of CRISPR permitted or required under this Agreement by any one of CRISPR UK, CRISPR AG, CRISPR Inc. or Tracr shall be binding upon all of the CRISPR Entities.

[SIGNATURE PAGE FOLLOWS]

* - * - * - *

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their representatives thereunto duly authorized as of the Effective Date.

VERTEX PHARMACEUTICALS INCORPORATED

By: /s/ Ian Smith
Name: Ian Smith
Title: Executive Vice President, Chief Operating Officer

VERTEX PHARMACEUTICALS (EUROPE) LIMITED

By: /s/ Ian Smith
Name: Ian Smith
Title: Director

CRISPR THERAPEUTICS AG

By: /s/ Rodger Novak
Name: Rodger Novak
Title: President

CRISPR THERAPEUTICS LIMITED

By: /s/ Tyler Dylan-Hyde
Name: Tyler Dylan-Hyde
Title: Director and Chief Legal Officer

CRISPR THERAPEUTICS, INC.

By: /s/ Rodger Novak
Name: Rodger Novak
Title: President

TRACR HEMATOLOGY LTD.

By: /s/ Tyler Dylan-Hyde
Name: Tyler Dylan-Hyde
Title: Director and Chief Legal Officer

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

Schedule A

[***] ARBITRATION

Selection of [***] Expert and Submission of Positions. The Parties will select and agree upon a mutually acceptable independent Third Party expert who is neutral, disinterested and impartial, and has the experience specified in Section 2.8 for the applicable dispute (the "**[***] Expert**"). If the Parties are unable to mutually agree upon a [***] Expert within [***] days following the delivery of the request for [***] Arbitration, then upon request by either Party, the [***] Expert will be an arbitrator appointed by Judicial and Mediation Services ("**JAMS**"), which arbitrator need not have the above-described experience. Once the [***] Expert has been selected, each Party will within [***] days following selection of the [***] Expert provide the [***] Expert and the other Party with a written report setting forth its position with respect to the substance of the dispute and may submit a revised or updated report and position to the [***] Expert within [***] days of receiving the other Party's report. If so requested by the [***] Expert, each Party will make oral submissions to the [***] Expert based on such Party's written report, and each Party will have the right to be present during any such oral submissions.

JAMS Supervision. In the event the [***] Expert is a JAMS arbitrator selected by JAMS as provided in this Schedule A, the matter will be conducted as a binding arbitration in accordance with JAMS procedures, as modified by this Schedule A (including that the arbitrator will adopt as his or her decision the position of one Party or the other, as described below). In such event, the arbitrator may retain a Third Party expert with the same experience specified in Section 2.8 for the [***] Expert to assist in rendering such decision, and the expenses of any such expert will be shared by the Parties as costs of the arbitration as provided in this Schedule A.

Determination by the [***] Expert. The [***] Expert will, no later than [***] days after the last submission of the written reports and, if any, oral submissions, select one of the Party's positions as his or her final decision, and will not have the authority to modify either Party's position or render any substantive decision other than to so select the position of either Party as set forth in their respective written report (as initially submitted, or as revised in accordance with this Schedule A, as applicable). The decision of the [***] Expert will be the sole, exclusive and binding remedy between them regarding the dispute submitted to such [***] Expert.

Location; Costs. Unless otherwise mutually agreed upon by the Parties in writing, the in-person portion (if any) of such proceedings will be conducted in Boston, Massachusetts. [***]

Timetable for Completion in [***] Days. The Parties will use, and will direct the [***] Expert to use, commercially reasonable efforts to resolve a dispute within [***] days after the selection of the [***] Expert, or if resolution within [***] days is not reasonably achievable, as determined by the [***] Expert, then as soon thereafter as is reasonably practicable

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

Schedule B

Reserved

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

Schedule C-1

PROJECT TEAM FUNCTIONS

Functions on Project team
[***]

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

Schedule C-2

INITIAL PROJECT TEAM MEMBERS

[***]

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

Schedule D

INITIAL CLINICAL TRIALS

[***]

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

Schedule E

CRISPR IN-LICENSE AGREEMENTS

[***]

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

Schedule F

VERTEX IN-LICENSE AGREEMENTS

[***]

[***] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would cause competitive harm if publicly disclosed.

Schedule G

CRISPR DISCLOSURE SCHEDULE

[***]

FIRST AMENDMENT TO CREDIT AGREEMENT

This **FIRST AMENDMENT TO CREDIT AGREEMENT**, dated as of December 29, 2020 (this "Amendment"), by and among Vertex Pharmaceuticals Incorporated, a Massachusetts corporation (the "Company"), the other Loan Parties (as defined in the Existing Credit Agreement (as defined below)) party hereto, the Lenders (as defined in the Existing Credit Agreement) party hereto (collectively, the "Consenting Lenders"), and Bank of America, N.A., ("Bank of America") as administrative agent (in such capacity, the "Administrative Agent"). Capitalized terms used but not otherwise defined in this Amendment have the same meanings as specified in the Existing Credit Agreement (as defined below).

RECITALS

WHEREAS, the Company, the other Loan Parties from time to time party thereto, the Lenders from time to time party thereto and the Administrative Agent have entered into that certain Credit Agreement, dated as of September 17, 2019 (as amended, restated, amended and restated, supplemented or otherwise modified from time to time immediately prior to the date hereof, the "Existing Credit Agreement"; the Existing Credit Agreement, as amended by this Amendment and as the same may be further amended, restated, amended and restated, supplemented or otherwise modified from time, is herein referred to as the "Amended Credit Agreement");

WHEREAS, the Company, certain Subsidiaries of the Company from time to time party thereto as co-borrowers and/or guarantors, the lenders from time to time party thereto and Bank of America, as administrative agent and swingline lender have entered into that certain Credit Agreement, dated as of September 18, 2020 (as amended, restated, amended and restated, supplemented or otherwise modified from time to time, the "2020 Credit Agreement");

WHEREAS, the Company, the other Loan Parties, the Administrative Agent and the Consenting Lenders (constituting the Required Lenders) desire to amend the Existing Credit Agreement as set forth herein to conform certain of its terms, provisions and schedules to the correlative terms and provisions of, and schedules to, the 2020 Credit Agreement; and

WHEREAS, the undersigned Loan Parties, the Administrative Agent and the Consenting Lenders are prepared to amend the Existing 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 Existing Credit Agreement and Certain Schedules to Existing Credit Agreement. Subject to the satisfaction (or waiver by the Administrative Agent with the consent of the Required Lenders) of the conditions precedent set forth in Section 2 of this Amendment, the Existing Credit Agreement and certain Schedules to the Existing Credit Agreement shall be amended, effective as of the Effective Date (as defined below), in the manner provided in this Section 1.

(a) Amendments to Existing Credit Agreement. The Existing Credit Agreement is hereby amended to delete the stricken text (indicated textually in the same manner as the following example: ~~**stricken text**~~) and to add the double-underlined text (indicated textually in the same manner as the following example: **double-underlined text**) as set forth in the pages of the Amended Credit Agreement attached as **Annex A** hereto.

(b) Amendments to Schedule 5.18(a) to Existing Credit Agreement. Schedule 5.18(a) to the Existing Credit Agreement is hereby amended and restated in its entirety by replacing such schedule with the new Schedule 5.18(a) attached as **Annex B** hereto.

(c) Amendments to Schedule 5.18(b) to Existing Credit Agreement. Schedule 5.18(b) to the Existing Credit Agreement is hereby amended and restated in its entirety by replacing such schedule with the new Schedule 5.18(b) attached as **Annex C** hereto.

(d) Amendments to Schedule 7.01 to Existing Credit Agreement. Schedule 7.01 to the Existing Credit Agreement is hereby amended and restated in its entirety by replacing such schedule with the new Schedule 7.01 attached as **Annex D** hereto.

(e) Amendments to Schedule 7.02 to Existing Credit Agreement. Schedule 7.02 to the Existing Credit Agreement is hereby amended and restated in its entirety by replacing such schedule with the new Schedule 7.02 attached as **Annex E** hereto.

Section 2. Condition Precedent. This Amendment shall become effective when the following conditions precedent have been satisfied (or waived by the Administrative Agent with the consent of the Required Lenders) (the "Effective Date"):

(a) Documentation. The Administrative Agent (or its counsel) shall have received counterparts of this Amendment (which may include delivery of an executed counterpart of a signature page to this Amendment by fax transmission, e-mail transmission or other electronic transmission in accordance with Section 8 of this Amendment) duly authorized and executed by (i) each Loan Party, (ii) the Administrative Agent and (iii) the Consenting Lenders representing at least the Required Lenders.

(b) No Default or Event of Default. No Default or Event of Default exists or will result after giving effect to this Amendment on the date hereof.

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 Company and each other Loan Party contained in Article V of the Amended Credit Agreement are (a) with respect to representations and warranties that contain a materiality qualification, true and correct in all respects on and as of the date hereof, except to the extent that such representations and warranties specifically refer to an earlier date, in which case they are true and correct as of such earlier date and (b) 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 hereof, the representations and warranties contained in

Sections 5.05(a) and (b) of the Amended Credit Agreement shall be deemed to refer to the most recent statements furnished pursuant to Sections 6.01(a) and (b) of the Amended Credit Agreement, respectively, (b) no Default or Event of Default has occurred and is continuing or will result after giving effect to this Amendment, and (c) the Amended Credit Agreement and each other Loan Document 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, examinership, 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).

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. Effect on Loan Documents. On and after the Effective Date, (a) this Amendment constitutes a "Loan Document" under the Amended Credit Agreement and (b) each reference in the Amended Credit Agreement to "this Agreement", "hereunder", "hereof", "herein" or words of like import referring to the Existing Credit Agreement, and each reference in the other Loan Documents to "Credit Agreement", "thereunder", "thereof" or words of like import referring to the Existing Credit Agreement shall mean and be a reference to the Amended Credit Agreement, and this Amendment and the Amended Credit Agreement shall be read together and construed as a single instrument.

Section 6. Costs and Expenses. The Borrower shall pay all reasonable and documented or invoiced out-of-pocket expenses incurred by the Administrative Agent (including the reasonable and documented or invoiced out-of-pocket fees, charges and disbursements of one primary 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 Amended Credit Agreement.

Section 7. Governing Law. THIS AMENDMENT 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 AMENDMENT 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.

Section 8. Execution. This Amendment 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. Delivery of an executed counterpart of a signature page of this Amendment by fax transmission or e-mail transmission (e.g., "pdf" or "tif") shall be effective as delivery of a manually executed counterpart of this Amendment. The words "delivery," "execute," "execution," "signed," "signature," and words of

like import in this Amendment or any other document executed in connection herewith 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.

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 Existing 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. Reaffirmation by Guarantors. Each of the Guarantors (other than the Company) 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 (a) notwithstanding the effectiveness of this Amendment, such Guarantor's Guaranty shall remain in full force and effect without modification thereto and (b) 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.

[*Remainder of page intentionally blank; signature pages follow*.]

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be executed and delivered as of the date first above written.

COMPANY: **VERTEX PHARMACEUTICALS INCORPORATED**, as a Borrower and a Guarantor

By: /s/ Charles F. Wagner, Jr.

Name: Charles F. Wagner, Jr.
Title: Executive Vice President and Chief Financial Officer

DESIGNATED FOREIGN BORROWERS: **VERTEX PHARMACEUTICALS (EUROPE) LIMITED**, as a Borrower

By: /s/ Klas Holmlund

Name: Klas Holmlund
Title: Director

VERTEX PHARMACEUTICALS (IRELAND) LIMITED, as a Borrower

By: /s/ Klas Holmlund

Name: Klas Holmlund
Title: Director

SUBSIDIARY GUARANTORS: **VERTEX PHARMACEUTICALS (SAN DIEGO) LLC**, as a Subsidiary Guarantor

By: /s/ Charles F. Wagner, Jr.

Name: Charles F. Wagner, Jr.
Title: Treasurer

VERTEX HOLDINGS, INC., as a Subsidiary Guarantor

By: /s/ Charles F. Wagner, Jr.

Name: Charles F. Wagner, Jr.
Title: Treasurer

VERTEX PHARMACEUTICALS (DISTRIBUTION) INCORPORATED, as a Subsidiary Guarantor

By: /s/ Charles F. Wagner, Jr.

Name: Charles F. Wagner, Jr.
Title: Treasurer

VERTEX PHARMACEUTICALS (PUERTO RICO) LLC, as a Subsidiary Guarantor

By: /s/ Charles F. Wagner, Jr.
Name: Charles F. Wagner, Jr.
Title: Treasurer

GUARANTORS: **VERTEX PHARMACEUTICALS (EUROPE) LIMITED**, as a Guarantor

By: /s/ Klas Holmlund

Name: Klas Holmlund
Title: Director

VERTEX PHARMACEUTICALS (IRELAND) LIMITED, as a Guarantor

By: /s/ Klas Holmlund

Name: Klas Holmlund
Title: Director

BANK OF AMERICA, N.A., as Administrative Agent

By: /s/ Linda Alto

Name: Linda Alto
Title: Senior 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

CITIBANK, N.A., as a Lender

By: /s/ Eugene Yermash

Name: Eugene Yermash
Title: Vice President

JPMORGAN CHASE BANK, N.A., as a Lender

By: /s/ Stacey Zoland

Name: Stacey Zoland
Title: Executive Director

TRUIST BANK (successor by merger to SunTrust Bank), as a Lender

By: /s/ Ben Cumming
Name: Ben Cumming
Title: Managing Director

WELLS FARGO BANK, NATIONAL ASSOCIATION, as a Lender

By: /s/ Kirk Tesch
Name: Kirk Tesch
Title: Wells Fargo

BARCLAYS BANK PLC, as a Lender

By: /s/ Arvind Admal
Name: Arvind Admal
Title: Vice President

CITIZENS BANK, N.A., as a Lender

By: /s/ Kristen Morse
Name: Kristen Morse
Title: Managing Director

HSBC BANK USA, NATIONAL ASSOCIATION, as a Lender

By: /s/ Kyle Patterson

Name: Kyle Patterson
Title: Senior Vice President

KEYBANK NATIONAL ASSOCIATION, as a Lender

By: /s/ Tanille Ingle
Name: Tanille Ingle
Title: Assistant Vice President

MUFG BANK, LTD., as a Lender

By: /s/ Jack Lonker
Name: Jack Lonker
Title: Director

PNC BANK, NATIONAL ASSOCIATION, as a Lender

By: /s/ Robert Novak
Name: Robert Novak
Title: Vice President

SANTANDER BANK, N.A., as a Lender

By: /s/ Donna Cleary
Name: Donna Cleary
Title: Senior Director

SUMITOMO MITSUI BANKING CORPORATION, as a Lender

By: /s/ Michael Maguire
Name: Michael Maguire
Title: Managing Director

U.S. BANK NATIONAL ASSOCIATION, as a Lender

By: /s/ Maria Massimino
Name: Maria Massimino
Title: Senior Vice President

Annex A

Amended Credit Agreement

[See attached.]

Published CUSIP Numbers: 92534MAH6 (Deal)

92534MAJ2 (Revolver)

CREDIT AGREEMENT

Dated as of September 17, 2019

among

VERTEX PHARMACEUTICALS INCORPORATED,

as the Company and a Borrower,
THE SUBSIDIARIES OF THE COMPANY PARTY HERETO

as Designated Foreign Borrowers or Subsidiary Guarantors,
BANK OF AMERICA, N.A.,

as Administrative Agent, Swingline Lender and an L/C Issuer,
and

THE LENDERS PARTY HERETO

BofA SECURITIES, INC.,
CITIBANK, N.A.,
JPMORGAN CHASE BANK, N.A.,
SUNTRUST ROBINSON HUMPHREY, INC., and
WELLS FARGO SECURITIES, LLC,

as Joint Lead Arrangers and Joint Bookrunners,
CITIBANK, N.A.,
JPMORGAN CHASE BANK, N.A.,
SUNTRUST BANK, and
WELLS FARGO BANK, NATIONAL ASSOCIATION,

as Co-Syndication Agents,
and

BARCLAYS BANK PLC,
CITIZENS BANK, N.A.,
HSBC BANK USA, NATIONAL ASSOCIATION,
KEYBANK NATIONAL ASSOCIATION, and
MUFG BANK, LTD.,

as Co-Documentation Agents

The Borrowers hereby acknowledge that, under the Credit Reporting Act 2013 (Ireland), lenders are required to provide personal and credit information for credit applications and credit agreements of €500 and above to the Central Credit Register. This information will be held on the Central Credit Register and may be used by other lenders when making decisions on your credit applications and credit agreements.

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Exhibit L Form of Letter of Credit Report
Exhibit M Form of Notice of Additional L/C Issuer
Exhibit N Form of Designated Foreign Borrower Request and Assumption Agreement
Exhibit O Form of Designated Foreign Borrower Notice

CREDIT AGREEMENT

This **CREDIT AGREEMENT** is entered into as of September 17, 2019, among **VERTEX PHARMACEUTICALS INCORPORATED**, a Massachusetts corporation (the "Company"), **VERTEX PHARMACEUTICALS (EUROPE) LIMITED**, a private limited company incorporated in England and Wales with registered number 02907620 ("Vertex Europe"), **VERTEX PHARMACEUTICALS (IRELAND) LIMITED**, a private company limited by shares incorporated in Ireland with registered number 502558 ("Vertex Ireland"), any other Foreign Subsidiaries of the Company party hereto pursuant to Section 2.16 (together with Vertex Europe and Vertex Ireland, collectively, the "Designated Foreign Borrowers", and each, a "Designated Foreign Borrower", and the Designated Foreign Borrowers together with the Company, collectively, the "Borrowers", and each, a "Borrower"), the Subsidiaries of the Company 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 Borrowers have requested that the Lenders, the Swingline Lender and the L/C Issuers make loans and other financial accommodations to the Borrowers 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:

"2020 Credit Agreement" means that certain Credit Agreement, dated as of September 18, 2020, among the Company, certain Subsidiaries of the Company from time to time party thereto as co-borrower and/or guarantors, the lenders from time to time party thereto and Bank of America as administrative agent and swingline lender thereunder.

"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.

"Additional Commitment Lender" has the meaning specified in Section 2.19(c).

"Additional Obligations" means (a) all obligations arising under Guaranteed Cash Management Agreements and Guaranteed 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) Additional Obligations shall be guaranteed pursuant to the Guaranty only until such time as the Guaranty terminates pursuant to Section 10.06 and (y) any release of Guarantors and/or Designated Foreign Borrowers effected in a manner not prohibited by this Agreement and the other Loan Documents shall not require the consent of holders of obligations under any Guaranteed Cash Management Agreements or any Guaranteed Hedge Agreements; provided, further, that Additional 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).

"Adjustment" has the meaning specified in Section 3.03(c).

"Administrative Agent" means Bank of America (as defined below) (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, with respect to any currency, the Administrative Agent's address and, as appropriate, account as set forth on Schedule 1.01(a) with respect to such currency, or such other address or account with respect to such currency as the Administrative Agent may from time to time notify the Company 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.

"Affected Financial Institution" means (a) any EEA Financial Institution or (b) any UK Financial Institution.

"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.

"Agent Parties" has the meaning specified in Section 11.02(c).

"Aggregate Revolving Commitments" means the Revolving Commitments of all the Lenders.

"Agreement" means this Credit Agreement, including all schedules, exhibits and annexes hereto ~~as amended, restated, amended and restated, supplemented or otherwise modified from time to time in accordance with the terms hereof~~.

"Agreement Currency" has the meaning specified in Section 11.23.

"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.

"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.

"Alternative Currency Sublimit" means an amount equal to the lesser of (a) $100,000,000 and (b) the Aggregate Revolving Commitments. The Alternative Currency Sublimit is part of, and not in addition to, the Aggregate Revolving Commitments.

"Applicable Designated Foreign Borrower Documents" has the meaning specified in Section 5.23(a).

"Applicable Percentage" means, with respect to any Revolving Lender at any time, the percentage (carried out to the ninth decimal place) of the Revolving Facility represented by such Revolving Lender's Revolving Commitment or, as the context may require, Revolving Commitment of any applicable Class at such time, subject (in each case) to adjustment as provided in Section 2.15. If the Revolving Commitments 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 any Class 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 (including, with respect to any such Class), 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 2.18 or 2.19) 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 2.18 or 2.19.

"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 Eurocurrency Rate Loans shall be the percentage set forth under the column "Eurocurrency Rate Loans & Letter of Credit Fee", (c) the Letter of Credit Fee shall be the percentage set forth under the column "Eurocurrency Rate Loans & Letter of Credit Fee", and (d) the Commitment Fee shall be the percentage set forth under the column "Commitment Fee":

Level	Consolidated Leverage Ratio	Eurocurrency Rate Loans & Letter of Credit Fee	Base Rate Loans	Commitment Fee
I	< 1.00 to 1.00	1.125%	0.125%	0.125%
II	≥ 1.00 to 1.00 but < 2.00 to 1.00	1.250%	0.250%	0.150%
III	≥ 2.00 to 1.00 but < 3.00 to 1.00	1.375%	0.375%	0.175%
IV	≥ 3.00 to 1.00	1.500%	0.500%	0.200%

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 IV 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), (y) the initial Applicable Rate shall be set forth in Level I 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, 2019, and (z) the Applicable Rate with respect to Credit Extensions under Extended Revolving Commitments of any Revolving Extension Series shall be as set forth in the Revolving Extension Amendment relating thereto. 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 (or, as the context may require, the Applicable Percentage in respect of the Revolving Facility reflecting a specified Class of Revolving Commitments) 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.

"Applicant Foreign Borrower" has the meaning specified in Section 2.16(b).

"Appropriate Lender" means, at any time, (a) with respect to the Revolving Facility, a Lender that has a Revolving Commitment or holds Revolving Loans thereunder (or as applicable and as the context shall require, a Lender that has a Class of Revolving Commitments or holds a specified Class of Revolving Loans) 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) BofA Securities, Inc., (b) Citibank, N.A., (c) JPMorgan Chase Bank, N.A., (d) Suntrust Robinson Humphrey, Inc., and (e) Wells Fargo Securities, LLC, in their respective capacities as joint lead arrangers and joint bookrunners.

~~"Article 55 BRRD" means Article 55 of Directive 2014/59/EU establishing a framework for the recovery and resolution of credit institutions and investments firms.~~

"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 Company and its Restricted Subsidiaries for the fiscal year ended December 31, 2018, and the

related Consolidated statements of income or operations, shareholders' equity and cash flows for such fiscal year of the Company and its Restricted Subsidiaries, including the notes thereto.

"Australian Dollar" means the lawful currency of Australia.

"Auto-Extension Letter of Credit" has the meaning specified in Section 2.03(b)(iv).

"Availability Period" means, in respect of any Class of Revolving Commitments, the period from and including the Closing Date (or, if later, the effective date for such Class of Revolving Commitments) to the earliest of (a) the Maturity Date for such Class, (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~~Affected Financial Institution.

"Bail-In Legislation" means, (a) with respect to any EEA Member Country implementing Article 55 ~~BRRD~~of Directive 2014/59/EU of the European Parliament and of the Council of the European Union, the implementing law, regulation, rule or requirement for such EEA Member Country from time to time which is described in the EU Bail-In Legislation Schedule and (b) ~~in relation to any state other than such an EEA Member Country or (to the extent that~~with respect to the United Kingdom, Part I of the United Kingdom ~~is not such an EEA Member Country)~~Banking Act 2009 and any other law, regulation or rule applicable in the United Kingdom~~, any analogous law or regulation from time to time which requires contractual recognition of any Write-Down and Conversion Powers contained in that law or regulation.~~ relating to the resolution of unsound or failing banks, investment firms or other financial institutions or their affiliates (other than through liquidation, administration or other insolvency proceedings).

"Bank of America" means Bank of America, N.A. and its successors.

"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.

"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 Eurocurrency 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. All Base Rate Loans are available only to the Company and shall be denominated in Dollars.

"Beneficial Ownership Certification" has the meaning specified in Section 4.01(i).

"Beneficial Ownership Regulation" has the meaning specified in Section 4.01(i).

"BHC Act Affiliate" of a party means an "affiliate" (as such term is defined under, and interpreted in accordance with, 12 U.S.C. 1841(k)) of such party.

"Borrower" and "Borrowers" have the meanings 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 with respect to Obligations denominated in Dollars is located and:

(a) if such day relates to any interest rate settings as to a Eurocurrency Rate Loan denominated in Dollars, any issuance, fundings, disbursements, settlements and payments in Dollars in respect of any Eurocurrency Rate Loan or Letter of Credit denominated in Dollars, 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 interest rate settings as to a Eurocurrency Rate Loan denominated in Euro, any issuance, fundings, disbursements, settlements and payments in Euro in respect of any Eurocurrency Rate Loan or 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 interest rate settings as to a Eurocurrency Rate Loan 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 Eurocurrency Rate Loan or 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 (other than any interest rate settings), 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, subject to Section 1.03(c).

"Capped Call Transactions" means one or more call options referencing the Company's Equity Interests purchased by the Company 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 Company upon exercise thereof based on a cap or upper strike price (howsoever defined).

"Captive Insurance Subsidiary" means any Subsidiary of the Company that is subject to regulation as an insurance company (or any Subsidiary thereof) under, and in accordance with, applicable Law.

"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" and "Cash Collateralization" 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 Company 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 Company 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;

(f) solely with respect to any Restricted Subsidiary that is a Foreign Subsidiary, (x) such local currencies in those countries in which such Foreign Subsidiary transacts business from time to time in the ordinary course of business and (y) Investments of comparable tenor and credit quality to those described in the foregoing clauses (a) through (e) customarily utilized in countries in which such Foreign Subsidiary operates for short term cash management purposes; and

(g) other Investments held by the Company and its Restricted Subsidiaries in accordance with the Company'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 "Guaranteed 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 Guaranteed Party Designation Notice to the Administrative Agent prior to such date of determination.

"CF Asset Subsidiary" means each Restricted Subsidiary of the Company 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 Company 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~~First Amendment Effective Date, Vertex Europe~~,~~ and Vertex Ireland ~~and Vertex Pharmaceuticals (Cayman II) Limited, a Cayman Islands company~~ are the only CF Asset Subsidiaries.

"CFC" means a Person that is a controlled foreign corporation within the meaning of Section 957 of the Code.

"CFF" means Cystic Fibrosis Foundation (as successor in interest to Cystic Fibrosis Foundation Therapeutics Incorporated).

"CFF Amendment" means that certain Amendment #7 to the CFF R&D Agreement, dated as of October 13, 2016, by and among the Company and CFF, and any agreements ancillary thereto.

"CFF R&D Agreement" means that certain Research, Development and Commercialization Agreement, dated as of May 24, 2004 between the Company and CFF, as amended.

"CFF Royalty Payments" means royalty payments paid pursuant to the CFF R&D Agreement (as amended by the CFF Amendment) by the Company to CFF, if any, on net sales of compounds.

"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 or CRD IV, 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 Company entitled to vote for members of the board of directors or equivalent governing body of the Company 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 Company 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.

"Class" means (a) when used in respect of any Loan or Borrowing, whether such Loan or the Loans comprising such Borrowing are Revolving Loans (other than under Extended Revolving Commitments), Revolving Loans under Extended Revolving Commitments of a given Revolving Extension Series, or Swingline Loans, and (b) when used in respect of any Revolving Commitment, whether such Revolving Commitment is a Revolving Commitment (other than an Extended Revolving Commitment) or an Extended Revolving Commitment of a given Revolving Extension Series. Revolving Extension Series that have different terms and conditions (together with the Revolving Commitments in respect thereof) from any Existing Revolving Tranche, or from other Revolving Extension Series, as applicable, shall be construed to be in separate and distinct Classes.

"Closing Date" means ~~the date hereof~~September 17, 2019.

"Code" means the Internal Revenue Code of 1986.

"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.

"Communication" has the meaning specified in Section 11.18(a).

"Company" has the meaning specified in the introductory paragraph hereto.

"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 Company 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 Measurement Period, the sum of the following determined on a Consolidated basis, without duplication, for the Company and its Restricted Subsidiaries in accordance with GAAP:

(a) Consolidated Net Income for such Measurement Period, plus

(b) each of the following to the extent deducted (or, in the case of clause (xiv)(A) below, not otherwise included) 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 expenses related to stock-based compensation, benefits or incentives (net of any cash payments related to stock-based compensation, benefits or incentives),

(v) non-cash charges, expenses and losses (including any non-cash charges attributable to impairment of goodwill or other intangible assets or impairment of long-lived assets but 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) (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 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, divestiture or merger, consolidation, amalgamation or other business combination, in each case, not prohibited under this Agreement, 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) in calculating Consolidated EBITDA for any Measurement Period shall not exceed 12.5% of Consolidated EBITDA for such Measurement Period (determined prior to giving effect to such adjustments),

(ix) any earnouts, milestone payments, royalty payments, working capital adjustments and other contingent payment obligations incurred under any Acquisition or other Investment,

(x) net after-tax losses (including all fees and expenses or charges relating thereto) on any sale or disposition of any asset of the Company or any of its Restricted Subsidiaries outside of the ordinary course of business and net after-tax losses from discontinued operations,

(xi) net after-tax losses (including all fees and expenses or charges relating thereto) on the retirement or extinguishment of Indebtedness,

(xii) the effects of adjustments pursuant to GAAP resulting from purchase accounting in relation to Investments not prohibited by this Agreement, or the amortization or write-off of any amounts thereof, net of taxes, in each case, which do not represent a cash item in such period or any future period,

(xiii) to the extent classified as such under Accounting Standards Update No. 2016-01 ("ASU 2016-01"), any net unrealized, non-cash losses associated with the Company's strategic investments in the ordinary course of business, and

(xiv) (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 Company 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 or added back, as the case may be, pursuant to this clause (~~x~~xiv) shall not exceed $50,000,000 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 Measurement 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), (ii) amounts received in respect of upfront, earnout or milestone payments or other similar contingent amounts in connection with any Disposition, (iii) net after-tax gains (less any fees and expenses or charges relating thereto) on any sale or disposition of any asset of the Company or any of its Restricted Subsidiaries outside of the ordinary course of business and net after-tax gains from discontinued operations, (iv) net after-tax gains (less any fees and expenses or charges relating thereto) on the retirement or extinguishment of Indebtedness and (v) to the extent classified as such under ASU 2016-01, any net unrealized, non-cash gains associated with the Company's strategic investments in the ordinary course of business.

Notwithstanding the foregoing to the contrary, in determining Consolidated EBITDA for any Measurement Period, (I) the net impact of (w) variable interest entities that the Company 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 (including upfront, earnout or milestone payments) and (y) 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) – (y), be excluded, (II) interest, depreciation and amortization related to the Specified Leased Properties shall be treated as operating expenses, and (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, (x) CFF Royalty Payments shall be characterized as a royalty expense and (y) Quarterly Reimbursement Payments shall be characterized as a reduction to research and development expense.

"Consolidated Funded Indebtedness" means, as of any date of determination, for the Company 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 Company 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 ninety-one (91) days after the Latest Maturity Date in effect at the time of incurrence thereof); (e) all Attributable Indebtedness; (f) all mandatory obligations to purchase, redeem, retire, defease or otherwise make any payment prior to the Latest Maturity Date in effect at the time of issuance thereof 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 Company 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 Company or a Restricted Subsidiary is a general partner or joint venturer, unless such Indebtedness is expressly made non-recourse to the Company or such Restricted Subsidiary; provided that "Consolidated Funded Indebtedness" shall not include any intercompany Indebtedness among the Company and/or its Restricted Subsidiaries. To the extent Specified CFF Payments qualify as Consolidated Funded Indebtedness, such Specified CFF Payments shall ~~nonetheless be excluded from~~only constitute Consolidated Funded Indebtedness to the extent that such Specified CFF Payments are ~~not~~ settled in cash.

"Consolidated Interest Charges" means, for any Measurement Period, an amount equal to the following, in each case, of or by the Company and its Restricted Subsidiaries on a Consolidated basis for such Measurement Period: (a) the sum of (i) 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 (ii) the portion of rent expense under Capitalized Leases that is treated as interest in accordance with GAAP, minus (b) to the extent included in clause (a)(i) above, (i) non-cash amounts attributable to amortization of financing costs paid in a previous period, (ii) non-cash amounts attributable to amortization of debt discounts or accrued interest payable in kind for such period, (iii) any break funding payment made pursuant to Section 3.05, and (iv) any imputed interest expense (including any interest, yield, rent or break funding payment (or similar obligations) paid or payable) in respect of any operating lease, including in respect of any leases of the Specified Leased Properties.

"Consolidated Interest Coverage Ratio" means, as of any date of determination, the ratio of (a) Consolidated EBITDA for the most recently completed Measurement Period to (b) Consolidated Interest Charges 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 Company 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 Company'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 Company'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 Company 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 Company as described in clause (b) of this proviso).

"Consolidated Net Worth" means, at any date of determination, the consolidated stockholders' equity of the Company and its Restricted Subsidiaries on a Consolidated basis at such date.

"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 Company's Equity Interests purchased by the Company 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 Company (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 Company).

"Copyright License" means any agreement now or hereafter in existence, providing for the grant to any Person of any rights (including, without limitation, the grant of rights for a party to be designated as an author or owner and/or to enforce, defend, use, display, copy,

manufacture, distribute, exploit and sell, make derivative works, and require joinder in suit and/or receive assistance from another party) in a Copyright.

"Copyrights" means, collectively, all of the following of any Person: (i) all copyrights, works protectable by copyright, copyright registrations and copyright applications anywhere in the world, (ii) all derivative works, counterparts, extensions and renewals of any of the foregoing, (iii) all income, royalties, damages and payments now or hereafter due and/or payable under any of the foregoing or with respect to any of the foregoing, including, without limitation, damages or payments for past, present and future infringements, violations or misappropriations of any of the foregoing, (iv) the right to sue for past, present and future infringements, violations or misappropriations of any of the foregoing and (v) all rights corresponding to any of the foregoing throughout the world.

"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 Company 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 Company 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 Company 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 Company shall be valued in accordance with GAAP.

~~"CRD IV" means (a) Regulation (EU) No. 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and (b) Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms.~~

"Covered Entity" means any of the following: (a) a "covered entity" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 252.82(b), (b) a "covered bank" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 47.3(b) or (c) a "covered FSI" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 382.2(b).

"Covered Party" has the meaning specified in Section 11.21.

"CRD IV" means (a) Regulation (EU) No. 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and (b) Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms.

"Credit Extension" means each of the following: (a) a Borrowing and (b) an L/C Credit Extension.

"Credit 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.

"Cystic Fibrosis Drug Franchise Assets" means (a) all approved products manufactured, sold and/or distributed by the Company or any of its Subsidiaries in any country related to the treatment of patients with cystic fibrosis, including, ivacaftor (tradename KALYDECO), lumacaftor in combination with ivacaftor (tradename ORKAMBI) ~~and~~, tezacaftor in combination with ivacaftor (tradenames SYMDEKO (US) and SYMKEVI (EU)), elexacaftor in combination with tezacaftor and ivacaftor (tradenames TRIKAFTA(US) and KAFTRIO (EU)) and any drug candidates related to the treatment of cystic fibrosis for which the Company has submitted an application for regulatory approval in any country, including the triple-combination of elexacaftor in combination with ivacaftor and tezacaftor and (b) all proceeds, Intellectual Property, permits and other assets of the Company 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, examinership, 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.

"Default Right" has the meaning assigned to that term in, and shall be interpreted in accordance with, 12 C.F.R. §§ 252.81, 47.2 or 382.1, as applicable.

"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 Company 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 Company, 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 Company, to confirm in writing to the Administrative Agent and the Company 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 Company), 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 Company, the L/C Issuers, the Swingline Lender and each other Lender promptly following such determination.

"Designated Foreign Borrower" and "Designated Foreign Borrowers" have the meanings specified in the introductory paragraph hereto.

"Designated Foreign Borrower Notice" means the notice substantially in the form of Exhibit O attached hereto.

"Designated Foreign Borrower Request and Assumption Agreement" means the notice substantially in the form of Exhibit N attached hereto.

"Designated Foreign Borrower Requirements" has the meaning specified in Section 2.16(b).

"Designated Jurisdiction" means any country, region or territory to the extent that such country, region or territory is the subject or target of comprehensive Sanctions.

"Designated Lender" has the meaning specified in Section 2.17.

"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 Company or any of its Subsidiaries which have been designated by the Company 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 Company 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 Company 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" means, 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 Latest Maturity Date in effect at the time of issuance thereof; provided, that Equity Interests issued pursuant to a plan for the benefit of employees of Company 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 Company 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 imposed in the country in which such currency is issued, results in, in the reasonable opinion of the Administrative Agent (in the case of any Loans to be denominated in an Alternative Currency) or the applicable L/C Issuer (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 no longer being practicable for the Lenders in their reasonable business judgment or (d) such currency no longer being a currency in which the Required Lenders or the applicable L/C Issuer, as applicable, are or is willing to make such Credit Extensions in their or its reasonable business judgment (each of the foregoing clauses, a "Disqualifying Event"), then the Administrative Agent shall promptly notify the Lenders and the Company, and such country's currency shall no longer be an Alternative Currency until such time as the Disqualifying Event(s) no longer exist. Within five (5) Business Days after receipt of such notice from the Administrative Agent, the Borrowers shall repay all Loans in such currency to which the

Disqualifying Event applies or convert such Loans into the Dollar Equivalent of Loans in Dollars, subject to the other terms contained herein.

"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 Company, 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 Company 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 Company or any ERISA Affiliate from a Multiple Employer 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 Company or any ERISA Affiliate from a Multiemployer Plan or notification that a Multiemployer Plan is insolvent; (d) the filing of a notice of intent to terminate a Pension Plan or 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 or Multiemployer 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 Company or any ERISA Affiliate or (i) a failure by the Company 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 Company 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.

"Eurocurrency Rate" means:

(a) for any Interest Period, with respect to any Credit Extension:

(i) denominated in a LIBOR Quoted Currency, the rate per annum equal to the London Interbank Offered Rate as administered by ICE Benchmark Administration (or any other Person that takes over the administration of such rate) ("LIBOR"), 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) on the Rate Determination Date, for deposits in the relevant currency, with a term equivalent to such Interest Period;

(ii) denominated in Canadian Dollars, the rate per annum equal to the Canadian Dollar Offered Rate ~~("CDOR")~~, 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 "CDOR Rate")~~ at or

about 10:00 a.m. (Toronto, Ontario time) on the Rate Determination Date with a term equivalent to such Interest Period;

(iii) denominated in Australian Dollars, the rate per annum equal to the Bank Bill Swap Reference Bid Rate ~~("BBSY")~~, 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) at or about 10:30 a.m. (Melbourne, Australia time) on the Rate Determination Date with a term equivalent to such Interest Period; and

(b) for any interest rate 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) determined two (2) Business Days prior to such date for Dollar deposits being delivered in the London interbank market for deposits in Dollars 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 with any rate set forth in this definition, 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 Eurocurrency Rate shall be less than zero, such rate shall be deemed zero for purposes of this Agreement.

"Eurocurrency Rate Loan" means a Loan that bears interest at a rate based on clause (a) of the definition of "Eurocurrency Rate". Eurocurrency Rate Loans may be denominated in Dollars or in an Alternative Currency. All Loans denominated in an Alternative Currency or made to a Designated Foreign Borrower must be Eurocurrency Rate Loans.

"Event of Default" has the meaning specified in Section 8.01.

"Excluded Subsidiary" means (a) each Foreign Subsidiary, (b) each CFC, (c) each Subsidiary, substantially all of the assets of which are Equity Interests or Indebtedness of one or more Foreign Subsidiaries, (d) each Immaterial Subsidiary, (e) each Subsidiary that is not a Wholly Owned Subsidiary (for so long as such Subsidiary remains a non-Wholly Owned Subsidiary), (f) each Subsidiary that is prohibited from Guaranteeing 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, (or, with respect to any Subsidiary acquired by the Company 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 or any Person (other

than an Affiliate) to Guarantee 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), (g) each Unrestricted Subsidiary, (h) each Massachusetts Security Corporation, (i) each not for profit Subsidiary, (j) each Captive Insurance Subsidiary, and (k) any other Subsidiary with respect to which, in the reasonable judgment of the Administrative Agent and the Company reasonably agree that 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. Notwithstanding anything to the contrary contained herein, no Subsidiary of the Company shall be an Excluded Subsidiary so long as it guarantees the obligations or is a co-obligor under the 2020 Credit Agreement, other than an Excluded Subsidiary that is excluded by reason of clause (a), (b) or (c) of the definition of Excluded Subsidiary.

"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 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 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 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 Company 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), (d) any U.S. federal withholding Taxes imposed pursuant to FATCA, (e) any Irish withholding Tax which arises solely because (i) the Lender is not (or has ceased to be) an Irish Qualifying Lender other than as a result of any change after the date it became a Lender

under this Agreement in (or in the interpretation, administration or application of) any Irish Tax Treaty, or any published practice ~~or published concession of any relevant authority~~of the Revenue Commissioners of Ireland or (ii) the Lender is an Irish Treaty Lender and the Company is able to demonstrate that the payment could have been made to the Lender without any deduction or withholding of any tax imposed by Ireland had that Lender complied with its obligations under Section 3.01(f), (f) any United Kingdom taxes required to be deducted or withheld (a "UK Tax Deduction") from a payment of interest under any Loan Document if on the date on which the payment falls due: (i) the payment could have been made to the relevant Lender without a UK Tax Deduction if the Lender had been a UK Qualifying Lender, but on that date that Lender is not or has ceased to be a UK Qualifying Lender other than as a result of any change after the date it became a Lender under this Agreement in (or in the interpretation, administration, or application of) any law or Treaty, or any published practice or published concession of any relevant taxing authority; or (ii) the relevant Lender is a UK Qualifying Lender solely by virtue of sub-paragraph (b) of the definition of UK Qualifying Lender and that relevant Lender has not given a UK Tax Confirmation to the Company and the payment could have been made to the relevant Lender without a UK Tax Deduction if that Lender had given a UK Tax Confirmation to the Company, on the basis that the UK Tax Confirmation would have enabled the relevant Loan Party to have formed a reasonable belief that the payment was an "excepted payment" for the purpose of section 930 of the UK Taxes Act; or (iii) the relevant Lender is a UK Qualifying Lender solely by virtue of sub-paragraph (b) of the definition of UK Qualifying Lender and an officer of HMRC has given (and not revoked) a direction (a "UK Direction") under section 931 of the UK Taxes Act which relates to that payment and that Lender has received from the relevant Loan Party a certified copy of that UK Direction and the payment could have been made to the Lender without any UK Tax Deduction if that UK Direction had not been made, and (g) the bank levy as set out in the Finance Act 2011 of the United Kingdom as in force (other than with respect to rates) at the date of this Agreement.

"Existing Borrower" has the meaning specified in Section 7.04(a)(v).

"Existing Credit Agreement" means that certain Credit Agreement, dated as of October 13, 2016, among the Company, Bank of America as administrative agent thereunder, and a syndicate of lenders and l/c issuers, as amended by that certain First Amendment to Credit Agreement dated as of February 9, 2017 and in effect immediately prior to the Closing Date.

"Existing Letters of Credit" means those certain letters of credit set forth on Schedule 1.01(c).

"Existing Maturity Date" has the meaning specified in Section 2.19(a).

"Existing Revolving Tranche" has the meaning specified in Section 2.19(a).

"Extended Revolving Commitments" has the meaning specified in Section 2.19(a).

"Extending Revolving Lenders" has the meaning specified in Section 2.19(b).

"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" means, with respect to any asset or property, the price, as determined in good faith by the Company, 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 (as determined in good faith by the Company).

"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 of such Code sections that is substantively comparable and not materially more onerous to comply with), any current or future regulations or official interpretations thereof, any agreements entered into pursuant to Section 1471(b)(1) of the Code and any fiscal or regulatory legislation or rules adopted pursuant to any intergovernmental agreement, treaty or convention among Governmental Authorities and implementing such Sections of the Code.

"FCPA" means the U.S. Foreign Corrupt Practices Act of 1977.

"Federal Funds Rate" means, for any day, the rate per annum calculated by the Federal Reserve Bank of New York based on such day's federal funds transactions by depository institutions (as determined in such manner as the Federal Reserve Bank of New York shall set forth on its public website from time to time) and published on the next succeeding Business Day by the Federal Reserve Bank of New York as the federal funds effective rate; provided that if the Federal Funds Rate as so determined would be less than zero, such rate shall be deemed to be zero for the purposes of this Agreement.

"Fee Letter" means the letter agreement, dated as of August 5, 2019, between the Company, the Administrative Agent and BofA Securities, Inc. in connection with this Agreement and the other Loan Documents.

"First Amendment Effective Date" means December 29, 2020.

"Foreign Government Scheme or Arrangement" has the meaning specified in Section 5.12(d).

"Foreign Lender" means, with respect to any Borrower, (a) if such Borrower is a U.S. Person, a Lender that is not a U.S. Person, and (b) if such 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 such

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(d).

"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 J.

"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 Cash Management Agreement" means any Cash Management Agreement between any Loan Party or any of its Subsidiaries and any Cash Management Bank.

"Guaranteed 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.

"Guaranteed Obligations" has the meaning specified in Section 10.01.

"Guaranteed Party Designation Notice" means a notice from any Lender or an Affiliate of a Lender substantially in the form of Exhibit G.

"Guarantors" means, collectively, (a) the Subsidiary Guarantors with respect to all Obligations and Additional Obligations, in each case, unless and until such Person ceases to be a Subsidiary Guarantor in accordance with the terms hereof, (b) the Company with respect to (i) Additional Obligations owing by any of its Subsidiaries, (ii) any Swap Obligation of a Specified Loan Party (determined before giving effect to Sections 10.01 and 10.11) under the Guaranty, and (iii) Obligations of the Designated Foreign Borrowers, and (c) to the extent (i) permitted by applicable Law and (ii) no material adverse tax consequence would result therefrom, each Designated Foreign Borrower with respect to Obligations of each other Designated Foreign Borrower.

"Guaranty" means, collectively, the Guarantee made by the Guarantors under Article X in favor of the Credit Parties, together with each other guaranty delivered pursuant to Section 6.12.

"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 "Guaranteed 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 Guaranteed Party Designation Notice to the Administrative Agent prior to such date of determination.

"HMRC" means Her Majesty's Revenue and Customs (or any other governmental authority with taxing authority in the United Kingdom).

"Honor Date" has the meaning set forth in Section 2.03(c)(i).

"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 any Subsidiary that is not a Material Subsidiary.

"Impacted Loans" has the meaning specified in Section 3.03(a).

"Increasing Revolving Lender" has the meaning specified in Section 2.18(a)(iii).

"Incremental Revolving Facility" has the meaning specified in Section 2.18(a)(i).

"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 Company 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. For the avoidance of doubt, "Indebtedness" does not include obligations representing deferred compensation to employees of the Company and its Subsidiaries incurred in the ordinary course of business.

"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" means, collectively, all of the following owned or controlled by any Person: (a) all systems software and applications software (including source code and object code), all documentation for such software, including, without limitation, user manuals, flowcharts, functional specifications, operations manuals, and all formulas, processes, ideas and know-how embodied in any of the foregoing that are developed by such Person, (b) concepts, discoveries, improvements and ideas, know-how, technology, reports, design information, trade secrets, practices, specifications, test procedures, maintenance manuals, research and development, inventions (whether or not patentable), blueprints, drawings, data, customer lists, catalogs, and all physical embodiments of any of the foregoing that are developed by such Person, and (c) Patents and Patent Licenses, Copyrights and Copyright Licenses, Trademarks and Trademark Licenses.

"Intercompany Debt" has the meaning specified in Section 7.02.

"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 Guaranteed Obligations.

"Interest Payment Date" means, (a) as to any Eurocurrency Rate Loan, the last day of each Interest Period applicable to such Loan and the Maturity Date for such Class of Loans; provided, however, that if any Interest Period for a Eurocurrency 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; (b) as to any Base Rate Loan, the last Business Day of each March, June, September and December and the Maturity Date for such Class of Loans; and (c) as to any Swingline Loan, the last Business Day of each March, June, September and December and the ~~latest~~Latest Maturity Date for any Class of Revolving Commitments maintained by the Swingline Lender (in its capacity as a Revolving Lender).

"Interest Period" means, as to each Eurocurrency Rate Loan, the period commencing on the date such Eurocurrency Rate Loan is disbursed or converted to or continued as a Eurocurrency Rate Loan and ending on the date one (1), two (2), three (3) or six (6) months thereafter (in each case, subject to availability) for the interest rate applicable to the relevant currency, as selected by the applicable Borrower in its Loan Notice, or such other period that is twelve (12) months or less requested by the applicable 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 next earliest 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 Company 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 Company, 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 5.21.

"Irish Qualifying Lender" means a Lender which is beneficially entitled to the interest payable to that Lender in respect of an advance under this Agreement and is (a) a bank within the meaning of section 246 of the Taxes Act which is carrying on bona fide banking business in Ireland for the purposes of section 246(3)(a) of the Taxes Act, (b) (i) a body corporate which, by virtue of the law of a Relevant Territory is resident for the purposes of tax in that Relevant Territory, where that Relevant Territory imposes a tax that generally applies to interest receivable in that Relevant Territory by bodies corporate from sources outside that Relevant Territory or (ii) a body corporate where interest payable in respect of an advance (A) is exempted from the charge to income tax under a double taxation agreement having force of law under the procedures set out in section 826(1) of the Taxes Act or (B) would be exempted from the charge to Irish income tax under an Irish Tax Treaty entered into on or before the payment date of that interest if that Irish Tax Treaty had the force of law under the provisions set out in section 826(1) of the Taxes Act at that date, (iii) a U.S. company, provided the U.S. company is incorporated in the U.S. and is taxed in the U.S. on its worldwide income or (iv) a U.S. limited liability company where (1) the ultimate recipients of the interest would, if they were themselves Lenders, be Irish Qualifying Lenders under sub-paragraphs (i), (ii) or (iii) of this clause (b) and (2) business is conducted through the U.S. limited liability company for market reasons and not for tax avoidance purposes; provided in each case at (i), (ii) (iii) or (iv) the Lender is not carrying on a

trade or business in Ireland through a branch or agency with which interest payment is connected, (c) a body corporate, (i) which advances money in the ordinary course of a trade which includes the lending of money; and (ii) where the interest on monies so advanced is taken into account in computing the trading income of such body corporate; and (iii) such body corporate has complied with the notification requirements under section 246(5)(a) of the Taxes Act or (d) a qualifying company within the meaning of section 110 of the Taxes Act or (e) an investment undertaking within the meaning of section 739B of the Taxes Act or (f) an Irish Treaty Lender.

"Irish Treaty Lender" means, a Lender, other than a Lender falling within clause (b) of the definition of Irish Qualifying Lender, which (a) is treated as a resident of an Irish Treaty State for the purposes of an Irish Tax Treaty, (b) does not carry on a business in Ireland through a permanent establishment with which that Lender's participation in this Agreement is effectively connected and (c) (subject to the completion of any procedural formalities) fulfils any other conditions which must be fulfilled under an Irish Tax Treaty by residents of that Irish Treaty State for such residents to obtain full exemption from tax imposed by Ireland on interest payable under a Loan Document.

"Irish Treaty State" means a jurisdiction having a double taxation treaty with Ireland (an "Irish Tax Treaty"), which has the force of law and which makes provision for full exemption from tax imposed by Ireland on interest.

"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 Company (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 6.12.

"Judgment Currency" has the meaning specified in Section 11.23.

"Latest Maturity Date" means, at any date of determination, the latest Maturity Date applicable to any Class of Loans or Revolving Commitments hereunder at such time, in each case then in effect on such date of determination.

"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 Company (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 clause (b) without such Lender's consent), or any successor issuer thereof or (c) any Lender selected by the Company (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 clause (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 Company where such sublease real property arrangements are entered into by the Company 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. The term "Lender" shall include any Designated Lender who has funded any Credit Extension.

"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 Company 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, as to any applicable L/C Issuer, the day that is seven (7) days prior to the Maturity Date for the applicable Class of Revolving Commitments maintained by such L/C Issuer (in its capacity as a Revolving Lender hereunder) (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 L 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 Eurocurrency Rate.

"LIBOR Quoted Currency" means Dollars, Euro, Sterling and Swiss Franc, in each case as long as there is a published LIBOR rate with respect thereto.

"LIBOR Screen Rate" means the LIBOR quote on the applicable screen page the Administrative Agent designates to determine LIBOR (or such other commercially available source providing such quotations as may be designated by the Administrative Agent from time to time).

"LIBOR Successor Rate" has the meaning specified in Section 3.03(c).

"LIBOR Successor Rate Conforming Changes" has the meaning specified in Section 3.03(~~f~~c).

"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 any 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 Fee Letter, (e) each Issuer Document, (f) each Joinder Agreement, (g) any agreement creating or perfecting rights in Cash Collateral pursuant to the provisions of Section 2.14, (h) the Intercompany Subordination Agreement, (i) each Designated Foreign Borrower Request and Assumption Agreement and (j) all other agreements and documents 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 Guaranteed Hedge Agreement or any Guaranteed Cash Management Agreement); provided, however, that for purposes of Section 11.01, "Loan Documents" shall mean this Agreement and the Guaranty.

"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 Eurocurrency 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 Company.

"Loan Parties" means, collectively, each 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 market.

"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.

"Master Agreement" has the meaning set forth in the definition of "Swap Contract."

"Material Acquisition" means any Acquisition for which the Cost of Acquisition is equal to or greater than $300,000,000.

"Material Adverse Effect" means (a) a material adverse change in, or a material adverse effect upon, the operations, business or financial condition of the Borrowers and their Restricted Subsidiaries taken as a whole; (b) a material impairment of the 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 payment obligations under the Loan Documents, taken as a whole.

"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 Company or its Subsidiaries after the Closing Date, shall be considered to be Material Intellectual Property as of the date of determination described above.

"Material Subsidiary" means, at any date of determination, any Subsidiary of the Company that (a) together with its Subsidiaries, generates revenue equal to or greater than 5% of Consolidated revenue on a Pro Forma Basis for the Measurement Period most recently ended, (b) together with its Subsidiaries, has total assets (including Equity Interests in other Subsidiaries and excluding investments that are eliminated in consolidation) equal to or greater than 5% of Consolidated total assets as of the end of such Measurement Period, or (c) is otherwise designated as a "Material Subsidiary" at such time pursuant to the proviso to this definition; provided, however, that if at any time there are Subsidiaries which are not classified or designated as "Material Subsidiaries" but which, together with their respective Subsidiaries, collectively (i) generate revenue equal to or greater than 10% of Consolidated revenue on a Pro Forma Basis for the Measurement Period most recently ended or (ii) have total assets (including Equity Interests in other Subsidiaries and excluding investments that are eliminated in consolidation) equal to or greater than 10% of Consolidated total assets as of the end of such Measurement Period, then the Company shall promptly designate one or more of such Subsidiaries as "Material Subsidiaries" such that, after giving effect to such designation, Subsidiaries which are not classified or designated as "Material Subsidiaries" shall, together with their respective Subsidiaries, collectively (A) generate revenue less than 10% of Consolidated revenue on a Pro Forma Basis for the Measurement Period most recently ended and (B) have total assets (including Equity Interests in other Subsidiaries and excluding investments that are eliminated in consolidation) less than 10% of Consolidated total assets as of the end of such Measurement Period.

"Maturity Date" means, as the context may require, (a) with respect to Revolving Commitments (except Extended Revolving Commitments), September 17, 2024, and (b) with respect to any Class of Extended Revolving Commitments, the maturity date set forth in the Revolving Extension Amendment with respect to such Class of Extended Revolving Commitments; provided, however, that, in each case, if such date is not a Business Day, the Maturity Date shall be the next preceding Business Day.

"Maximum Rate" has the meaning specified in Section 11.09.

"Measurement Period" means, at any date of determination, the most recently completed four (4) fiscal quarters of the Company (or, for purposes of determining Pro Forma Compliance,

the most recently completed four (4) fiscal quarters of the Company 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.

"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 Company 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 Company 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 either (a) does not approve any consent, waiver or amendment that (i) 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 (ii) has been approved by the Required Lenders or (b) does not consent to a request by the Company to extend the Maturity Date pursuant to Section 2.19.

"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).

"Non-LIBOR Quoted Currency" means any currency other than a LIBOR Quoted Currency.

"Notice of Additional L/C Issuer" means a certificate substantially in the form of Exhibit M 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 K 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 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, 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) with respect to Revolving Loans (including any Class thereof) and Swingline Loans on any date, the Dollar Equivalent amount of 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 any 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).

"Participant Register" has the meaning specified in Section 11.06(d).

"Participating Member State" means any member state of the European Union that has the Euro as its lawful currency in accordance with legislation of the European Union related to Economic and Monetary Union.

"Patent License" means any agreement, now or hereafter in existence, providing for the grant to any Person of any rights (including, without limitation, the right for a party to be designated as an owner and/or to enforce, defend, make, have made, make improvements, manufacture, use, sell, import, export, and require joinder in suit and/or receive assistance from another party) in a Patent.

"Patents" means collectively, all of the following of any Person: (a) all patents, all inventions and patent applications anywhere in the world, (b) all improvements, counterparts, reissues, divisional, re-examinations, extensions, continuations (in whole or in part) and renewals of any of the foregoing and improvements thereon, (c) all income, royalties, damages or payments now or hereafter due and/or payable under any of the foregoing or with respect to any of the foregoing, including, without limitation, damages or payments for past, present or future infringements, violations or misappropriations of any of the foregoing, (d) the right to sue for past, present and future infringements, violations or misappropriations of any of the foregoing and (e) all rights corresponding to any of the foregoing throughout the world.

"Patriot Act" has the meaning specified in Section 11.19.

"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 Multiemployer 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, but other than a Multiemployer Plan) that is maintained or is contributed to by the Company and any ERISA Affiliate and is either covered by Title IV of ERISA or is subject to Pension Funding Rules.

"Permitted Liens" has the meaning set forth in Section 7.01.

"Permitted Restructuring" means a transaction or series of transactions pursuant to which one or more Restricted Subsidiaries of the Company (other than any Designated Foreign Borrower) are converted, restructured or reorganized due to changes or potential changes in any relevant legal or regulatory framework, whether by (i) transfer, (ii) acquisition, (iii) contribution, (iv) merger, (v) consolidation, (vi) voluntary dissolution, (vii) liquidation, (viii) recapitalization, (ix) change in identity, form, place of organization, incorporation, domicile or, to the extent relevant and subject to Section 5.23(~~d~~c), centre of main interests (as that term is used in Article 3(1) of the Regulation), or (x) otherwise, in each case the result of which may cause a direct or indirect sale, assignment or transfer of Equity Interests and/or other assets between and among the Company and/or various Restricted Subsidiaries of the Company, and in each case to the extent the Administrative Agent (acting in its reasonable credit judgment) approves such Permitted Restructuring.

"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 Company or any ERISA Affiliate or any such Plan to which the Company or any ERISA Affiliate is required to contribute on behalf of any of its employees.

"Plan of Reorganization" has the meaning specified in Section 11.06(h)(iii).

"Platform" has the meaning specified in Section 6.02.

"Priority Indebtedness" means (a) Indebtedness (other than Obligations) of any Loan Party secured by a Lien on any assets of such Loan Party, (b) Indebtedness of any Restricted Subsidiary that is not a Loan Party, and (c) Guarantees of the Company or any Restricted Subsidiary in respect of Indebtedness of any Unrestricted Subsidiary; provided that, the definition of "Priority Indebtedness" shall not include any Guarantees of the Company issued with respect to any operating lease payment obligations of any of the Subsidiaries of the Company.

"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 Company 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 Company 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 Company 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 Company 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.

"PTE" means a prohibited transaction class exemption issued by the U.S. Department of Labor, as any such exemption may be amended from time to time.

"Public Lender" has the meaning specified in Section 6.02.

"QFC" has the meaning assigned to the term "qualified financial contract" in, and shall be interpreted in accordance with, 12 U.S.C. 5390(c)(8)(D).

"QFC Credit Support" has the meaning specified in Section 11.21.

"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" means any Equity Interest that is not Disqualified Stock.

"Quarterly Reimbursement Payments" means non-refundable quarterly reimbursements of certain of the Company's research and development expenses.

"R&D Collaboration Payments" means one-time non-recurring up-front payments and milestone payments payable by the Company and its Restricted Subsidiaries under research and development licensing agreements, collaboration agreements or development agreements of the Company and its Subsidiaries relating to product candidates of the Company and its Subsidiaries.

"Rate Determination Date" means two (2) Business Days prior to the commencement of such Interest Period (or such other day as is generally treated as the rate fixing day by market practice in such interbank market, as determined by the Administrative Agent; provided that, to the extent such market practice is not administratively feasible for the Administrative Agent, then "Rate Determination Date" means such other day as otherwise reasonably determined by the Administrative Agent.

"Real Property" means any means any owned or leased real property of a Loan Party or 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).

"Regulation" has the meaning specified in Section 5.23(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.

"Relevant Territory" means (a) a member state of the European Communities other than Ireland, (b) a jurisdiction with which Ireland has entered into an Irish Tax Treaty that has the force of law by virtue of Section 826(1) of the Taxes Act or (c) a jurisdiction with which Ireland

has entered into an Irish Tax Treaty where that treaty will (on completion of necessary procedures set out in Section 826(1) of the Taxes Act) have the force of law.

"Removal Effective Date" has the meaning specified in Section 9.06(b).

"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(a).

"Resolution Authority" means an EEA Resolution Authority or, with respect to any UK Financial Institution, a UK Resolution Authority.

"Responsible Officer" means (a) the chief executive officer, executive chairman, president, chief financial officer, treasurer, executive vice president, assistant treasurer, controller or assistant controller (and, in the case of a Designated Foreign Borrower incorporated in England and Wales or in Ireland, a director) of a Loan Party, (b) solely for purposes of the delivery of incumbency and/or secretary's certificates pursuant to Section 4.01, a director, the secretary or any assistant secretary of a Loan Party and (c) 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 Company 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 Company 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 Company 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 Company that is not an Unrestricted Subsidiary.

"Revaluation Date" means, (a) with respect to any Loan, each of the following: (i) each date of a Borrowing of a Eurocurrency Rate Loan denominated in an Alternative Currency, (ii) each date of a continuation of a Eurocurrency Rate Loan denominated in an Alternative Currency pursuant to Section 2.02, and (iii) such additional dates as the Administrative Agent shall reasonably determine or the Required Lenders shall require; and (b) with respect to any Letter of Credit, each of the following: (i) each date of issuance, amendment and/or extension of a Letter of Credit denominated in an Alternative Currency, (ii) each date of any payment by the applicable L/C Issuer under any Letter of Credit denominated in an Alternative Currency, (iii) in the case of all Existing Letters of Credit denominated in Alternative Currencies, the Closing Date, and (iv) such additional dates as the Administrative Agent or the applicable 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 Eurocurrency 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 Borrowers 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, in the case of any Extended Revolving Commitment, under the caption reflecting such Revolving Extension Series) 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 (including in connection with any Revolving Extension

Amendment). 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 Extension Amendment" has the meaning specified in Section 2.19(d).

"Revolving Extension Request" has the meaning specified in Section 2.19(a).

"Revolving Extension Series" has the meaning specified in Section 2.19(f).

"Revolving Facility" means, as applicable and as the context may require, at any time, (a) the aggregate amount of the Revolving Lenders' Revolving Commitments at such time or (b) the aggregate amount of the Revolving Lenders' Revolving Commitments under any specific Class at such time.

"Revolving Facility Increase Effective Date" has the meaning specified in Section 2.18(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 (including any Class of Extended Revolving Commitments) 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 Borrowers 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 F.

"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.

"Sanctioned Persons" has the meaning specified in Section 5.17(a).

"Sanction(s)" means all economic or financial sanctions or trade embargoes imposed, administered or enforced from time to time by (a) the U.S. government, including those administered by the Office of Foreign Assets Control of the U.S. Department of the Treasury or the U.S. Department of State, or (b) the United Nations Security Council, the European Union, any European Union member state or Her Majesty's Treasury of the United Kingdom ("HMT").

"Scheduled Unavailability Date" has the meaning specified in Section 3.03(c).

"SEC" means the Securities and Exchange Commission, or any Governmental Authority succeeding to any of its principal functions.

~~"Securities Act" means the Securities Act of 1933, including all amendments thereto and regulations promulgated thereunder.~~

"Social Security Act" means the Social Security Act of 1965.

"Solvent" and "Solvency" mean, with respect to the Company and its Restricted Subsidiaries on any date of determination, that on such date (a) the fair value of the assets of the Company and its Restricted Subsidiaries, on a Consolidated basis, is greater than the total amount of liabilities, including contingent liabilities, of the Company and its Restricted Subsidiaries, on a Consolidated basis, (b) the present fair saleable value of the assets of the Company and its Restricted Subsidiaries, on a Consolidated basis, is not less than the amount that will be required to pay the probable liability of the Company and its Restricted Subsidiaries, on a Consolidated basis, on their existing debts as they become absolute and matured, (c) the Company and its Restricted Subsidiaries, on a Consolidated basis, do not intend to, and do not believe that they will, incur debts or liabilities beyond their ability to pay such debts and liabilities as they mature, (d) the Company and its Restricted Subsidiaries, on a Consolidated basis, are not engaged in business or a transaction, and are not about to engage in business or a transaction, for which their property would constitute an unreasonably small capital, (e) the Company and its Restricted Subsidiaries, on a Consolidated basis, will be able to pay their debts and liabilities, contingent obligations and other commitments as they mature in the ordinary course of business and (f) without prejudice to paragraphs (a) to (e) above and in relation to a Restricted Subsidiary incorporated in England and Wales or Ireland only, such Restricted Subsidiary is not unable to or has not admitted inability to pay its debts as they fall due. 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.

"Special Notice Currency" means at any time an Alternative Currency, other than the currency of a country that is a member of the Organization for Economic Cooperation and Development at such time located in North America or Europe.

"Specified CFF Payments" means the following amounts paid or payable by CFF to the Company pursuant to the CFF Amendment: (i) the $75 million non-refundable upfront payment and (ii) the non-refundable Quarterly Reimbursement Payments, in each case, net of any amortization required under GAAP.

"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~~New Jersey 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 Company 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.

"Subordinating Loan Party" has the meaning specified in Section 11.16.

"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 Company 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 Company set forth on Schedule 5.18(b) and each other Subsidiary of the Company that shall execute and ~~delivery~~deliver a Joinder Agreement or otherwise become party to this Agreement from time to time pursuant to the requirements of Section 6.12. Notwithstanding anything to the contrary contained herein, no Excluded Subsidiary shall be required to become a "Subsidiary Guarantor" hereunder. As of the ~~Closing~~First Amendment Effective 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, and (iv) Vertex Pharmaceuticals (Puerto Rico) LLC, a Delaware limited liability company~~, and (v) Exonics Therapeutics, Inc., a Delaware corporation~~.

"Subsidiary Redesignation" has the meaning set forth in the definition of "Unrestricted Subsidiary".

"Successor Borrower" has the meaning specified in Section 7.04(a)(v).

"Supported QFC" has the meaning specified in Section 11.21.

"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.

"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, through itself or through one of its designated Affiliate or branch offices, 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 H 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 Company.

"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).

"TARGET2" means the Trans-European Automated Real-time Gross Settlement Express Transfer payment system which utilizes a single shared platform and which was launched on November 19, 2007.

"TARGET Day" means any day on which TARGET2 (or, if such payment system ceases to be operative, such other payment system, if any, determined by the Administrative Agent to be a suitable replacement) is open for the settlement of payments in Euro.

"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.

"Taxes Act" means the Taxes Consolidation Act 1997 of Ireland, as amended.

"Threshold Amount" means $100,000,000.

"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.

"Trademark License" means any agreement, now or hereafter in existence, providing for the grant to any Person of any rights (including, without limitation, the right for a party to be designated as an owner and/or to enforce, defend, use, mark, police, and require joinder in suit and/or receive assistance from another party) in a Trademark.

"Trademarks" means, collectively, all of the following of any Person: (a) all trademarks, trade names, internet domain names, trade styles, service marks, logos and other identifiers of source or origin, whether registered or unregistered, all registrations and recordings thereof, and all applications in connection therewith anywhere in the world, (b) all counterparts, extensions and renewals of any of the foregoing, (c) all income, royalties, damages and payments now or hereafter due and/or payable under any of the foregoing or with respect to any of the foregoing, including, without limitation, damages or payments for past, present or future infringements, violations, dilutions or misappropriations of any of the foregoing, (d) the right to sue for past, present or future infringements, violations, dilutions or misappropriations of any of the foregoing and (e) all rights corresponding to any of the foregoing (including the goodwill associated with any of the foregoing) throughout the world.

"Type" means, with respect to a Loan, its character as a Base Rate Loan or a Eurocurrency 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).

~~"UK Bail-In Legislation" means (to the extent that the United Kingdom is not an EEA Member Country which has implemented, or implements, Article 55 BRRD) Part I of the United Kingdom Banking Act 2009 and any other law or regulation applicable in the United Kingdom relating to the resolution of unsound or failing banks, investment firms or other financial institutions or their affiliates (otherwise than through liquidation, administration or other insolvency proceedings).~~

"UK Corporation Tax Act" means the Corporation Tax Act 2009 of the United Kingdom.

"UK Direction" has the meaning assigned to that term in paragraph (f)(iii) of the definition of Excluded Taxes in Section 1.1.

"UK DTTP Filing" means an HMRC Form DTTP2 duly completed and filed by the relevant Loan Party, which: (a) where it relates to a UK Treaty Lender that is a Lender on the date of this Agreement, contains the scheme reference number and jurisdiction of tax residence opposite that Lender's name in Schedule 1.01(d), and (i) where the Loan Party is a Loan Party on the date of this Agreement, is filed with HMRC within thirty (30) Business Days after the date of this Agreement; or (ii) where the Loan Party becomes a Loan Party after the date of this Agreement, is filed with HMRC within 30 Business Days after the date on which that Loan Party becomes an additional Borrower under this Agreement; or (b) where it relates to a UK Treaty Lender that becomes a Lender after the Closing Date, contains the scheme reference number and jurisdiction of tax residence in the relevant Assignment and Assumption, and (i) where the Loan Party is a Loan Party on the date such UK Treaty Lender becomes a Lender under this Agreement ("New Lender Date"), is filed with HMRC within thirty (30) Business Days after the New Lender Date; or (ii) where the Loan Party becomes a Loan Party under this Agreement after the New Lender Date, is filed with HMRC within thirty (30) Business Days after the date on which that Loan Party becomes a Loan Party under this Agreement.

"UK DTTP Scheme" has the meaning assigned to that term in Section 3.01(g)(ii).

"UK Financial Institution" means any BRRD Undertaking (as such term is defined under the PRA Rulebook promulgated by the United Kingdom Prudential Regulation Authority) or any person falling within IFPRU 11.6 of the FCA Handbook promulgated by the United Kingdom Financial Conduct Authority, which includes certain credit institutions and investment firms, and certain affiliates of such credit institutions or investment firms.

"UK Qualifying Lender" means a Lender which is beneficially entitled to interest payable to that Lender in respect of an advance under a Loan Document and is: (a) a Lender: (i) which is a bank (as defined for the purpose of section 879 of the UK Taxes Act) making an advance under a Loan Document and is within the charge to United Kingdom corporation tax as respects any payments of interest made in respect of that advance or would be within such charge as respects such payment apart from section 18A of the UK Corporation Tax Act; or (ii) in respect of an advance made under a Loan Document by a person that was a bank (as defined for the purpose of section 879 of the UK Taxes Act) at the time that that advance was made and is within the charge to United Kingdom corporation tax as respects any payments of interest made in respect of that advance; or (b) a Lender which is: (i) a company resident in the United Kingdom for United Kingdom tax purposes; (ii) a partnership each member of which is (A) a company resident in the United Kingdom or (B) a company not so resident in the United Kingdom which carries on a trade in the United Kingdom through a permanent establishment and which brings into account in computing its chargeable profits (within the meaning of section 19 of the UK Corporation Tax Act) the whole of any share of interest payable in respect of that advance that falls to it by reason of Part 17 of the UK Corporation Tax Act; (iii) a company not so resident in the United Kingdom which carries on a trade in the United Kingdom through a permanent establishment

and which brings into account interest payable in respect of that advance in computing the chargeable profits (within the meaning of section 19 of the UK Corporation Tax Act) of that company; or (c) a UK Treaty Lender.

"UK Resolution Authority" means the Bank of England or any other public administrative authority having responsibility for the resolution of any UK Financial Institution.

"UK Tax Confirmation" means a confirmation by a Lender that the person beneficially entitled to interest payable to that Lender in respect of an advance under a Loan Document is either: (a) a company resident in the United Kingdom for United Kingdom tax purposes; (b) a partnership each member of which is (~~A~~i) a company resident in the United Kingdom or (~~B~~ii) a company not so resident in the United Kingdom which carries on a trade in the United Kingdom through a permanent establishment and which brings into account in computing its chargeable profits (within the meaning of section 19 of the UK Corporation Tax Act) the whole of any share of interest payable in respect of that advance that falls to it by reason of Part 17 of the UK Corporation Tax Act; or (c) a company not so resident in the United Kingdom which carries on a trade in the United Kingdom through a permanent establishment and which brings into account interest payable in respect of that advance in computing the chargeable profits (for the purposes of section 19 of the UK Corporation Tax Act) of that company.

"UK Tax Deduction" has the meaning assigned to that term in paragraph (f) of the definition of Excluded Taxes in Section 1.1.

"UK Taxes Act" means the Income Tax Act 2007 of the United Kingdom.

"UK Treaty Lender" means a Lender which (a) is treated as a resident of a UK Treaty State for the purposes of the Treaty, (b) does not carry on a business in the United Kingdom through a permanent establishment with which that Lender's participation in the Loan is effectively connected and (c) meets all other conditions in the Treaty for full exemption from tax imposed by the United Kingdom on interest, except that for this purpose it shall be assumed that any necessary procedural formalities are satisfied.

"UK Treaty State" means a jurisdiction having a double taxation agreement (a "Treaty") with the United Kingdom, which makes provision for full exemption from tax imposed by the United Kingdom on interest.

"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" means any non-Wholly Owned Subsidiary of the Company, whether now owned or acquired or created after the Closing Date, that is designated on or after the Closing Date by the Company as an Unrestricted Subsidiary hereunder by written notice to the Administrative Agent; provided, that the Company 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 Company shall be in Pro Forma Compliance, (c) 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, (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 Company (or its Restricted Subsidiaries) therein at the date of designation in an amount equal to the Fair Market Value of the Company's (or its Restricted Subsidiaries') Investments therein. The Company 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 Company shall be in Pro Forma Compliance, (iii) the Company shall have delivered to the Administrative Agent an officer's certificate executed by a Responsible Officer of the Company, certifying to such officer's knowledge, compliance with the foregoing requirements and (iv) the Company shall cause any such Restricted Subsidiary to comply with the provisions of Section 6.12, 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. No Borrower may be designated as an Unrestricted Subsidiary.

"U.S. Loan Party" means any Loan Party that is not a Designated Foreign Borrower.

"U.S. Person" means any Person that is a "United States Person" as defined in Section 7701(a)(30) of the Code.

"U.S. Special Resolution Regimes" has the meaning specified in Section 11.21.

"U.S. Tax Compliance Certificate" has the meaning specified in Section 3.01(e)(ii)(B)(3).

"Vertex Europe" has the meaning specified in the introductory paragraph hereto.

"Vertex Ireland" has the meaning specified in the introductory paragraph hereto.

"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 Company's common stock written by Company substantially contemporaneously with the purchase by the Company 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 means 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" means a Subsidiary of the Company that is a Wholly Owned Subsidiary of the Company.

"Write-Down and Conversion Powers" means, (a) ~~in relation to any~~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~~ from time to time, the powers described as such in relation to that Bail-In Legislation in the EU Bail-In Legislation Schedule; (b) in relation to any other~~, and (b) with respect to the United Kingdom, any powers of the applicable Resolution Authority under the Bail-In Legislation~~: (i) any powers under that Bail-In Legislation to cancel, transfer or dilute shares issued by a person that is a bank or investment firm or other financial institution or affiliate of a bank, investment firm or other financial institution,~~ to cancel, reduce, modify or change the form of a liability of ~~such a person~~any UK Financial Institution or any contract or instrument under which that liability arises, to convert all or part of that liability into shares, securities or obligations of that person or any other person, to provide that any such contract or instrument is to have effect as if a right had been exercised under it or to suspend any obligation in respect of that liability or any of the powers under that Bail-In Legislation that are related to or ancillary to any of those powers~~; and (ii) any similar or analogous powers under that Bail-In Legislation; and (c) in relation to any UK Bail-In Legislation: (i) any powers under that UK Bail-In Legislation to cancel, transfer or dilute shares issued by a person that is a bank or investment firm or other financial institution or affiliate of a bank, investment firm or other financial institution, to cancel, reduce, modify or change the form of a liability of such a person or any contract or instrument under which that liability arises, to convert all or part of that liability into shares, securities or obligations of that person or any other person, to provide that any such contract or instrument is to have effect as if a right had been exercised under it or to suspend any obligation in respect of that liability or any of the powers under that UK Bail-In Legislation that are related to or ancillary to any of those powers; and (ii) any similar or analogous powers under that UK Bail-In Legislation.~~.

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, rule or regulation shall, unless otherwise specified, refer to such law, rule 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. Any and all references to "Borrower" regardless of whether preceded by the term "a", "any", "each of", "all", "and/or", or any other similar term shall be deemed to refer, as the context requires, to each and every (and/or any, one or all) parties constituting a Borrower, individually and/or in the aggregate.

(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.

(d) Any reference herein to a merger, transfer, consolidation, amalgamation, assignment, sale, disposition or transfer, or similar term, shall be deemed to apply to a division of or by a limited liability company, or an allocation of assets to a series of a

limited liability company (or the unwinding of such a division or allocation), as if it were a merger, transfer, consolidation, amalgamation, assignment, sale, disposition or transfer, or similar term, as applicable, to, of or with a separate Person. Any division of a limited liability company shall constitute a separate Person hereunder (and each division of any limited liability company that is a Subsidiary, joint venture or any other like term shall also constitute such a Person or entity).

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 Company 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 or application thereof (including the adoption of IFRS) would affect the computation of any financial ratio or requirement set forth in any Loan Document, and either the Company or the Required Lenders shall so request, the Administrative Agent, the Lenders and the Company shall negotiate in good faith, each acting reasonably (and without requirement of any fee), to amend such ratio or requirement to preserve the original intent thereof in light of such change in GAAP or application thereof (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 or the application thereof (without regard to such change or adoption of IFRS) and (ii) the Company shall provide to the Administrative Agent and the Lenders the 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.

(c) Lease Accounting. Notwithstanding any other provision contained herein, each financial covenant, ratio, accounting definition or requirement used herein shall be construed, and all computations of amounts and ratios referred to herein shall be made, without giving effect to the adoption of Accounting Standards Updated No. 2016-02 ("ASU 2016-02") by the Financial Accounting Standards Board such that "Capitalized Leases" shall specifically exclude liabilities that were considered operating lease liabilities under GAAP prior to the adoption of ASU 2016-02; provided that all financial statements delivered pursuant to this Agreement shall, if applicable and solely to the extent reasonably requested by the Administrative Agent, be accompanied by a schedule

showing any adjustments necessary to reconcile such financial statements with GAAP prior to the adoption of ASU 2016-02, with respect to such lease liabilities.

(d) Consolidation of Variable Interest Entities. All references herein to Consolidated financial statements of the Company and its Subsidiaries or to the determination of any amount for the Company 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 Company is required to otherwise consolidate pursuant to FASB ASC 810.

(e) Pro Forma Treatment. Each Disposition of all or substantially all of a line of business, and each Acquisition, by the Company 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 Company 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 Exchange 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 a Borrowing, conversion, continuation or prepayment of a Eurocurrency Rate Loan or 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 Borrowing, Eurocurrency Rate Loan or 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 "Eurocurrency Rate" or with respect to any rate that is an alternative or replacement for or successor to any of such rates (including, without limitation, any LIBOR Successor Rate) or the effect of any of the foregoing, or of any LIBOR Successor Rate Conforming Changes.

(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 Company may from time to time request that Eurocurrency Rate Loans be made and/or Letters of Credit be issued in a currency other than those specifically listed in the definition of "Alternative Currency"; provided that (i) such requested currency is an Eligible Currency and (ii) such requested currency shall only be treated as a "LIBOR Quoted Currency" to the extent that there is published LIBOR rate for such currency. In the case of any such request with respect to the making of Eurocurrency Rate Loans, such request shall be subject to the approval of the Administrative Agent and each Lender with a Revolving Commitment under which such currency is requested to be made available; and in the case of any such request with respect to the issuance of Letters of Credit, such request shall be subject to the approval of the Administrative Agent and the applicable L/C Issuer.

(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, in the case of any such request pertaining to Letters of Credit, the L/C Issuers, in its or their sole discretion). In the case of any such request pertaining to Eurocurrency Rate Loans, the Administrative Agent shall promptly notify each Appropriate Lender thereof; and in the case of any such request pertaining to Letters of Credit, the Administrative Agent shall promptly notify the L/C Issuers thereof. Each Appropriate Lender (in the case of any such request pertaining to Eurocurrency Rate Loans) or the L/C Issuers (in the case of a request pertaining to Letters of Credit) 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 making of Eurocurrency Rate Loans or the issuance of Letters of Credit, as the case may be, in such requested currency.

(c) Any failure by a Lender or any L/C Issuer, as the case may be, to respond to such request within the time period specified in the preceding sentence shall be deemed to be a refusal by such Lender or such L/C Issuer, as the case may be, to permit Eurocurrency Rate Loans to be made or Letters of Credit to be issued in such requested currency. If the Administrative Agent and all the Appropriate Lenders consent to making Eurocurrency Rate Loans in such requested currency and the Administrative Agent and such Lenders reasonably determine that an appropriate interest rate is available to be used for such requested currency, the Administrative Agent shall so notify the Company and (i) the Administrative Agent and such Lenders may amend the definition of Eurocurrency Rate for any Non-LIBOR Quoted Currency to the extent necessary to add the applicable Eurocurrency Rate for such currency and (ii) to the extent the definition of Eurocurrency Rate reflects the appropriate interest rate for such currency or has been amended to reflect the appropriate rate for such currency, such currency shall thereupon be deemed for all purposes to be an Alternative Currency for purposes of any Borrowings of Eurocurrency Rate Loans. 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 Company and (iii) the Administrative Agent and the L/C Issuers may amend the

definition of Eurocurrency Rate for any Non-LIBOR Quoted Currency to the extent necessary to add the applicable Eurocurrency Rate for such currency and (iv) to the extent the definition of Eurocurrency Rate reflects the appropriate interest rate for such currency or has been amended to reflect the appropriate rate for such currency, 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 Company. Any specified currency of an Existing Letter of Credit that is neither Dollars nor one of the Alternative Currencies specifically listed in the definition of "Alternative Currency" shall be deemed an Alternative Currency with respect to such Existing Letter of Credit only.

1.10 Change of Currency.

(a) Each obligation of the Borrowers 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. If, in relation to the currency of any such member state, the basis of accrual of interest expressed in this Agreement in respect of that currency shall be inconsistent with any convention or practice in the London interbank market for the basis of accrual of interest in respect of the Euro, such expressed basis shall be replaced by such convention or practice with effect from the date on which such member state adopts the Euro as its lawful currency; provided that, if any Borrowing in the currency of such member state is outstanding immediately prior to such date, such replacement shall take effect, with respect to such Borrowing, at the end of the then current Interest Period.

(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 Borrowers, in Dollars or in one or more Alternative Currencies, 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, (a) the Total Revolving

Outstandings shall not exceed the Aggregate Revolving Commitments, (b) the Revolving Exposure of any Lender shall not exceed such Revolving Lender's Revolving Commitment, (c) the Revolving Exposure of any Lender under any Class of Revolving Commitments shall not exceed such Lender's Revolving Commitment of such Class, and (d) the aggregate Outstanding Amount of all Loans denominated in Alternative Currencies shall not exceed the Alternative Currency Sublimit. Within the limits of each Revolving Lender's Revolving Commitment, and subject to the other terms and conditions hereof, the Borrowers may borrow Revolving Loans, prepay under Section 2.05, and reborrow under this Section 2.01. Revolving Loans may be Base Rate Loans or Eurocurrency Rate Loans, as further provided herein; provided, however, any Revolving Borrowings made on the Closing Date or any of the three (3) Business Days (or such longer applicable period, in accordance with Section 2.02(a), for Revolving Borrowings denominated in Alternative Currencies other than Euro or Sterling) following the Closing Date shall be made as Base Rate Loans unless the Company delivers a Funding Indemnity Letter not less than three (3) Business Days (or such longer applicable period, in accordance with Section 2.02(a), for Revolving Borrowings denominated in Alternative Currencies other than Euro or Sterling) 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 Eurocurrency Rate Loans shall be made upon the applicable Borrower's irrevocable notice to the Administrative Agent, which may be given by: (i) telephone or (ii) 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. (A) three (3) Business Days prior to the requested date of any Borrowing of, conversion to or continuation of Eurocurrency Rate Loans denominated in Dollars, Euro or Sterling, or of any conversion of Eurocurrency Rate Loans denominated in Dollars to Base Rate Loans, (B) four (4) Business Days (or five (5) Business Days in the case of a Special Notice Currency) prior to the requested date of any Borrowing or continuation of Eurocurrency Rate Loans denominated in other Alternative Currencies, and (C) on the requested date of any Borrowing of Base Rate Loans; provided, however, that if the applicable Borrower wishes to request Eurocurrency 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. (x) four (4) Business Days prior to the requested date of such Borrowing, conversion or continuation of Eurocurrency Rate Loans denominated in Dollars, Euro or Sterling, or (y) five (5) Business Days (or six (6) Business Days in the case of a Special Notice Currency) prior to the requested date of such Borrowing, conversion or continuation of Eurocurrency Rate Loans denominated in other Alternative Currencies, 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., (1) three (3)

Business Days before the requested date of such Borrowing, conversion or continuation of Eurocurrency Rate Loans denominated in Dollars, Euro or Sterling, or (2) four (4) Business Days (or five (5) Business Days in the case of a Special Notice Currency) prior to the requested date of such Borrowing, conversion or continuation of Eurocurrency Rate Loans denominated in other Alternative Currencies, the Administrative Agent shall notify the applicable 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 Eurocurrency 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 (I) whether the applicable 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, (II) the requested date of the Borrowing, conversion or continuation, as the case may be (which shall be a Business Day), (III) the principal amount of Loans to be borrowed, converted or continued, (IV) the Type of Loans to be borrowed or to which existing Loans are to be converted, (V) if applicable, the duration of the Interest Period with respect thereto, (VI) the currency of the Loans to be borrowed and (VII) the relevant Borrower requesting such Borrowing. If the applicable Borrower fails to specify a currency in a Loan Notice requesting a Borrowing, then the Loans so requested shall be made in Dollars. If the applicable Borrower fails to specify a Type of Loan in a Loan Notice or if the applicable 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; provided, however, that in the case of a failure to timely request a continuation of Loans denominated in an Alternative Currency, such Loans shall be continued as Eurocurrency Rate Loans in their original currency with an Interest Period of one (1) month. 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 Eurocurrency Rate Loans. If the applicable Borrower requests a Borrowing of, conversion to, or continuation of Eurocurrency 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 Eurocurrency Rate Loan. Except as provided pursuant to Section 2.12(a), no Loan may be converted into or continued as a Loan denominated in a different currency, but instead must be repaid in the original currency of such Loan and reborrowed in the other currency.

(b) Advances. Following receipt of a Loan Notice, the Administrative Agent shall promptly notify each Appropriate Lender of the amount (and currency) of its Applicable Percentage of the applicable Loans, and if no timely notice of a conversion or continuation is provided by the applicable Borrower, the Administrative Agent shall notify each Appropriate Lender of the details of any automatic conversion to Base Rate Loans or continuation of Loans denominated in a currency other than Dollars, in each case as 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 for the applicable currency not later than 1:00 p.m., in the case of any Loan denominated in Dollars, and not later than the Applicable Time specified by the Administrative Agent in the case of any Loan in an Alternative Currency, in each case 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, or, if applicable, Section 2.19), the Administrative Agent shall make all funds so received available to the applicable Borrower in like funds as received by the Administrative Agent either by (i) crediting the account of the applicable 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 applicable Borrower; provided, however, that if, on the date a Loan Notice with respect to a Revolving Borrowing is given by the applicable 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 applicable Borrower as provided above; provided further, however, that no Revolving Borrowing by a Designated Foreign Borrower shall be used to pay any L/C Borrowings of or attributable to any U.S. Loan Party (or any other Domestic Subsidiary).

(c) Eurocurrency Rate Loans. Except as otherwise provided herein, a Eurocurrency Rate Loan may be continued or converted only on the last day of an Interest Period for such Eurocurrency Rate Loan. During the existence of an Event of Default, no Loans may be requested as, converted to or continued as Eurocurrency Rate Loans without the consent of the Required Lenders, and the Required Lenders may demand that any or all of the outstanding Eurocurrency Rate Loans denominated in Dollars be converted immediately to Base Rate Loans and any or all of the then outstanding Eurocurrency Rate Loans denominated in an Alternative Currency be prepaid, or redenominated into Dollars in the amount of the Dollar Equivalent thereof, on the last day of the then current Interest Period with respect thereto.

(d) Interest Rates. Each determination of an interest rate by the Administrative Agent pursuant to any provision of this Agreement shall be conclusive and binding on the Borrowers and the Lenders in the absence of manifest error.

(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 a portion of its Loans in connection with any refinancing, extension, incremental increase, loan modification or similar transaction permitted by the terms of this Agreement,

pursuant to a cashless settlement mechanism approved by the Company, 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) each L/C Issuer agrees, in reliance upon the agreements of the Revolving Lenders set forth in this Section 2.03, (1) from time to time on any Business Day during the period from the Closing Date until the applicable Letter of Credit Expiration Date, to issue Letters of Credit denominated in Dollars or in one or more Alternative Currencies for the account of any 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 any 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; and provided further that no Letter of Credit denominated in any Alternative Currency may be issued by any L/C Issuer other than Bank of America, through itself or through one of its designated Affiliates or branch offices, in its capacity as such. Each request by a Borrower for the issuance or amendment of a Letter of Credit shall be deemed to be a representation by such 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 Borrowers' ability to obtain Letters of Credit shall be fully revolving, and accordingly the Borrowers 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 in accordance with the terms hereof. 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; or

(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 Borrowers 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 applicable Borrowers 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;

(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; or

(H) the requested Letter of Credit is to be issued for the benefit of an Irish beneficiary.

(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 a 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 such Borrower and/or its Restricted Subsidiary, as required by such L/C Issuer. Such Letter of Credit Application may be sent by facsimile, by 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 Borrowers shall furnish to the applicable L/C Issuer and the Administrative Agent such other documents and information pertaining to such requested Letter of Credit issuance or amendment, including any Issuer Documents, as such L/C Issuer or the Administrative Agent 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 applicable 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 applicable Borrower (or its 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 (determined without regard to any Class or Classes of Revolving Commitments of such Lender) 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 Company and the Administrative Agent a true and complete copy of such Letter of Credit or amendment.

(iv) If the applicable Borrower so requests in any applicable Letter of Credit Application (or the amendment of an outstanding Letter of Credit), 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 applicable 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 applicable 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 any 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 applicable Borrower and the Administrative Agent thereof; provided that any failure to give or delay in giving such notice shall not relieve the applicable Borrower of its obligation to reimburse such L/C Issuer and the Lenders with respect to any drawing under any Letter of Credit. The applicable

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 applicable Borrower shall have notified such L/C Issuer promptly following receipt of the notice of drawing that such 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 applicable Borrower of the Dollar Equivalent of the amount of the drawing promptly following the determination thereof. If such Borrower shall have received such 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 such Borrower shall have received such 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 applicable 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 applicable 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, such Borrower agrees, as a separate and independent obligation, to indemnify the applicable 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 such Borrower fails to so reimburse such 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 Borrowers 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 (determined without regard to any separate Class or Classes of Revolving Commitments of such Lender) 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 Company 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 applicable 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 2.03.

(iv) Until each Revolving Lender funds its Revolving Loan or L/C Advance pursuant to this Section 2.03(c) to reimburse the applicable 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 each L/C Issuer 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, any Borrower, any Subsidiary or any other Person for any reason whatsoever; (B) the occurrence or continuance of a Default; (C) any existing Class of Revolving Commitments or (D) 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 Company of a Loan Notice). No such making of an L/C Advance shall relieve or otherwise impair the obligation of the applicable Borrower to reimburse the applicable 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 any 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 applicable 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 the applicable 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 each applicable 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 any 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 any Borrower or any waiver by such L/C Issuer which does not in fact materially prejudice the Borrowers;

(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, any 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 any 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 Borrowers to the extent provided in the second proviso to Section 2.03(f).

The applicable 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 any of such Borrower's instructions or other irregularity, such Borrower will immediately notify the applicable L/C Issuer. The Borrowers 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 Issuers. Each Lender and each 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 Borrowers hereby assume 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 Borrowers' 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 Borrowers may have a claim against any L/C Issuer, and such L/C Issuer may be liable to the Borrowers, to the extent, but only to the extent, of any direct, as opposed to consequential, special, indirect, punitive or exemplary, damages suffered by the Borrowers which the Borrowers prove, 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 applicable 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 Borrowers for, and no L/C Issuer's rights and remedies against the Borrowers 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 applicable Borrowers 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 Dollar Equivalent of 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 applicable Borrowers 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 applicable Borrowers 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 applicable Borrowers 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 applicable Borrowers 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 applicable Borrowers 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 any applicable 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 Company, 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 any Borrower, such 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. Each Borrower hereby acknowledges that the issuance of Letters of Credit for the account of its Restricted Subsidiaries inures to the benefit of such Borrower, and that such 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 Company (each such loan, a "Swingline Loan"). Each such Swingline Loan may be made, subject to the terms and conditions set forth herein, to the Company, in Dollars, from time to time on any Business Day during the Availability Period for any Class of Revolving Commitments in which the Swingline Lender holds a Revolving Commitment, 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, (B) the Revolving Exposure of any Revolving Lender at such time shall not exceed such Lender's Revolving Commitment, and (C) the Revolving Exposure of any Lender under any Class of Revolving Commitments shall not exceed such Lender's Revolving Commitment of such Class, (ii) the Company 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 Company 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 (determined without regard to any separate Class or Classes of Revolving Commitments of such Lender) 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 Company's irrevocable notice to the Swingline Lender and the Administrative Agent, which may be given by: (i) telephone or (ii) 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 (A) the amount to be borrowed, which shall be a minimum of $100,000 and (B) 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 (1) 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~~second sentence of Section 2.04(a), or (2) 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 Company at its office by crediting the account of the Company 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 Company (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 (determined without regard to any Class or Classes of Revolving Commitments of such Lender) 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 Company 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 (determined without regard to any Class or Classes of Revolving Commitments of such Lender) 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 for Dollar-denominated payments 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 Company 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 applicable Overnight Rate from time to time in effect, 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, any Borrower or any other Person for any reason whatsoever, (B) the occurrence or continuance of a Default, (C) any Class of any such Loans or (D) 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 Company of a Loan Notice). No such funding of risk participations shall relieve or otherwise impair the obligation of the Company 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 (determined without regard to any separate Class or Classes of Revolving Commitments of such Lender) 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 (determined without regard to any separate Class or Classes of Revolving Commitments of such Lender) 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 applicable Overnight 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 Company 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 Company 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 Borrowers 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 Eurocurrency Rate Loans denominated in Dollars, Euro or Sterling, (2) four (4) Business Days (or five (5), in the case of prepayment of Loans denominated in Special Notice Currencies) prior to any date of prepayment of Eurocurrency Rate Loans denominated in other Alternative Currencies, and (3) on the date of prepayment of Base Rate Loans; (B) any prepayment of Eurocurrency 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, the currency and amount of such prepayment and the Type(s) of Loans to be prepaid and, if Eurocurrency Rate Loans are to be prepaid, the Interest Period(s) of such Loans. The Administrative Agent will promptly notify each Appropriate 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 any Borrower, the applicable Borrower shall make such prepayment and the payment amount specified in such notice shall be due and payable on the date specified therein; provided, that any notice of prepayment 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 applicable Borrower (by notice to the Administrative Agent on or prior to the specified date) if such condition is not satisfied. 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 Company 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 Company, the Company shall make such prepayment and the payment amount specified in such notice shall be due and payable on the date specified therein; provided, that any notice of prepayment 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 Company (by notice to the Administrative Agent on or prior to the specified date) if such condition is not satisfied. 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 applicable Borrowers 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 Borrowers 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 further, 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 applicable Borrowers upon three (3) Business Days' notice from the Administrative Agent to the Company.

(ii) If the Administrative Agent notifies the Company at any time that, as a result of a change in the applicable exchange rates relating to Alternative Currencies, the Outstanding Amount of all L/C Obligations 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 the Company's receipt of such notice, the

applicable Borrowers shall 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.

(iii) If the Administrative Agent notifies the Company at any time that, as a result of a change in the applicable exchange rates relating to Alternative Currencies, the Total Revolving Outstandings denominated in Alternative Currencies at such time exceeds an amount equal to 105% of the Alternative Currency Sublimit then in effect, then, within three (3) Business Days after the Company's receipt of such notice, the applicable Borrowers shall prepay Revolving Loans and/or Cash Collateralize Letters of Credit, in each case denominated in Alternative Currencies, in an aggregate amount sufficient to reduce Total Revolving Outstandings denominated in Alternative Currencies as of such date of payment to an amount not to exceed 100% of the Alternative Currency Sublimit then in effect; provided, however, that the Borrowers shall not be required to Cash Collateralize such Letters of Credit pursuant to this Section 2.05(b)(~~ii~~iii) unless, after the prepayment of the Revolving Loans denominated in Alternative Currencies, the Total Revolving Outstandings denominated in Alternative Currencies exceed the Alternative Currency Sublimit then in effect.

(iv) Except as otherwise provided in Section 2.15, (A) prepayments of the Revolving Facility made pursuant to Section 2.05(b)(i) (other than by provision of Cash Collateral) first, shall be applied ratably to the L/C Borrowings and the Swingline Loans, and second, shall be applied to the outstanding Revolving Loans, ratably across each outstanding Class of Revolving Loans, and (B) prepayments of the Revolving Facility made pursuant to Section 2.05(b)(iii) (other than by provision of Cash Collateral) shall be applied to the outstanding Revolving Loans denominated in Alternative Currencies, ratably across each outstanding Class of Revolving Loans. Cash Collateral provided pursuant to this Section 2.05(b) shall be applied in accordance with Section 2.14. 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 any Loan Party or any Defaulting Lender that has provided Cash Collateral) to reimburse the applicable L/C Issuer or the Revolving Lenders, as applicable.

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 Eurocurrency 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.

Notwithstanding anything to the contrary in this Section 2.05, no prepayment by a Designated Foreign Borrower shall be used to pay or be applied against any Guaranteed Obligations of or attributable to any U.S. Loan Party (or any other Domestic Subsidiary).

2.06 Termination or Reduction of Commitments.

(a) Optional. The Company may, upon notice to the Administrative Agent, terminate the Revolving Facility, the Letter of Credit Sublimit, the Swingline Sublimit or the Alternative Currency Sublimit, or from time to time permanently reduce the Revolving Facility, the Letter of Credit Sublimit, the Swingline Sublimit or the Alternative Currency 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 Company 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, (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, or (D) the Alternative Currency Sublimit if, after giving effect thereto and to any concurrent prepayments hereunder, the Total Revolving Outstandings denominated in Alternative Currencies would exceed the Alternative Currency 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 Company (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, the Alternative Currency Sublimit or the Swingline Sublimit exceeds the Aggregate Revolving Commitments at such time, the Letter of Credit Sublimit, the Alternative Currency 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, the Alternative Currency Sublimit, the 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 on a pro rata basis across all Classes of Revolving Commitments 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 applicable Borrowers shall repay to the relevant Revolving Lenders on the applicable Maturity Date for each Class of Revolving Loans the aggregate principal amount of all Revolving Loans of such Class outstanding on such date made to such Borrower (it being understood and agreed that, subject to the other terms and conditions hereof, the Borrowers may make Borrowings of Revolving Loans under any remaining Revolving Commitments of any other Class to effect such repayment).

(b) Swingline Loans. The Company 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 Company 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 ~~latest~~Latest Maturity Date for any Class of Revolving Commitments maintained by the Swingline Lender (in its capacity as a Revolving Lender).

(c) Reallocation of Applicable Percentages after Maturity. Upon the occurrence of a Maturity Date for any applicable Class of Revolving Loans, the relevant Applicable Percentages with respect to each remaining Class of Revolving Commitments shall be readjusted without any further action or consent of any other party (calculated without regard to the Class of Revolving Commitments as to which the Maturity Date has occurred), to reflect the expiration of the Class of Revolving Commitments as to which the Maturity Date has occurred.

2.08 Interest and Default Rate.

(a) Interest. Subject to the provisions of Section 2.08(b), (i) each Eurocurrency 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 Eurocurrency 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 Company 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 third Business Day after the end 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 applicable Borrowers 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 applicable Borrowers 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 Eurocurrency 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), or, in the case of interest in respect of Loans denominated in Alternative Currencies as to which market practice differs from the foregoing, in accordance with such market practice. 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. With respect to all Non-LIBOR Quoted Currencies, the calculation of the applicable interest rate shall be determined in accordance with market practice.

(b) Financial Statement Adjustments or Restatements. If, as a result of any restatement of or other adjustment to the financial statements of the Company and its Subsidiaries or for any other reason, the Company, or the Lenders determine that (i) the Consolidated Leverage Ratio as calculated by the Company 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 Borrowers 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 any 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 Borrowers' 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 Borrowers 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 Borrowers 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 Borrowers 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, currency 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 Borrowers 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 and except with respect to principal of and interest on Loans denominated in an Alternative Currency, all payments by the Borrowers hereunder shall be made to the Administrative Agent, for the account of the respective Lenders to which such payment is owed, at the applicable Administrative Agent's Office in Dollars and in Same Day Funds not later than 2:00 p.m.

on the date specified herein. Except as otherwise expressly provided herein, all payments by the Borrowers hereunder with respect to principal and interest on Loans denominated in an Alternative Currency shall be made to the Administrative Agent, for the account of the respective Lenders to which such payment is owed, at the applicable Administrative Agent's Office in such Alternative Currency and in Same Day Funds not later than the Applicable Time specified by the Administrative Agent on the dates specified herein. Without limiting the generality of the foregoing, the Administrative Agent may require that any payments due under this Agreement be made in the United States. If, for any reason, any Borrower is prohibited by any Law from making any required payment hereunder in an Alternative Currency, such Borrower shall make such payment in Dollars in the Dollar Equivalent of the Alternative Currency payment amount. The Administrative Agent will promptly distribute to each Appropriate Lender its relevant Applicable Percentage (or other applicable share (including on account of Extended Revolving Commitments) 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 a 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 Eurocurrency 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 applicable 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 applicable 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 applicable 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 any Borrower, the interest rate applicable to Base Rate Loans or in the case of Alternative Currencies in accordance with such market practice, in each case as applicable. If the applicable

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 applicable Borrower the amount of such interest paid by the applicable 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 applicable Borrower shall be without prejudice to any claim the applicable Borrower may have against a Lender that shall have failed to make such payment to the Administrative Agent.

(ii) Payments by Borrowers; Presumptions by Administrative Agent. Unless the Administrative Agent shall have received notice from the Company 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 applicable Borrower will not make such payment, the Administrative Agent may assume that the Borrowers have 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 any applicable 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 Company 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 Borrowers 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 Sections 2.09(a) and 2.03(h) and 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 Borrowers 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 Borrowers 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 Borrowers 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 or Extended Revolving Commitments), (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) any 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 applicable Borrowers shall, solely with respect to their respective outstanding Letters of Credit or L/C Borrowings, as applicable, immediately (in the case of clause (iii) above, except to the extent a longer period is provided under Section 2.05, as applicable) 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 such Defaulting Lender) or the amount required pursuant to Section 2.05, as applicable.

(b) Grant of Security Interest. Each 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 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 applicable Borrower or, to the extent provided by any Defaulting Lender, such Defaulting Lender, 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 applicable Borrowers 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. Each Designated Foreign Borrower hereby agrees to take all such further acts and to execute, acknowledge, deliver, record, file and register such documents and instruments as the Administrative Agent may reasonably require to carry out the provisions of this Section 2.14.

(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; provided that no Cash Collateral provided in respect of any Obligations of a Designated Foreign Borrower shall be applied to the satisfaction of any Obligations of or attributable to any U.S. Loan Party; provided further, however, that the Borrowers shall cause Cash Collateral to be provided by each applicable Borrower in an amount sufficient to Cash Collateralize the L/C Obligations related to such Borrower, as provided 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 Borrowers 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 Borrowers 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, examiner 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

Company 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 Company, 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 Borrowers as a result of any judgment of a court of competent jurisdiction obtained by the Borrowers 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 with respect to any applicable Class 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 Classes of the relevant Classes of 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 (including any applicable Class of 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 Borrowers 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 Borrowers 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 (x) such reallocation does not cause the aggregate Revolving Exposure of any Non-Defaulting Lender to exceed such Non-Defaulting Lender's Revolving Commitment or the aggregate Revolving Exposure of any Non-Defaulting Lender under any Class of Revolving Commitments to exceed such Non-Defaulting Lender's Revolving Commitment of such Class and (y) no Non-Defaulting Lender is allocated any Class of Revolving Commitments which it does not maintain. 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 applicable Borrowers 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 Company, 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 Borrowers 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 Designated Foreign Borrowers.

(a) Initial Designated Foreign Borrowers. Effective as of the date hereof, Vertex Europe and Vertex Ireland shall each be a "Designated Foreign Borrower" hereunder and may receive Loans and have Letters of Credit issued for its account as a Designated Foreign Borrower on the terms and conditions set forth in this Agreement.

(b) Additional Designated Foreign Borrowers. The Company may at any time, upon not less than fifteen (15) Business Days' notice from the Company to the Administrative Agent (or such shorter period as may be agreed by the Administrative Agent in its sole discretion), request to designate any additional Restricted Subsidiary that is a Foreign Subsidiary of the Company (an "Applicant Foreign Borrower") as a Designated Foreign Borrower to receive Revolving Loans hereunder by delivering to the Administrative Agent (which shall promptly deliver counterparts thereof to each Lender) a duly executed Designated Foreign Borrower Request and Assumption Agreement. The parties hereto acknowledge and agree that prior to any Applicant Foreign Borrower becoming entitled to utilize the credit facilities provided for herein, (i) the Administrative Agent, the Lenders and the L/C Issuers must each agree to such Applicant Foreign Borrower becoming a Designated Foreign Borrower (such consent not to be unreasonably withheld or delayed) and (ii) the Administrative Agent, the Lenders and the L/C Issuers shall have received such supporting resolutions, incumbency certificates, opinions of counsel and other documents or information reasonably requested (including, without limitation and to the extent so requested, (x) to the extent any Applicant Foreign Borrower qualifies as a "legal entity customer" under the Beneficial Ownership

Regulation, a Beneficial Ownership Certification and (y) any other documentation and information regarding such Applicant Foreign Borrower reasonably requested by the Administrative Agent and the Lenders in order to comply with "know your customer" and anti-money laundering rules and regulations), in form, content and scope reasonably satisfactory to the Administrative Agent, as may be required by the Administrative Agent, and Revolving Notes signed by such new Borrowers to the extent any Lender so requires (the requirements in the foregoing clauses (i) and (ii), the "Designated Foreign Borrower Requirements"). If the Designated Foreign Borrower Requirements are met, the Administrative Agent shall send a Designated Foreign Borrower Notice to the Company, the Lenders and the L/C Issuers specifying the effective date upon which such Applicant Foreign Borrower shall constitute a Designated Foreign Borrower for purposes hereof, whereupon each of the Lenders and L/C Issuers agrees to permit such Designated Foreign Borrower to receive Credit Extensions hereunder, on the terms and conditions set forth herein, and each of the parties agrees that such Designated Foreign Borrower otherwise shall be a Borrower for all purposes of this Agreement; provided that no Loan Notice or Letter of Credit Application may be submitted by or on behalf of such Designated Foreign Borrower until the date that is five (5) Business Days after such effective date.

(c) Obligations. Except as specifically provided herein, the Obligations of each of the Borrowers (including, without limitation, Obligations under Sections 2.07, 2.08 and 2.09) shall be joint and several in nature, regardless of which Person actually receives Credit Extensions hereunder or the amount of such Credit Extensions received or the manner in which the Administrative Agent, the L/C Issuer or any Lender accounts for such Credit Extensions on its books and records; provided, however, that notwithstanding anything contained to the contrary herein or in any other Loan Document, the Designated Foreign Borrowers shall not be liable with respect to any Obligations of the Company.

(d) Appointment. Each Restricted Subsidiary of the Company that is or becomes a Designated Foreign Borrower hereby irrevocably appoints, designates and authorizes the Company to act on its behalf as its agent for all purposes of this Agreement and the other Loan Documents and authorizes the Company to take such actions on its behalf and to exercise such powers as are delegated to the Company by the terms hereof or thereof, together with such actions and powers as are reasonably incidental thereto. Each Restricted Subsidiary of the Company that is or becomes a Designated Foreign Borrower hereby further agrees that (i) the Company may execute such documents on behalf of such Designated Foreign Borrower as the Company deems appropriate in its sole discretion and each Designated Foreign Borrower shall be obligated by all of the terms of any such document executed on its behalf, (ii) any notice or communication delivered by the Administrative Agent or the Lender to the Company shall be deemed delivered to each Designated Foreign Borrower and (iii) the Administrative Agent or the Lenders may accept, and be permitted to rely on, any document, instrument or agreement executed by the Company on behalf of each of the Loan Parties.

(e) Termination. The Company may from time to time, upon not less than three (3) Business Days' prior written notice from the Company to the Administrative Agent (or such shorter period as may be agreed by the Administrative Agent in its sole discretion), terminate a Designated Foreign Borrower's status as such; provided that (i) there are no outstanding Loans payable by such Designated Foreign Borrower, Letters of Credit issued for the account of such Designated Foreign Borrower or any of its Subsidiaries, or other amounts due and payable by such Designated Foreign Borrower as of the effective date of such termination, (ii) no Event of Default has occurred and is continuing or would result therefrom and (iii) immediately after giving effect to such termination, the aggregate outstanding principal amount of all Priority Indebtedness shall not exceed fifteen percent (15%) of Consolidated Net Worth (determined as of the last day of the most recent fiscal quarter for which financial statements shall have been delivered pursuant to Section 6.01(a) or 6.01(b) (or, prior to the delivery of any such financial statements, determined as of June 30, 2019)); provided further, that the Administrative Agent, the applicable L/C Issuer and the Lenders shall cooperate with any Designated Foreign Borrower to amend or replace any Letter of Credit in order to name the Company as the applicant or account party with respect to any Letter of Credit issued for the account of such Designated Foreign Borrower or any of its Subsidiaries. The Administrative Agent will promptly notify the Lenders of any such termination of a Designated Foreign Borrower's status.

2.17 Designated Lenders.

Each of the Administrative Agent, each L/C Issuer, each Swingline Lender and each Lender at its option may make any Credit Extension or otherwise perform its obligations hereunder through any Lending Office (each, a "Designated Lender"); provided that any exercise of such option shall not affect the obligation of any Borrower to repay any Credit Extension in accordance with the terms of this Agreement. Any Designated Lender shall be considered a Lender; provided that designation of a Designated Lender is for administrative convenience only and does not expand the scope of liabilities or obligations of any Lender or Designated Lender beyond those of the Lender designating such Person as a Designated Lender as provided in this Agreement.

2.18 Increase in Revolving Commitments.

(a) Increase in Revolving Facility.

(i) Upon notice to the Administrative Agent (which shall promptly notify the Revolving Lenders), the Company 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 $500,000,000 (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 $1,000,000,000. Subject to the terms and conditions hereof, the Company 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 Company (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 Company 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 Company 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 Company 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 Company 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 2.18:

(i) as of the Revolving Facility 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 Company 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 Company 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 2.18, 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 Company 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 Company 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 Company, the other Borrowers 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 applicable Borrowers shall prepay any Revolving Loans outstanding on the Revolving Facility 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 2.18.

(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 (or, if more than one Class of Revolving Commitments is then outstanding, the Revolving Commitments with the then Latest Maturity Date) 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 Facility pursuant to this Section 2.18.

(d) Conflicting Provisions. This Section 2.18 shall supersede any provisions in Section 2.13 or 11.01 to the contrary.

2.19 Extension of Maturity Date.

(a) Request for Extended Revolving Commitments. So long as no Event of Default has occurred and is continuing, the Borrowers may at any time and from time to time, upon written request to and the consent of the Administrative Agent, the Swingline Lender and the L/C Issuers, request (each, a "Revolving Extension Request") that an aggregate principal amount of not less than $100,000,000 of the then existing Revolving Commitments of any Class (each, an "Existing Revolving Tranche") be amended to, among other things, extend the applicable Maturity Date with respect thereto (the "Existing Maturity Date") to a date that is no earlier than the then Latest Maturity Date of any other Revolving Commitment hereunder (any such Revolving Commitments so amended, "Extended Revolving Commitments"); provided that (i) after giving effect to any Extended Revolving Commitments under this Section 2.19, there shall be no more than three (3) Classes of Revolving Commitments outstanding at any time and (ii) any such Extended Revolving Commitments shall be offered on the same terms to each Revolving Lender under the applicable Existing Revolving Tranche on a ratable basis. For the avoidance of doubt, the reference to "on the same terms" in the preceding sentence shall mean that all of the Revolving Lenders holding such Existing Revolving Tranche are offered to be extended for the same amount of time, offered the same type of Revolving Commitment and that the interest rate changes and fees payable with respect to such extension are the same. Promptly after receipt of any Revolving Extension Request, the Administrative Agent shall provide a copy of such request to each of the Revolving Lenders under the applicable Existing Revolving Tranche to be amended, which request shall set forth the proposed terms (which shall be determined in consultation with the Administrative Agent) of the Extended Revolving Commitments to be established. Each Revolving Extension Request shall specify (A) the applicable Class of Revolving Commitments and Revolving Loans hereunder to be extended, (B) the date to which the applicable Maturity Date is sought to be extended, and (C) the changes, if any, to the Applicable Rate to be applied in determining the interest payable on the Revolving Loans of, and fees payable hereunder to, Extending Revolving Lenders in respect of that portion of their Revolving Commitments and Revolving Loans extended to such new Maturity Date; provided, however, that such Extended Revolving Commitments shall, except as to interest rates, fees and any other pricing terms and final maturity, have the same terms (including borrowing terms and payment terms (other than payment on the applicable Maturity Date)) as the existing Class of Revolving Commitments from which they are extended. At the time of sending such notice, the Company (in consultation with the Administrative Agent) shall specify the time period within which each applicable Revolving Lender is requested to respond to such request (which shall in no event be less than fifteen (15) calendar days (or such shorter period as

may be agreed by the Administrative Agent) from the date of delivery of such notice to such Revolving Lenders) and shall agree to such procedures, if any, as may be established by, or reasonably acceptable to, the Administrative Agent to accomplish the purposes of this Section 2.19.

(b) Election to Extend. Any Revolving Lender wishing to have all (but not less than all) of its Revolving Commitments under the Existing Revolving Tranche amended into Extended Revolving Commitments (each, including any Additional Commitment Lenders (as defined below), an "Extending Revolving Lender") specified in the Revolving Extension Request shall notify the Administrative Agent on or prior to the response date specified in such Revolving Extension Request of the Revolving Commitments it has elected to be amended. No Revolving Lender shall have any obligation to agree to provide any Extended Revolving Commitment pursuant to any Revolving Extension Request. Any Revolving Lender that determines not to extend its Revolving Commitments under the Existing Revolving Tranche, and notifies the Administrative Agent as to the same, or does not responding on or prior to such response date shall be deemed to have declined such Revolving Extension Request and, in each case, shall constitute a "Non-Consenting Lender" hereunder. The Administrative Agent shall notify the Company and each Revolving Lender under the applicable Existing Revolving Tranche of responses to such Revolving Extension Request. In the event that the aggregate principal amount of existing Revolving Commitments that the Extending Revolving Lenders have elected to amend pursuant to the relevant Revolving Extension Request exceeds the amount of Extended Revolving Commitments requested by the Borrowers, the principal amount of Extended Revolving Commitments requested by the Borrowers shall be allocated to each Extending Revolving Lender in such manner and in such amounts as may be agreed by Administrative Agent and the Company, in their sole discretion.

(c) Additional Commitment Lenders. The Company shall have the right to replace each Non-Consenting Lender with, and add as "Revolving Lenders" under this Agreement in place thereof, one or more Eligible Assignees (each, an "Additional Commitment Lender") as provided in Section 11.13; provided that each of such Additional Commitment Lenders shall enter into an Assignment and Assumption in connection with any such Revolving Extension Request pursuant to which such Additional Commitment Lender shall undertake a Revolving Commitment (and, if any such Additional Commitment Lender is already a Lender, its Revolving Commitment shall be in addition to any other Revolving Commitment of such Lender hereunder on such date) from one or more Non-Consenting Lenders.

(d) Revolving Extension Amendment. Extended Revolving Commitments shall be established pursuant to an amendment (each, a "Revolving Extension Amendment") to this Agreement among the Borrowers, the Administrative Agent and each Extending Revolving Lender, if any, providing an Extended Revolving Commitment, which shall be consistent with the provisions set forth in Sections 2.19(a), (b) and (d) (but which shall not require the consent of any other Lender). The

effectiveness of any Revolving Extension Amendment shall be subject to the satisfaction on the date thereof of each of the conditions set forth in Sections 4.02(a) and 4.02(b) (but solely limited to an Event of Default) (with all references in such Sections to a Credit Extension being deemed to be references to such Revolving Extension Request) and receipt of a certificate to that effect and, any other condition as may be agreed among the Borrowers, the Administrative Agent and the Extending Revolving Lenders. In addition, the Company 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 Company, the other Borrowers 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 extension. The Administrative Agent shall promptly notify each Lender as to the effectiveness of each Revolving Extension Amendment and the matters specified therein. Each of the parties hereto hereby agrees that this Agreement and the other Loan Documents may be amended pursuant to a Revolving Extension Amendment, without the consent of any other Lender, to the extent (but only to the extent) necessary to (i) reflect the existence and terms of the Extended Revolving Commitments incurred pursuant thereto, and (ii) effect such other amendments to this Agreement and the other Loan Documents as may be necessary or appropriate, in the reasonable opinion of the Administrative Agent and the Borrowers, to effect the provisions of this Section 2.19, in each case, in a manner consistent with the terms of this Section 2.19, and the Required Lenders hereby expressly authorize the Administrative Agent to enter into any such Revolving Extension Amendment.

(e) Terms of Extended Revolving Commitments. Except as expressly provided herein, all Extended Revolving Commitments effected pursuant to any Revolving Extension Request and Revolving Extension Amendment shall be subject to the same terms, and shall be subject to the same conditions as the Existing Revolving Tranche. After giving effect to any Extended Revolving Commitment, all borrowings under the Revolving Commitments (including any such Extended Revolving Commitments) and repayments thereunder shall be made on a pro rata basis (except for (x) any payments of interest and fees at different rates on any Revolving Extension Series (and related Loans thereunder), (y) repayments required upon the applicable Maturity Date of other Revolving Commitments and (z) except as otherwise expressly set forth herein). If a Revolving Extension Amendment has become effective hereunder, not later than the third Business Day prior to the Existing Maturity Date, the Borrowers shall make prepayments of Revolving Loans and shall Cash Collateralize Letters of Credit, such that, after giving effect to such prepayments and such provision of Cash Collateral, the aggregate Revolving Exposure as of such date will not exceed the aggregate applicable Extended Revolving Commitments of the Extended Revolving Lenders (and the Borrowers shall not be permitted thereafter to request any Revolving Loan or any issuance, amendment, renewal or extension of a Letter of Credit if, after giving effect

thereto, the applicable Revolving Exposure would exceed the aggregate amount of the Extended Revolving Commitments then in effect).

(f) Revolving Extension Series. Any Extended Revolving Commitments effected pursuant to a Revolving Extension Request shall be designated a series (each, a "Revolving Extension Series") of Extended Revolving Commitments for all purposes of this Agreement; provided that any Extended Revolving Commitments effected from an Existing Revolving Tranche may, to the extent provided in the applicable Revolving Extension Amendment, be designated as an increase in any previously established Revolving Extension Series with respect to such Existing Revolving Tranche. In connection with the foregoing, Schedule 1.01(b) attached hereto shall be updated to reflect each applicable Revolving Extension Series, in a manner reasonably satisfactory to the Administrative Agent.

(g) Changes to Applicable Rate. In connection with any extension of the Maturity Date made pursuant to this Section 2.19, the Applicable Rate applicable to Loans made and to be made by Extending Revolving Lenders may be modified without any consent of any other Lender, provided that no such modification shall apply to the Loans of the other Lenders unless the Company and the Administrative Agent (without any requirement of consultation with or approval by any other Lender) determine that such change should apply to the Loans of the other Lenders and either (i) such other Lender has consented to such change (notwithstanding ~~its~~such Lender is not consenting to the applicable extension of the Maturity Date) or (ii) such change represents an increase in the Applicable Rate applicable to the Loans of the other Lenders.

(h) Conflicting Provisions. This Section 2.19 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 this Section 3.01.

(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 this Section 3.01, (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 withholdings and 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 this Section 3.01, (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 withholdings and 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.

(iv) A Loan Party shall promptly upon becoming aware that it must make a deduction or withholding for any Taxes from a payment under any Loan Document (or that there is a change in the rate or the basis of such deduction or withholding) notify the Administrative Agent (who shall notify any relevant Lenders) accordingly.

(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 applicable Loan Party 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

applicable Loan Party 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 applicable Borrower and the Administrative Agent, at the time or times reasonably requested by the applicable Borrower or the Administrative Agent, such properly completed and executed documentation reasonably requested by the applicable 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 applicable Borrower or the Administrative Agent, shall deliver such other documentation prescribed by applicable Law or reasonably requested by the applicable Borrower or the Administrative Agent as will enable the applicable 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 applicable Borrower is a U.S. Person (including the Company),

(A) any Lender that is a U.S. Person shall deliver to the Company 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 Company 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 Company 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 Company 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 I-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 Company 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 I-2 or Exhibit I-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 I-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 Company 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 Company 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 Company 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 Company and the Administrative Agent at the time or times prescribed by law and at such time or times reasonably requested by the Company 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 Company or the Administrative Agent as may be necessary for the Company 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 applicable Borrower and the Administrative Agent in writing of its legal inability to do so.

(f) An Irish Treaty Lender and the applicable Borrower shall co-operate in completing any procedural formalities necessary for the applicable Borrower to obtain authorization to make a payment to that Irish Treaty Lender without any deduction or withholding of any tax imposed by Ireland.

(g) In respect of Loans advanced to a Loan Party that is within the charge to ~~UK Taxes~~United Kingdom corporation tax:

(i) Subject to Section 3.01(g)(ii), a UK Treaty Lender and each Loan Party which makes a payment under a Loan Document to which that UK Treaty Lender is entitled shall cooperate in completing any procedural formalities necessary for such Loan Party to obtain authorization to make that payment without a UK Tax Deduction, including making and filing of an appropriate application for relief under an applicable Treaty.

(ii) A UK Treaty Lender that holds a passport under the HMRC Double Taxation Treaty Passport Scheme ("UK DTTP Scheme") and which wishes the UK DTTP Scheme to apply to this Agreement, shall confirm its scheme reference number and jurisdiction of tax residence in: (A) where the UK Treaty Lender is a Lender on the date of this Agreement, Schedule 1.01(d) to this Agreement; or (B) where the UK Treaty Lender becomes a Lender after the date of this Agreement, the relevant Assignment and Assumption, and, having done so, that UK Treaty Lender shall be under no obligation pursuant to Section 3.01(g)(i) to cooperate with the relevant Loan Party but, for avoidance of doubt, such UK Treaty Lender shall have an obligation to cooperate further with the relevant Loan Party in accordance with Section 3.01(g)(iii).

(iii) If a UK Treaty Lender has confirmed its scheme reference number and its jurisdiction of tax residence in accordance with Section 3.01(g)(ii) and:

(A) a Loan Party making a payment to that UK Treaty Lender has not made a UK DTTP Filing in respect of that UK Treaty Lender; or

(B) a Loan Party making a payment to that UK Treaty Lender has made a UK DTTP Filing in respect of that Lender but either (~~a~~1) that UK DTTP Filing has been rejected by HMRC or (~~b~~2) HMRC has not given the Loan Party authority to make payments to that UK Treaty Lender without a UK Tax Deduction within forty (40) Business Days of the date of the UK DTTP Filing, and in each case, the relevant Loan Party has notified that UK Treaty Lender in writing, that UK Treaty Lender and the Loan Party shall cooperate in completing any additional procedural formalities necessary for that Loan Party to obtain authorization to make that payment without a UK Tax Deduction.

(iv) If a Lender has not confirmed its scheme reference number and jurisdiction of tax residence in accordance with Section 3.01(g)(ii), no Loan Party shall make a UK DTTP Filing or file any other form relating to the UK DTTP Scheme in respect of that Lender's Revolving Commitment or participation in any Loan unless the Lender otherwise agrees.

(v) A Loan Party shall, promptly after making a UK DTTP Filing, deliver a copy of the UK DTTP Filing to the Administrative Agent for delivery to the relevant Lender.

(vi) A Lender that is a Lender on the date of this Agreement that is a UK Qualifying Lender solely by virtue of sub-paragraph (b) of the definition of UK Qualifying Lender gives a UK Tax Confirmation to Company by entering into the Agreement. A Lender that is a UK Qualifying Lender solely by virtue of sub-paragraph (b) of the definition of UK Qualifying Lender shall promptly notify Company and the Administrative Agent if there is any change in the position from that set out in the UK Tax Confirmation.

(vii) Each Lender which is not a Lender on the date of this Agreement shall indicate in the relevant Assignment and Assumption, for the benefit of the Administrative Agent, but without liability to any Loan Party, whether it is:

(A) not a UK Qualifying Lender;

(B) a UK Qualifying Lender (that is not a UK Treaty Lender); or

(C) a UK Treaty Lender.

If a Lender fails to indicate its status in accordance with this Section 3.01(g)(vii) then such Lender shall be treated for the purposes of this Agreement (including by each Loan Party) as if it is not a UK Qualifying Lender until such time as it notifies the Administrative Agent (and the Administrative Agent, upon receipt of such notification, shall inform the Company). For the avoidance of doubt, an Assignment and Assumption shall not be invalidated by any failure of a Lender to comply with this Section 3.01(g)(vii).

(h) Each Lender which is not a Lender on the date of this Agreement shall indicate in the relevant Assignment and Assumption, for the benefit of the Administrative Agent, but without liability to any Loan Party, whether it is:

(i) not an Irish Qualifying Lender;

(ii) an Irish Qualifying Lender (that is not an Irish Treaty Lender); or

(iii) an Irish Treaty Lender.

If a Lender fails to indicate its status in accordance with this Section 3.01(h) then such Lender shall be treated for the purposes of this Agreement (including by each Loan Party) as if it is not an Irish Qualifying Lender until such time as it notifies the Administrative Agent (and the Administrative Agent, upon receipt of such notification, shall inform the Company). For the avoidance of doubt, an Assignment and Assumption shall not be invalidated by any failure of a Lender to comply with this Section 3.01(h).

(i) 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.

(j) 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 applicable Lending Office to make, maintain or fund or charge interest with respect to any Credit Extension, or to determine or charge interest rates based upon the Eurocurrency 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 or any Alternative Currency in the applicable interbank market, then, upon notice thereof by such Lender to the Company (through the Administrative Agent), (i) any obligation of such Lender to make or continue Eurocurrency Rate Loans in the affected currency or currencies or, in the case of Eurocurrency Rate Loans in Dollars, to convert Base Rate Loans to Eurocurrency Rate Loans, shall be suspended, and (ii) 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 Eurocurrency 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 Eurocurrency Rate component of the Base Rate, in each case until such Lender notifies the Administrative Agent and the Company that the circumstances giving rise to such determination no longer exist. Upon receipt of such notice, (A) the Borrowers shall, upon demand from such Lender (with a copy to the Administrative Agent), prepay or, if applicable and such

Loans are denominated in Dollars, convert all Eurocurrency 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 Eurocurrency 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 Eurocurrency Rate Loans to such day, or immediately, if such Lender may not lawfully continue to maintain such Eurocurrency Rate Loans and (B) if such notice asserts the illegality of such Lender determining or charging interest rates based upon the Eurocurrency Rate, the Administrative Agent shall during the period of such suspension compute the Base Rate applicable to such Lender without reference to the Eurocurrency 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 Eurocurrency Rate. Upon any such prepayment or conversion, the Borrowers shall also pay accrued interest on the amount so prepaid or converted, together with any additional amounts required pursuant to Section 3.05.

(b) If, in any applicable jurisdiction, the Administrative Agent, the applicable L/C Issuer or any Lender or any Designated Lender determines that any Law has made it unlawful, or that any Governmental Authority has asserted that it is unlawful, for the Administrative Agent, the applicable L/C Issuer or any Lender or its applicable Designated Lender to (i) perform any of its obligations hereunder or under any other Loan Document, (ii) to fund, hold a commitment or maintain its participation in any Loan or Letter of Credit or (iii) 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 Company, 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 participation in the Loans or other applicable Obligations on the last day of the Interest Period for each Loan or other Obligation occurring after the Administrative Agent has notified the Company or, if earlier, 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), (B) to the extent applicable to the applicable L/C Issuer, Cash Collateralize that portion of applicable L/C Obligations comprised of the aggregate undrawn amount of Letters of Credit to the extent not otherwise Cash Collateralized and (C) 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 Eurocurrency Rate Loan or a conversion to or continuation thereof, (i) the Administrative Agent determines that (A) deposits (whether in Dollars or an Alternative Currency) are not being offered to banks in the applicable offshore interbank market for such currency for the applicable amount and Interest Period of such Eurocurrency Rate Loan, (B) (1) adequate and

reasonable means do not exist for determining the Eurocurrency Rate for any requested Interest Period with respect to a proposed Eurocurrency Rate Loan (whether denominated in Dollars or an Alternative Currency) or in connection with an existing or proposed Base Rate Loan and (2) the circumstances described in Section 3.03(c)(i) do not apply or (C) a fundamental change has occurred in the foreign exchange or interbank markets with respect to such Alternative Currency (including, without limitation, changes in national or international financial, political or economic conditions or currency exchange rates or exchange controls) (in each case with respect to this clause (i), "Impacted Loans") or (ii) the Administrative Agent or the Required Lenders determine that for any reason Eurocurrency Rate for any requested Interest Period with respect to a proposed Eurocurrency 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 Company and each Lender. Thereafter, (x) the obligation of the Lenders to make or maintain Eurocurrency Rate Loans in the affected currency or currencies shall be suspended (to the extent of the affected Eurocurrency Rate Loans or Interest Periods), and (y) in the event of a determination described in the preceding sentence with respect to the Eurocurrency Rate component of the Base Rate, the utilization of the Eurocurrency Rate component in determining the Base Rate shall be suspended, in each case until the Administrative Agent (or, in the case of a determination by the Required Lenders described in clause (ii) of this Section 3.03(a), until the Administrative Agent upon instruction of the Required Lenders) revokes such notice. Upon receipt of such notice, the Company may revoke any pending request for a Borrowing of, conversion to or continuation of Eurocurrency Rate Loans in the affected currency or currencies (to the extent of the affected Eurocurrency 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 Dollars 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 3.03, the Administrative Agent in consultation with the Company, 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 (i) the Administrative Agent revokes the notice delivered with respect to the Impacted Loans under clause (a)(i) of this Section 3.03, (ii) the Administrative Agent or the Required Lenders notify the Administrative Agent and the Company that such alternative interest rate does not adequately and fairly reflect the cost to such Lenders of funding the Impacted Loans or (iii) 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 Company written notice thereof.

(c) Notwithstanding anything to the contrary in this Agreement or any other Loan Documents, but without limiting Sections 3.01(a) and (b) above, if the Administrative Agent determines (which determination shall be conclusive and binding upon all parties hereto absent manifest error), or the Company or Required Lenders notify the Administrative Agent (with, in the case of the Required Lenders, a copy to the Company) that the Company or Required Lenders (as applicable) have determined (which determination likewise shall be conclusive and binding upon all parties hereto absent manifest error), that:

(i) adequate and reasonable means do not exist for ascertaining LIBOR for any requested Interest Period, including, without limitation, because the LIBOR Screen Rate is not available or published on a current basis and such circumstances are unlikely to be temporary; or

(ii) the administrator of the LIBOR Screen Rate or a Governmental Authority having or purporting to have jurisdiction over the Administrative Agent has made a public statement identifying a specific date after which LIBOR or the LIBOR Screen Rate shall no longer be made available, or used for determining the interest rate of loans in the applicable currency; provided that, at the time of such statement, there is no successor administrator that is satisfactory to the Administrative Agent, that will continue to provide LIBOR after such specific date (such specific date, the "Scheduled Unavailability Date"), or

(iii) syndicated loans currently being executed, or that include language similar to that contained in this Section 3.03, are being executed or amended (as applicable) to incorporate or adopt a new benchmark interest rate to replace LIBOR,

then, reasonably promptly after such determination by the Administrative Agent or receipt by the Administrative Agent of such notice, as applicable, the Administrative Agent and the Company may amend this Agreement to replace LIBOR in accordance with this Section 3.03 with (x) one or more SOFR-Based Rates (which shall be applicable only to Loans denominated in Dollars) or (y) another alternate benchmark rate giving due consideration to any evolving or then existing convention for similar ~~U.S. dollar~~Dollar denominated syndicated credit facilities for such alternative benchmarks and, in each case, including any mathematical or other adjustments to such benchmark giving due consideration to any evolving or then existing convention for similar ~~U.S. dollar~~Dollar denominated syndicated credit facilities for such benchmarks, which adjustment or method for calculating such adjustment shall be published on an information service as selected by the Administrative Agent from time to time in its reasonable discretion and may be periodically updated (the "Adjustment"; and any such proposed rate, a "LIBOR Successor Rate"), and any such amendment shall become effective at 5:00 p.m. on the fifth Business Day after the Administrative Agent shall have posted such proposed amendment to all Lenders and the Company unless, prior to such time, Lenders comprising the Required Lenders have delivered to the Administrative Agent written

notice that such Required Lenders (A) in the case of an amendment to replace LIBOR with a rate described in clause (x), object to the Adjustment; or (B) in the case of an amendment to replace LIBOR with a rate described in clause (y), object to such amendment; provided that for the avoidance of doubt, in the case of clause (A), the Required Lenders shall not be entitled to object to any SOFR-Based Rate contained in any such amendment. Such LIBOR Successor Rate shall be applied in a manner consistent with market practice; provided that to the extent such market practice is not administratively feasible for the Administrative Agent, such LIBOR Successor Rate shall be applied in a manner as otherwise reasonably determined by the Administrative Agent.

If no LIBOR Successor Rate has been determined and the circumstances under clause (c)(i) above exist or the Scheduled Unavailability Date has occurred (as applicable), the Administrative Agent will promptly so notify the Company and each Lender. Thereafter, (i) the obligation of the Lenders to make or maintain Eurocurrency Rate Loans in the affected currency or currencies shall be suspended (to the extent of the affected Eurocurrency Rate Loans or Interest Periods), and (ii) the Eurocurrency Rate component shall no longer be utilized in determining the Base Rate. Upon receipt of such notice, the Company may revoke any pending request for a Borrowing of, conversion to or continuation of Eurocurrency Rate Loans in the affected currency or currencies (to the extent of the affected Eurocurrency 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 (subject to the foregoing clause (ii)) in Dollars in the amount specified therein.

Notwithstanding anything else herein, any definition of LIBOR Successor Rate shall provide that in no event shall such LIBOR Successor Rate be less than zero for purposes of this Agreement.

In connection with the implementation of a LIBOR Successor Rate, the Administrative Agent will have the right to make LIBOR Successor Rate Conforming Changes from time to time and, notwithstanding anything to the contrary herein or in any other Loan Document, any amendments implementing such LIBOR Successor Rate Conforming Changes will become effective without any further action or consent of any other party to this Agreement~~.~~; provided that, with respect to any such amendment effected, the Administrative Agent shall post each such amendment implementing LIBOR Successor Rate Conforming Changes to the Company and the Lenders reasonably promptly after such amendment becomes effective.

For purposes hereof:

"LIBOR Successor Rate Conforming Changes" means, with respect to any proposed LIBOR Successor Rate, any conforming changes to the definition of Base Rate, Interest Period, timing and frequency of determining rates and making payments of interest and other technical, administrative or operational matters as may be appropriate, in the discretion of the Administrative Agent, to reflect the adoption and implementation of such LIBOR Successor Rate and to permit the administration thereof by the

Administrative Agent in a manner substantially consistent with market practice (or, if the Administrative Agent determines that adoption of any portion of such market practice is not administratively feasible or that no market practice for the administration of such LIBOR Successor Rate exists, in such other manner of administration as the Administrative Agent determines is reasonably necessary in connection with the administration of this Agreement).

"Relevant Governmental Body" means the Federal Reserve Board and/or the Federal Reserve Bank of New York, or a committee officially endorsed or convened by the Federal Reserve Board and/or the Federal Reserve Bank of New York for the purpose of recommending a benchmark rate to replace LIBOR in loan agreements similar to this Agreement.

"SOFR" with respect to any day means the secured overnight financing rate published for such day by the Federal Reserve Bank of New York, as the administrator of the benchmark (or a successor administrator) on the Federal Reserve Bank of New York's website (or any successor source) and, in each case, that has been selected or recommended by the Relevant Governmental Body.

"SOFR-Based Rate" means SOFR or Term SOFR.

"Term SOFR" means the forward-looking term rate for any period that is approximately (as determined by the Administrative Agent) as long as any of the Interest Period options set forth in the definition of "Interest Period" and that is based on SOFR and that has been selected or recommended by the Relevant Governmental Body, in each case as published on an information service as selected by the Administrative Agent from time to time in its reasonable discretion.

3.04 Increased Costs; Reserves on Eurocurrency 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(e)) or any L/C Issuer;

(ii) subject any Recipient to any Taxes (other than (A) Indemnified Taxes, (B) Excluded Taxes (other than those described in clause (a) 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

Eurocurrency 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 Company will pay (or cause the applicable Designated Foreign Borrower to 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 or liquidity), then from time to time the Company will pay (or cause the applicable Designated Foreign Borrower to 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) [Reserved].

(d) Certificates for Reimbursement. A certificate of a Lender or an L/C Issuer setting forth in reasonable detail 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 clause (a) or (b) of this Section 3.04, including the basis and calculation thereof, shall be delivered to the Company and shall be conclusive absent manifest error. The Company shall pay (or cause the applicable Designated Foreign Borrower to 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.

(e) Reserves on Eurocurrency Rate Loans. The Company shall pay (or cause the applicable Designated Foreign Borrower to 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 Eurocurrency 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 Company 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.

(f) 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 Borrowers 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 Company 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 Company shall promptly compensate (or cause the applicable Designated Foreign Borrower to 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 Borrowers (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 Company (or the applicable Designated Foreign Borrower);

(c) any assignment of a Eurocurrency Rate Loan on a day other than the last day of the Interest Period therefor as a result of a request by the Company pursuant to Section 11.13; or

(d) any failure by any Borrower to make payment of any Loan or 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 foreign exchange losses and 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 or from the performance of any foreign exchange contract (but excluding any loss of anticipated profits). The Company shall also pay (or cause the applicable Designated Foreign Borrower to pay) any customer administrative fees charged by such Lender in connection with the foregoing.

For purposes of calculating amounts payable by the Company (or the applicable Designated Foreign Borrower) to the Lenders under this Section 3.05, each Lender shall be deemed to have funded each Eurocurrency Rate Loan made by it at the Eurocurrency Rate for such Loan by a matching deposit or other borrowing in the offshore interbank market for such currency for a comparable amount and for a comparable period, whether or not such Eurocurrency 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 Borrowers 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 Company, 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 Company hereby agrees to pay (or cause the applicable Designated Foreign Borrower 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 Borrowers are 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 Company may replace such Lender in accordance with Section 11.13.

3.07 Survival.

All of the Borrowers' 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:

(a) Execution of Credit Agreement; Loan Documents. The Administrative Agent (or its counsel) 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 reasonably in advance of the Closing Date, a Revolving Note executed by a Responsible Officer of each Borrower and (iii) counterparts of the Intercompany Subordination Agreement, executed by a Responsible Officer of each 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 (or its counsel) shall have received a certificate of a Responsible Officer of each Loan Party dated the Closing Date, certifying as to (i) the Organization Documents of such Loan Party (which, to the extent filed with a Governmental Authority in the United States, shall be certified as of a recent date by such Governmental Authority), (ii) the resolutions of the board of directors or other governing body of such Loan Party, (iii) in the case of Vertex Europe only, a resolution signed by all of the holders of the issued shares in Vertex Europe, (iv) the good standing of such Loan Party (to the extent the concept is relevant and customarily certified in the applicable jurisdiction) by attaching a good standing certificate, certified as of a recent date by such Governmental Authority, (v) the incumbency (including specimen signatures) of the Responsible Officers of such Loan Party and (vi) in the case of Vertex Europe and Vertex Ireland only, that the borrowing or guaranteeing (as

applicable) of the aggregate of the Revolving Commitments would not cause any borrowing, guarantee or similar limit binding on it to be exceeded, each in form and substance reasonably satisfactory to the Administrative Agent.

(c) Legal Opinions of Counsel. The Administrative Agent shall have received favorable opinions of counsel to the Borrowers (including appropriate local counsel), in each case, dated the Closing Date and addressed to the Administrative Agent and the Lenders, in form and substance reasonably satisfactory 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) Insurance. The Administrative Agent shall have received customary certificates evidencing insurance meeting the requirements set forth herein.

(e) Officer's Closing Certificate. The Administrative Agent (or its counsel) shall have received a certificate or certificates executed by a Responsible Officer (i) of the Company as of the Closing Date, certifying as to the matters set forth in clause (h) of this Section 4.01, the matters set forth in Section 4.02(a) and (b) and, (ii) in respect of Vertex Ireland only, of Vertex Ireland as of the Closing Date, that (A) its entry into the Loan Documents and performance of the transactions thereby contemplated would not constitute "financial assistance" within the meaning of section 82 of the Companies Act 2014 of Ireland and (B) the Loan Parties are members of the same group of companies consisting of a holding company and its subsidiaries (within the meanings of sections 7 and 8 of the Companies Act 2014 of Ireland) for the purposes of section 243 of the Companies Act 2014 of Ireland.

(f) Loan Notice. The Administrative Agent shall have received a Loan Notice with respect to any Loans to be made on the Closing Date.

(g) 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 Company and its Restricted Subsidiaries under the Existing Credit Agreement shall be repaid in full and all security interests related thereto shall be terminated substantially concurrently with, or prior to, the Closing Date.

(h) 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 Borrowers, threatened in writing) that has had or would be reasonably expected to have, either individually or in the aggregate, a Material Adverse Effect.

(i) Anti-Money-Laundering; Beneficial Ownership. (x) The Administrative Agent shall have received, at least three (3) Business Days prior to the Closing Date, the documentation and other information regarding the Borrowers requested by the Administrative Agent and the Lenders in order to comply with "know your customer"

and anti-money laundering rules and regulations, including without limitation, the Patriot Act, to the extent requested in writing by the Administrative Agent on behalf of the Lenders at least ten (10) days prior to the Closing Date and (y) to the extent any Borrower qualifies as a "legal entity customer" under 31 C.F.R. § 1010.230 (the "Beneficial Ownership Regulation"), at least three (3) Business Days prior to the Closing Date, any Lender that has requested in a written notice to the Company at least ten (10) days prior to the Closing Date, a certification regarding beneficial ownership required by the Beneficial Ownership Regulation (the "Beneficial Ownership Certification") in relation to the Borrowers shall have received such Beneficial Ownership Certification (provided that, execution and delivery of a Beneficial Ownership Certification in the form published by The Loan Syndication and Trading Association is acceptable to all Lenders for purposes of satisfying the condition set forth in this clause (y) of Section 4.01(i)).

(j) Consents. The Administrative Agent (or its counsel) shall have received a certificate of a Responsible Officer of the Company either (i) 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 (ii) stating that no such consents, licenses or approvals are so required.

(k) Fees and Expenses. The Administrative Agent, the Lenders and the Arrangers shall have received all reasonable, documented and out-of-pocket fees and expenses (including the reasonable, document and out-of-pocket fees and expenses of one primary counsel and one local counsel as necessary in each appropriate jurisdiction for the Administrative Agent, the Lenders and the Arrangers, taken as a whole) owing pursuant to the 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 (except as otherwise agreed by the Company).

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. The Administrative Agent shall promptly notify the Lenders and the Borrowers in writing of the occurrence of the Closing Date and each of the Lenders hereby agrees that the receipt of such notification shall be conclusive and binding.

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 Eurocurrency Rate Loans) is subject to the following conditions precedent:

(a) Representations and Warranties. The representations and warranties of the Company and each other Loan Party contained in Article V (other than, solely with respect to Credit Extensions after the Closing Date, Section 5.05(c)) 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, 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 (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, except to the extent that such representations and warranties specifically refer to an earlier date, in which case they shall be true and correct in all material respects as of such earlier date, and, further, 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) Designated Foreign Borrower. If the applicable Borrower is a Designated Foreign Borrower pursuant to Section 2.16(b) (other than Vertex Europe or Vertex Ireland), then the Designated Foreign Borrower Requirements shall have been met to the reasonable satisfaction of the Administrative Agent.

(e) 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 Eurocurrency Rate Loans) submitted by the Company 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, formed or incorporated, 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 organization, formation or incorporation, (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, 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; 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~~a) contravene the terms of any of such Person's Organization Documents, (~~ii~~b) conflict with or result in any breach or contravention of, or the creation of any Lien under (~~A~~i) 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)~~ii) 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~~c) violate any applicable Law, except in the case of this clauses (~~ii~~b) and (~~iii~~c) above, with respect to any conflict, breach or violation to the extent that such conflict, breach or violation 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 the execution, delivery or performance by, or enforcement against, any Loan Party of this Agreement or any other Loan Document, except for (~~i~~a) 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, (~~ii~~b) filings with the SEC, including a Current Report on Form 8-K and (~~iii~~c) 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, examinership, 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 Company 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 sheets of the Company and its Restricted Subsidiaries dated March 31, 2019 and June 30, 2019, and the related Consolidated statements of income or operations, shareholders' equity and cash flows for the fiscal quarters ended on such dates (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 Company and its Restricted Subsidiaries as of the dates thereof and their results of operations, cash flows and changes in shareholders' equity for the periods 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 Company and its Restricted Subsidiaries delivered pursuant to Section 6.01 were prepared in good faith on the basis of the assumptions stated therein, which assumptions were believed by management of the Company to be reasonable at the time made; it being understood and 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 forecasts and projections are as to future events, and not to be viewed as facts and are subject to significant uncertainties and contingencies, many of which are beyond the control of the Company and its 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 significantly 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 the Company or any Restricted Subsidiary 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.

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 material to the present conduct of its business, in each case, except for defects in title that do not materially interfere with its ability to conduct its business or to utilize such properties for their intended purposes or 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 (~~i~~a) are in compliance with applicable Environmental Laws, which compliance includes possession of and compliance with all required Environmental Permits, (~~ii~~b) are not subject to any Environmental Liability, and (~~iii~~c) have not received written notice of any claim pursuant to Environmental Laws or with respect to the release of or exposure to Hazardous Materials, excluding any matters with respect to the foregoing that would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

5.10 Insurance.

The properties of the Company and its Restricted Subsidiaries are insured with financially sound and reputable insurance companies, 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 income Tax and other material Tax returns and reports required to be filed, and have paid, caused to be paid or made a provision for the payment of, all material federal income Taxes

and other material Taxes required to be paid by it except (~~i~~a) those which are not overdue for a period of more than thirty (30) days, so long as the failure to make any such payment during such thirty (30~~-~~) day period would not reasonably be expected to have a Material Adverse Effect, or (~~ii~~b) 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 other than an agreement solely among any of the Company and its Subsidiaries.

The Company is not required to make any deduction on account of Irish tax from any payment it may make under any Loan Document to a Lender which is an Irish Qualifying Lender subject, in the case of an Irish Treaty Lender, to the completion of any necessary procedural formalities.

No Loan Party is required to make any UK Tax Deduction from any payment it may make under a Loan Document to a Lender which is (a) a UK Qualifying Lender (i) falling within paragraph (a) of the definition of "UK Qualifying Lender" or (ii) except where a UK Direction has been given under Section 931 of the UK Taxes Act in relation to the payment concerned, falling within paragraph (b) of the definition of "UK Qualifying Lender", or (b) a UK Treaty Lender and the payment is one specified in a direction given by the Commissioners of Revenue and Customs under Regulation 2 of the Double Taxation Relief (Taxes on Income) (General) Regulations 1970 (SI 1970/488).

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 except for instances of noncompliance that, either individually or in the aggregate, have not resulted or would not reasonably be expected to result in a Material Adverse Effect. 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 Procedure 2019-19 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 Company 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 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. None of the Borrowers is engaged, nor will it 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, other forward-looking information and information of a general economic or industry nature) to the Administrative Agent or any Lender in connection with this Agreement or any other Loan Document or the transactions contemplated hereby or thereby or delivered hereunder or thereunder (in each case as modified or supplemented by other information so furnished) when taken as a whole, together with disclosures made by the Company 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 Company 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.

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.

5.16 Solvency.

The Company, 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 Company 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 and HMT's Consolidated List of Financial Sanctions Targets, or (ii) located, organized or resident in a Designated Jurisdiction (such Persons referred to herein as "Sanctioned Persons").

(b) Anti-Corruption Laws; Sanctions. 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, other similar anti-corruption legislation in other jurisdictions and applicable Sanctions, and have instituted and maintained policies and procedures designed to promote and achieve compliance in all material respects with such laws and applicable Sanctions.

5.18 Subsidiaries; Equity Interests; Loan Parties.

(a) Subsidiaries. Set forth on Schedule 5.18(a), is the following information which is true and complete in all respects as of the ~~Closing~~First Amendment Effective 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 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.).

(b) Loan Parties. Set forth on Schedule 5.18(b) is a complete and accurate list of all Loan Parties, showing as of the ~~Closing~~First Amendment Effective 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 (if any), (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).

5.19 Covered Entities.

No Loan Party is a Covered Entity.

5.20 [Reserved].

5.21 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 consist of the Material Intellectual Property or other IP Rights reasonably necessary for the operation of their respective businesses, except where the failure to own or possess the right to use such IP Rights would not reasonably be expected to have a Material Adverse Effect. To the knowledge of the Loan Parties, 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.

5.22 ~~EEA~~Affected Financial Institutions.

No Loan Party is an ~~EEA~~Affected Financial Institution.

5.23 Representations as to Designated Foreign Borrowers.

(a) Each Designated Foreign Borrower is subject to civil and commercial Laws with respect to its obligations under this Agreement and the other Loan Documents to which it is a party (collectively as to such Designated Foreign Borrower, the "Applicable Designated Foreign Borrower Documents"), and the execution, delivery and performance by such Designated Foreign Borrower of the Applicable Designated Foreign Borrower Documents constitute and will constitute private and commercial acts and not public or governmental acts. Neither such Designated Foreign Borrower nor any of its property has any immunity from jurisdiction of any court or from any legal process (whether through service or notice, attachment prior to judgment, attachment in aid of execution, execution or otherwise) under the Laws of the jurisdiction in which such Designated Foreign Borrower is organized and existing in respect of its obligations under the Applicable Designated Foreign Borrower Documents.

(b) The Applicable Designated Foreign Borrower Documents are in proper legal form under the Laws of the jurisdiction in which such Designated Foreign Borrower is organized and existing for the enforcement thereof against such Designated Foreign Borrower under the Laws of such jurisdiction, and to ensure the legality, validity,

enforceability, priority or admissibility in evidence of the Applicable Designated Foreign Borrower Documents. It is not necessary to ensure the legality, validity, enforceability, priority or admissibility in evidence of the Applicable Designated Foreign Borrower Documents that the Applicable Designated Foreign Borrower Documents be filed, registered or recorded with, or executed or notarized before, any court or other authority in the jurisdiction in which such Designated Foreign Borrower is organized and existing or that any registration charge or stamp or similar tax be paid on or in respect of the Applicable Designated Foreign Borrower Documents or any other document, except for (i) any such filing, registration, recording, execution or notarization as has been made or is not required to be made until the Applicable Designated Foreign Borrower Document or any other document is sought to be enforced and (ii) any charge or tax as has been timely paid.

(c) For purposes of Regulation (EU) 2015/848 of the European Parliament and of the Council of 20 May 2015 on insolvency proceedings (recast) (the "Regulation"), the centre of main interest (as that term is used in Article 3(1) of the Regulation) for Vertex Europe and Vertex Ireland is situated in its jurisdiction of incorporation and, in each case, neither Vertex Europe nor Vertex Ireland has any "establishment" (as that term is used in Article 2(10) of the Regulation) in any other jurisdiction.

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 Company, a Consolidated balance sheet of the Company 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 (except for any qualification pertaining to a maturity occurring under this Revolving Facility within twelve (12) months of the relevant 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 Company (commencing with the fiscal quarter ended September 30, 2019), a Consolidated balance sheet of the Company 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 Company'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 Company as fairly presenting in all material respects the financial condition, results of operations, shareholders' equity and cash flows of the Company 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 Company, an annual budget of the Company and its Restricted Subsidiaries on a Consolidated basis, including forecasts prepared by management of the Company, in a form reasonably satisfactory to the Administrative Agent, of projected Consolidated statements of income or operations and projected cash flows of the Company 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 Company 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 Company 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 Company.

(b) Updated Schedules. Within fifteen (15) days of delivery of the financial statements referred to in Section 6.01(a), updated Schedules 5.18(a) and 5.18(b) (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.

(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 Company 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) Anti-Money-Laundering; Beneficial Ownership Regulation. Promptly following any request therefor, information and documentation reasonably requested by the Administrative Agent or any Lender in writing for purposes of compliance with applicable "know your customer" and anti-money-laundering rules and regulations, including, without limitation, the Patriot Act.

(e) Beneficial Ownership. To the extent any Loan Party qualifies as a "legal entity customer" under the Beneficial Ownership Regulation, an updated Beneficial Ownership Certification promptly following any change in the information provided in the Beneficial Ownership Certification delivered to any Lender in relation to such Loan Party that would result in a change to the list of beneficial owners identified in such certification.

(f) Additional Information. Promptly, such additional information regarding the business, financial, legal or corporate affairs of the Company 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 SEC's Electronic Data Gathering, Analysis and Retrieval system ~~("EDGAR")~~ on the internet or (b) posted on the Company's website on the Internet at the website address listed on Schedule 1.01(a); or on the Company'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 Company shall deliver paper copies of such documents to the Administrative Agent or any Lender upon its request to the Company 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 Company shall notify the Administrative Agent (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 Company 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 Borrowers hereby acknowledge 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 Borrowers 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 Company 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 Borrowers hereby agree that they 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 Borrowers 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 Borrowers or their 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 Borrowers 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 a Responsible Officer of any Borrower obtaining actual 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; and

(c) of the occurrence of any ERISA Event that has resulted or would reasonably be expected to result in a Material Adverse Effect.

Each notice pursuant to this Section 6.03 shall be accompanied by a statement of a Responsible Officer of the Company setting forth details of the occurrence referred to therein

and, to the extent applicable, stating what action the Company 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 Taxes.

The Company and its Restricted Subsidiaries will pay all material federal income Taxes and other material Taxes 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 Company or such Restricted Subsidiary.

6.05 Preservation of Existence, Etc.

(a) Except as otherwise permitted under Section 7.04, 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, formation or incorporation, as applicable, except, in the case of any Restricted Subsidiary of the Company 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 and casualty excepted.

(b) Except as may be permitted pursuant to Section 7.04, 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.

Maintain with financially sound and reputable insurance companies, 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.

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.

Maintain proper books of record and account, in which full, true and correct entries in conformity, in all material respects, 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.

6.10 Inspection Rights.

Permit representatives and independent contractors of the Administrative Agent 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 Company, 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 Company shall (a) 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 (b) notify the Administrative Agent to the extent the Company and its Restricted Subsidiaries are not providing otherwise requested information; provided, however, that (i) except during the occurrence and continuance of an Event of Default, the Borrowers 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 (ii) 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 Borrowers 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 working

capital and any other general corporate purpose not in contravention of any Law or of any Loan Document.

6.12 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 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) and (d), and (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.

6.13 Further Assurances.

Promptly upon the reasonable request by the Administrative Agent, or any Lender through the Administrative Agent, (a) correct any objective 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, and deliver 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 carry out more effectively the purposes of the Loan Documents.

6.14 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 Company nor any of its Restricted Subsidiaries 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.

6.15 Approvals and Authorizations.

Without limiting the generality of Section 6.08, the Company and each Restricted Subsidiary shall maintain all authorizations, consents, approvals and licenses from, exemptions of, and filings and registrations with, each Governmental Authority of the jurisdiction in which each Loan Party is organized and existing, and all approvals and consents of each other Person in such jurisdiction, 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.

6.16 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.

6.17 Conduct of Business.

Continue to engage in lines of business consistent with the activities of a biotechnology company.

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 (if any) pursuant to any Loan Document (including Liens on Cash Collateral);

(b) Liens existing on the ~~Closing~~First Amendment Effective Date and listed on Schedule 7.01 and any amendments, modifications, replacements, renewals, or extensions thereof; provided that (i) the Lien does not encumber any property other than (A) property encumbered on the ~~Closing~~First Amendment Effective Date, (B) after-acquired property that is affixed or incorporated into the property encumbered by such Lien on the ~~Closing~~First Amendment Effective 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) Liens imposed by law such as carriers', landlords', warehousemen's, mechanics', materialmen's, repairmen's construction, or other like Liens arising in the ordinary course of business which are not overdue for a period of more than sixty (60) days or which are being contested in good faith and by appropriate proceedings, if adequate reserves with respect thereto are maintained on the books of the applicable Person;

(e) (i) 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; (ii) pledges and deposits to secure insurance premiums or reimbursement obligations under insurance policies or (iii) obligations in respect of letters of credit or bank guarantees that have been posted by the Company or any of its Restricted Subsidiaries to support the payments of the items set forth in the foregoing clauses (i) and (ii);

(f) (i) 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~~;~~ and (ii) obligations in respect of letters of credit or bank guarantees that have been posted to support payment of the items set forth in the foregoing clause (i);

(g) easements, rights-of-way, restrictions and other similar encumbrances affecting real property which, in the aggregate do not in any case materially detract from the value of the property subject thereto or 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; <u>provided</u> 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 Company or any of its Restricted Subsidiaries, in each case in the ordinary course of business in favor of the bank or banks with which such accounts are maintained; 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 4-208 or 4-210 of the UCC on items in the course of collection, (ii) attaching to commodities trading accounts or other commodities brokerage accounts in the ordinary course of business or (iii) 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; provided, that in no case shall any such Liens secure (either directly or indirectly) the repayment of any Indebtedness for borrowed money;

(m) any zoning, building or similar laws or rights reserved to or vested in any Governmental Authority;

(n) [reserved];

(o) leases, licenses, subleases or sublicenses to the extent permitted under Section 7.04(b);

(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~~i) on cash or Cash Equivalent advances or escrow deposits in favor of the seller of any property to be acquired in an Investment 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 not prohibited by this Agreement (including any letter of intent or purchase agreement with respect to such Investment or Disposition), or (~~B~~ii) consisting of an agreement to dispose of any property in a Disposition not prohibited by this Agreement, 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 (i) a Restricted Subsidiary that is not a Loan Party in favor of the Company or any other Restricted Subsidiary, (ii) a Loan Party in favor of a U.S. Loan Party or (iii) a Designated Foreign Borrower in favor of a Designated Foreign Borrower;

(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~~i) such Lien was not created in contemplation of such Acquisition or such Person becoming a Restricted Subsidiary, (~~B~~ii) such Lien does not extend to or cover any other assets or property of such Person (other than improvements thereon, replacements and products thereof, additions and accessions thereto or proceeds thereof and other after-acquired property subjected to a Lien securing Indebtedness and other obligations incurred prior to such time and which Indebtedness and other obligations are not prohibited hereunder that require, pursuant to their terms at such time, a pledge of after-acquired property), and (~~C~~iii) 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 (and amendments, modifications, extensions, refinancings, renewals and replacements thereof that do not increase the outstanding principal amount thereof (other than as not prohibited by this Agreement));

(t) Liens deemed to exist in connection with Investments in repurchase agreements related to Cash Equivalents;

(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 Company or any Restricted Subsidiary in the ordinary course of business;

(x) Liens that are contractual rights of set-off relating to purchase orders and other agreements entered into with customers and other counterparties of the Company or any of its Restricted Subsidiaries in the ordinary course of business;

(y) the prior rights of consignees and their lenders under consignment arrangements entered into in the ordinary course of business;

(z) Liens arising from precautionary UCC financing statements regarding operating leases or other obligations not constituting Indebtedness;

(aa) Liens securing insurance premiums financing arrangements; provided that such Liens are limited to the applicable unearned insurance premiums;

(bb) (i) Liens on cash and Cash Equivalents in connection with a Guaranteed Hedge Agreement securing customary initial deposits and margin deposits which are required as a matter of Law and (ii) pledges or transfers of collateral to support bilateral mark-to-market security arrangements in respect of uncleared swap or derivative transactions;

(cc) Liens consisting of pledges or deposits of cash or Cash Equivalents securing obligations in respect of customary (i) letters of credit or bank guarantees permitted under Section 7.02(m) or (ii) warehouse receipts or similar obligations permitted hereunder and, in each case, incurred in the ordinary course of business or consistent with past practice (provided that no such letters of credit, bank guarantees, warehouse receipts or similar obligations support obligations in respect of Indebtedness);

(dd) Liens of sellers of goods to any Loan Party and any of their respective Subsidiaries arising under Article 2 of the UCC or similar provisions of applicable law in the ordinary course of business, covering only the goods sold and securing only the unpaid purchase price for such goods and related expenses;

(ee) in the case of any joint venture, any put and call arrangements related to its Equity Interests set forth in its organizational documents or any related joint venture or similar agreement; and

(ff) Liens securing Indebtedness and other obligations of the Company or any Restricted Subsidiary; *provided* that immediately after giving effect to the incurrence of any Indebtedness or obligations secured by Liens in reliance on this clause (ff), the aggregate outstanding principal amount of all Priority Indebtedness shall not exceed fifteen percent (15%) of Consolidated Net Worth (determined as of the last day of the most recent fiscal quarter for which financial statements shall have been delivered pursuant to Section 6.01(a) or 6.01(b) (or, prior to the delivery of any such financial statements, determined as of June 30, 2019)).

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 Borrowers may, in their 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 any Cystic Fibrosis Drug Franchise Assets 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~~First Amendment Effective Date and listed on Schedule 7.02 and any amendments, 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 Company) 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 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; provided that, in the case of Indebtedness owed by any Loan Party to any Restricted Subsidiary that is not a Loan Party, such Indebtedness shall be unsecured and, to the extent all such Indebtedness exceeds $1,000,000 at any time outstanding, be subordinated in right of payment to the Guaranteed 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 Company or any Subsidiary Guarantor 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;

(g) [reserved];

(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 Company (or of any Person not previously a Subsidiary that is merged, amalgamated or consolidated with or into the Company or a Restricted Subsidiary) after the Closing Date as a result of an Acquisition, or Indebtedness of any Person that is assumed by the Company or any of its Restricted Subsidiaries in connection with an Acquisition of assets by the Company or such Restricted Subsidiary in an Acquisition; provided that (A) such Indebtedness is not incurred in contemplation of such 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 $50,000,000;

(j) [reserved];

(k) obligations of the Company 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 Company 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 $10,000,000 at any one time outstanding;

(n) Indebtedness representing deferred compensation or stock-based compensation or severance, pension and health and welfare benefits to employees and former employees, as applicable, of the Company 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 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 Acquisition or other Investment 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;

(r) Guarantees by the Company with respect to any operating lease payment obligations of any Subsidiaries of the Company;

(s) to the extent constituting Indebtedness, obligations that are being contested in accordance with Section 6.04;

(t) customer advances or deposits or other endorsements for collection, deposit or negotiation and warranties of products or services, in each case received or incurred in the ordinary course of business; and

(u) other Indebtedness of the Company or any Restricted Subsidiary; provided that immediately after giving effect to the incurrence of any Indebtedness in reliance on this clause (u), (i) the aggregate outstanding principal amount of all Priority Indebtedness shall not exceed fifteen percent (15%) of Consolidated Net Worth (determined as of the last day of the most recent fiscal quarter for which financial statements shall have been delivered pursuant to Section 6.01(a) or 6.01(b) (or, prior to the delivery of any such financial statements, determined as of June 30, 2019)) and (ii) the Loan Parties are in Pro Forma Compliance.

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~~Section 7.02, the Borrowers may, in their 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, 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 any CF Asset Subsidiary to any Restricted Subsidiary that is not a Loan Party ~~and~~, (y) ~~Obligations~~Indebtedness of any Designated Foreign Borrower or any

Subsidiary Guarantor hereunder and (z) Indebtedness of any "Designated Foreign Borrower" or any "Subsidiary Guarantor" (in each case, under and as such term is defined in the 2020 Credit Agreement)) in an aggregate amount in excess of $100,000,000 at any one time outstanding.

7.03 [Reserved].

7.04 Fundamental Changes.

(a) 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:

(i) any Restricted Subsidiary that is a Domestic Subsidiary may merge or consolidate with or dissolve or liquidate into (A) the Company; provided that the Company shall be the continuing or surviving Person, or (B) so long as no Event of Default would result therefrom, any one or more other Restricted Subsidiaries that are Domestic Subsidiaries; provided that (x) in any such transaction involving a Subsidiary Guarantor, such Subsidiary Guarantor shall be the continuing or surviving Person, and (y) no such transaction shall cause any ~~then existing~~then-existing Subsidiary Guarantor to become a Subsidiary that would not be required to be a Subsidiary Guarantor pursuant to Section 6.12;

(ii) any Designated Foreign Borrower may merge or consolidate with or dissolve or liquidate into any other Designated Foreign Borrower which is organized or existing under the Laws of the jurisdiction in which the first Designated Foreign Borrower is organized;

(iii) any Restricted Subsidiary that is a Foreign Subsidiary (other than a Designated Foreign Borrower) may merge or consolidate with or dissolve or liquidate into (A) a Designated Foreign Borrower which is organized or existing under the Laws of the jurisdiction in which the first Designated Foreign Borrower is organized; provided that such Designated Foreign Borrower shall be the continuing or surviving Person, or (B) so long as no Event of Default would result therefrom, any one or more other Restricted Subsidiaries that are Foreign Subsidiaries;

(iv) (A) any Subsidiary Guarantor may Dispose of all or substantially all of its assets (including any Disposition that is in the nature of a liquidation) to any other U.S. Loan Party, (B) any Designated Foreign Borrower may Dispose of all or substantially all of its assets (including any Disposition that is in the nature of a liquidation) to any other Loan Party, and (C) any Restricted Subsidiary that is not a Loan Party may Dispose of all or substantially all of its assets (including any Disposition that is in the nature of a liquidation) to any Loan Party or, so long as no Event of Default would result therefrom, any other Restricted Subsidiary;

(v) so long as no Event of Default shall exist or would result therefrom, each of the Company and any of its Restricted Subsidiaries may merge into or consolidate with any other Person (other than the Company or any of its Subsidiaries) or permit any other Person (other than the Company or any of its Subsidiaries) 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 or consolidation to which a Borrower is a party (the "Existing Borrower"), (x) the Existing Borrower is the surviving Person (and if the Company is a party to such merger or consolidation, the Company is the surviving Person) or (y) if the Person formed by or surviving any such merger or consolidation is not the Existing Borrower (any such Person, the "Successor Borrower"), (A) (1) if the Existing Borrower is the Company, 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 (2) if the Existing Borrower is a Designated Foreign Borrower, the Successor Borrower shall be an entity organized or existing under the Laws of the jurisdiction in which the Existing Borrower is organized, (B) the Successor Borrower shall expressly assume all the obligations of the Existing Borrower under this Agreement and the other Loan Documents to which the Existing Borrower is a party pursuant to documents in form and substance reasonably satisfactory to the Administrative Agent, (C) each applicable Guarantor shall have confirmed that its Guarantee shall apply to the Successor Borrower's obligations under the Loan Documents (to the same extent as such Guarantee applied to the Existing Borrower's obligations under the Loan Documents) pursuant to documents in form and substance reasonably satisfactory to the Administrative Agent, (D) the Company 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 (E) 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 or consolidation to which any Subsidiary Guarantor is a party, such Subsidiary Guarantor is the surviving Person, and (iii) in the case of any such merger or consolidation to which any Restricted Subsidiary (other than a Loan Party) is a party, such Restricted Subsidiary is the surviving Person; and

(vi) so long as no Default or Event of Default has occurred and is continuing or would result therefrom, the Company and its Restricted Subsidiaries may consummate Permitted Restructurings.

(b) Make any Disposition (including, for avoidance of doubt and without limitation, by way of Investment, Restricted Payment, sale, transfer or other Disposition) of any Cystic Fibrosis Drug Franchise Assets, except:

(i) (A) Dispositions of inventory in the ordinary course of business and (B) Dispositions of cash and Cash Equivalents;

(ii) Dispositions of equipment or real property to the extent that (A) such property is exchanged for credit against the purchase price of similar replacement property or (B) the proceeds of such Disposition are reasonably promptly applied to the purchase price of such replacement property;

(iii) Dispositions of property by a Restricted Subsidiary to the Company or to a Wholly Owned Subsidiary of the Company; provided that (A) if the transferor of such property is a Subsidiary Guarantor, the transferee thereof must be a U.S. Loan Party, and (B) if the transferor of such property is a Designated Foreign Borrower, the transferee thereof must be a Loan Party;

(iv) Dispositions of accounts receivable in connection with the collection, discounting, settlement or compromise thereof in the ordinary course of business;

(v) Dispositions in the ordinary course of business consisting of the abandonment, or allowing to lapse, of Intellectual Property which, in the reasonable good faith determination of the Borrowers, is uneconomical to maintain, non-strategic, negligible, obsolete or otherwise not material to the value of the Cystic Fibrosis Drug Franchise Assets (taken as a whole) or the conduct of their business (taken as a whole);

(vi) Dispositions of Intellectual Property owned by a Loan Party to a Foreign Subsidiary of a Borrower that is a Restricted Subsidiary, to the extent the Administrative Agent (acting in its reasonable credit judgment) approves such Disposition; provided that (~~i~~A) 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~~B) 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 any Lien thereon securing the Guaranteed Obligations (as such Guaranteed Obligations may be modified, increased, extended, refinanced, renewed or replaced from time to time), (3) be terminable at will by the Loan Parties (which termination shall require the Administrative Agent's consent), (4) 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, (5) specify that it may not be terminated in connection with a Loan Party's bankruptcy, (6) 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 (7) 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~~C) 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, on customary terms for fair value; and

(vii) Dispositions consisting of (A) non-exclusive licenses or sublicenses of (or other non-exclusive grants of rights to use or exploit) Intellectual Property in the ordinary course of business (including inter-company agreements between or among any Loan Parties and Restricted Subsidiaries), (B) outside of the United States, Canada, Ireland, the United Kingdom, France, Germany, Italy, Spain, Australia and the Netherlands, exclusive licenses or sublicenses of (or other exclusive grants of rights to use or exploit) Intellectual Property of the Loan Parties and their Restricted Subsidiaries to third parties, in the ordinary course of business consistent with past practices, to the extent necessary to facilitate the commercial distribution of products and services in regions and territories in which the Loan Parties and their Restricted Subsidiaries do not distribute their products directly, provided that none of the licenses or sublicenses described in the foregoing clauses (A) and (B) (either individually or in the aggregate) could reasonably be expected to (x) result in a Material Adverse Effect, (y) materially interfere with the business of the Loan Parties and their Restricted Subsidiaries, taken as a whole, or (z) solely with respect to clause (B), impair in any material respect the value of the Intellectual Property licensed or granted and (C) licenses or sublicenses of (or other exclusive grants of rights to use or exploit) Intellectual Property approved by the Administrative Agent (acting in its reasonable credit judgment);

provided, that any Disposition pursuant to this Section 7.04(b) (other than Section 7.04(b)(i)(A), (b)(iv), (b)(vi) and (b)(vii)) shall be for Fair Market Value; provided further, that nothing herein shall preclude the Company or any Restricted Subsidiary from consummating any Permitted Restructuring so long as no Default or Event of Default has occurred and is continuing or would result therefrom.

7.05 [Reserved].

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, either directly or indirectly, Restricted Payments to the Company, 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 Company 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 Company 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 Company 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 Company may issue and sell its Equity Interests constituting Qualified Stock;

(e) the Company 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 Company and each Restricted Subsidiary may make Restricted Payments to shareholders of any Person (other than an Affiliate of the Company) acquired by merger pursuant to an Investment, at the time of such Investment;

(g) the Company and each of its Restricted Subsidiaries may (~~A~~i) repurchase, retire, or otherwise acquire or retire at value, Equity Interests held by former directors, officers, employees and consultants; (~~B~~ii) pay withholding or similar Taxes payable by present or former directors, officers, employees or consultants in respect of their Equity Interests; (~~C~~iii) repurchase Equity Interests deemed to occur upon a cashless exercise of options or warrants and (~~D~~iv) pay withholding amounts in respect of Equity Interests of present or former directors, officers, employees or consultants in cash and Cash Equivalents;

(h) the Company 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 Company 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 Event of Default shall exist or would result therefrom and (y) immediately after giving effect to such Restricted Payment, the Company shall be in Pro Forma Compliance, provided that the Consolidated Leverage Ratio shall not exceed, on a Pro Forma Basis, 3.00 to 1.00;

(j) the Company and any Restricted Subsidiary may pay cash in lieu of fractional shares in connection with any dividend, split or combination of its Equity Interests;

(k) the Company or any Restricted Subsidiary 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, consultants or advisors of the Company and its Subsidiaries; and

(l) the Company may pay any dividend or distribution or make any irrevocable Restricted Payment within sixty (60) days after the date of declaration of such dividend or distribution or giving irrevocable notice with respect to such Restricted Payment, as the case may be, if at the date of declaration or notice such Restricted Payment would have complied with the provisions of this Agreement (including the other provisions of this Section 7.06).

7.07 [Reserved].

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 not prohibited by this Agreement); (b) Investments by the Loan Parties and their Restricted Subsidiaries in any other Loan Party or any Subsidiary; (c) R&D Collaboration Payments; (d) customary directors' fees, indemnification (including the provision of directors and officers insurance), expense reimbursement and similar arrangements, consulting fees, employee salaries, bonuses or employment agreements, compensation or employee benefit arrangements, incentive and severance arrangements with any past, present or future officer, director or employee of a Loan Party or a Restricted Subsidiary entered into in the ordinary course of business; (e) Restricted Payments permitted under Section 7.06; (f) advances of payroll payments to employees of the Company or any Restricted Subsidiary in the ordinary course of business; (g) advances to officers, directors, managers, consultants and employees (or, in the case of the following clause (g)(ii), 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 Company or any Restricted Subsidiary (i) for relocation, (ii) in connection with such Person's purchase of Equity Interests of the Company; provided that no cash is actually advanced pursuant to this clause (g)(ii), and (iii) for entertainment, travel and similar purposes in the

ordinary course of business; (h) 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 Company; (i) transactions undertaken in connection with the consummation of any Permitted Restructuring; (j) issuances of Equity Interests to Affiliates and the registration rights and other customary rights associated therewith; (k) transactions with joint ventures for the purchase or sale of property or other assets and services entered into in the ordinary course of business and investments in joint ventures; (l) transactions approved by (i) a majority of disinterested directors of the Company or of the applicable Restricted Subsidiary in good faith or (ii) a committee of the board of directors (or other governing body) of such Person that is comprised of disinterested directors (or such committee otherwise approves such transactions by action of disinterested directors); (m) any transaction or series of related transactions with respect to which the aggregate consideration paid, or fair market value of property Disposed of, by the Company and its Restricted Subsidiaries is less than $5,000,000 for any such individual transaction or series of related transactions; (n) any transaction in respect of which the Company delivers to the Administrative Agent (for delivery to the Lenders) a letter addressed to the board of directors of the Company (or the board of directors or other relevant governing body of the relevant Restricted Subsidiary) from an accounting, appraisal or investment banking firm that is in the good faith determination of the Company qualified to render such letter, which letter states that such transaction is on terms that are no less favorable to the Company or the relevant Restricted Subsidiary, as applicable, than would be obtained on an arm's-length basis from a Person that is not an Affiliate for a comparable transaction; (o) any transaction with an Affiliate where the only consideration paid consists of Equity Interests of the Company; and (p) 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 and the "Loan Documents" (as defined in the 2020 Credit Agreement)) that (a) 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 (A) any agreement in effect on the date hereof and set forth on Schedule 7.09, (B) any agreement in effect at the time any Restricted Subsidiary becomes a Restricted Subsidiary of the Company, so long as such agreement was not entered into in contemplation of such Person becoming a Restricted Subsidiary of the Company, or (C) any reimbursement agreement entered into in the ordinary course of business, to the extent necessary, to effect periodic settlements mandated by such Loan Parties or Restricted Subsidiaries pursuant to such reimbursement agreements, or (ii) create any Lien upon any of their properties or assets to secure the Guaranteed Obligations, except, in the case of clause (a)(ii) 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 secured Indebtedness incurred pursuant to Section 7.02 so long as

such negative pledge does not restrict Liens on the Cystic Fibrosis Drug Franchise Assets of the Loan Parties securing the Guaranteed Obligations (as such Guaranteed 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 not prohibited by this Agreement, 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, so long as such Contractual Obligations are applicable only to such joint venture, (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 or (4) are contained in sales agreements, purchase agreements, acquisition agreements (including by way of merger, acquisition or consolidation) entered into by the Company or any Restricted Subsidiary and solely to the extent in effect pending the closing of such transaction and with respect to the assets covered thereby, (D) restrict subletting or assignment of any lease governing a leasehold interest, and (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 Guaranteed 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 Company 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 Measurement Period ending December 31, 2019) to be greater than 3.50 to 1.00 (such ratio, the "Stated Ratio"); provided, however, that upon consummation of a Material Acquisition and upon the written election of the Company (which may be exercised not more than three (3) times during the term of this Agreement) to the Administrative Agent (which shall promptly notify the Lenders), the Company may increase the maximum Consolidated Leverage Ratio to 4.00 to 1.00 (the "Adjusted Consolidated Leverage Ratio"). The Adjusted Consolidated Leverage Ratio shall be effective as of the date of consummation of the Material Acquisition (including, without limitation, for determining Pro Forma Compliance with the requirements of this Agreement for such 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 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 Material Acquisition. Notwithstanding anything in the foregoing to the contrary, in the event that the Company makes any such election to adjust the Consolidated Leverage Ratio as set forth above during concurrent periods for Material Acquisitions occurring within any period of four (4) full fiscal quarters following the date of the consummation of such Material Acquisitions, the step downs (as set forth above) shall occur after the end of the two (2) and four (4) (respectively) full fiscal quarters following the date of consummation of the most recent Material Acquisition (on account of which the Consolidated Leverage Ratio was adjusted).

(b) Consolidated Interest Coverage Ratio. Permit the Consolidated Interest Coverage Ratio as of the end of any Measurement Period (commencing with the Measurement Period ending December 31, 2019) to be less than 2.50 to 1.00.

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 Company or any of its Restricted Subsidiaries, in a manner adverse to the Lenders in any material respect;

(b) change the fiscal year of the Company 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 Company;

(c) without providing prompt prior written notice to the Administrative Agent following any change in the name, state of formation or organization, form of organization or principal place of business of any Loan Party; or

(d) make any other change in accounting policies or reporting practices of the Company or any of its Restricted Subsidiaries, except as required by GAAP.

7.13 [Reserved].

7.14 [Reserved].

7.15 [Reserved].

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 any Restricted Subsidiary that is a 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 such Person's qualification as a Massachusetts "security corporation" under Mass. Gen. L. c. 63, §38B.

7.19 Unrestricted Subsidiaries.

Permit any Unrestricted Subsidiary to (~~i~~a) own, or possess the right to use, any Intellectual Property, or (~~ii~~b) own any of the material economic rights derived from any Intellectual Property, in each case with respect to clause (~~i~~a) or (~~ii~~b), 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 (each, an "Event of Default"):

(a) Non-Payment. Any Borrower or any other Loan Party fails to pay, in the currency required hereunder, (i) when and as required to be paid herein, 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), 6.10, 6.11, 6.12, Article VII or Article X; or

(c) Other Defaults. Any Loan Party fails to perform or observe 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 Responsible Officer of any Loan Party becoming aware thereof and (y) the Administrative Agent providing the Company 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 any Borrower or any other Loan Party herein, in any other Loan Document, or in any Compliance Certificate or other certificate delivered pursuant to or in connection with this Agreement or 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 (other than an Immaterial Subsidiary) (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 Company 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 under any lease for the Specified Leased Locations (or contained in any instrument or agreement evidencing or relating thereto), the effect of which payment default 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

(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, examiner, 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, administrator, administrative receiver, compulsory manager, 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 Restricted Subsidiary (other than an Immaterial Subsidiary) thereof 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, fully bonded or covered by independent third-party insurance as to which the insurer has been notified of the potential claim and has not denied coverage) and (~~A~~i) enforcement proceedings are commenced by any creditor upon such judgment or order or (~~B~~ii) there is a period of sixty (60) 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 Company 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) Change of Control. There occurs any Change of Control.

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 Borrowers;

(c) require that the Borrowers 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 Borrowers 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 Borrowers 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 Guaranteed Obligations then due hereunder, any amounts received on account of the Guaranteed 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 Guaranteed 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 Guaranteed 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 Guaranteed Obligations constituting accrued and unpaid Letter of Credit Fees and interest on the Loans, L/C Borrowings and other Guaranteed 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 Guaranteed 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 Borrowers 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 Guaranteed Obligations then owing under the Guaranteed Hedge Agreements and Guaranteed 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 Guaranteed Obligations have been indefeasibly paid in full, to the Borrowers 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 Guaranteed 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 Guaranteed Obligations otherwise set forth above in this Section.

Notwithstanding the foregoing, (a) Guaranteed Obligations arising under Guaranteed Cash Management Agreements and Guaranteed Hedge Agreements shall be excluded from the application described above if the Administrative Agent has not received a Guaranteed 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, and (b) no amounts received from or on account of a Designated Foreign Borrower shall be used to pay or applied against any Guaranteed Obligations of or attributable to any U.S. Loan Party or any other Domestic Subsidiary. 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.

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 IX are solely for the benefit of the Administrative Agent, the Lenders and the L/C Issuers, and neither the Borrowers 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.

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.

(a) The Administrative Agent or the Arrangers, as applicable, shall not have any duties or obligations except those expressly set forth herein and in the other Loan Documents, and ~~its~~their respective duties hereunder shall be administrative in nature. Without limiting the generality of the foregoing, the Administrative Agent ~~and its~~or the Arrangers, as applicable, and their Related Parties:

(i) shall not be subject to any fiduciary or other implied duties, regardless of whether a Default has occurred and is continuing;

(ii) 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

(iii) 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~~to any Lender or any L/C Issuer any credit or other information concerning the business, prospects, operations, property, financial and other condition or creditworthiness of any of the Loan ~~Party~~Parties or any of ~~its~~their Affiliates that is communicated to, or ~~obtained by~~in the ~~Person serving as~~possession of, the Administrative Agent, Arranger or any of ~~its Affiliates~~their Related Parties in any capacity, except for notices, reports and other documents expressly required to be furnished to the Lenders by the Administrative Agent herein.

(b) 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 Company, a Lender or an L/C Issuer.

(c) 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.

(d) 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 (v) 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 IX 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 Revolving Facility 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 Company. Upon receipt of any such notice of resignation, the Required Lenders shall have the right, in consultation with the Company, 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, and in each case such successor shall require the consent of the Company at all times other than during the existence of an Event of Default under Section 8.01(a) or 8.01(f) (such consent not to be unreasonably withheld or delayed). 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 Company and

such Person remove such Person as Administrative Agent and, in consultation with the Company, 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(j) 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 Company to a successor Administrative Agent shall be the same as those payable to its predecessor unless otherwise agreed between the Company and such successor, and the retiring or removed Administrative Agent shall cease to be entitled to all such fees upon the effectiveness of its resignation or removal as Administrative Agent, except to the extent it continues to act in any capacity hereunder or under the other Loan Documents after such resignation or removal. After the retiring or removed Administrative Agent's resignation or removal hereunder and under the other Loan Documents, the provisions of this Article XI 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 (A) while the retiring or removed Administrative Agent was acting as Administrative Agent and (B) 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, (1) acting as collateral agent or otherwise holding any collateral security on behalf of any of the Credit Parties and (2) 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 9.06 shall also constitute its resignation as an 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 an 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 Company 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, the Arrangers and the Other Lenders.

Each Lender and each L/C Issuer expressly acknowledges that none of the Administrative Agent nor the Arrangers has made any representation or warranty to it, and that no act by the Administrative Agent or any Arranger hereafter taken, including any consent to, and acceptance of any assignment or review of the affairs of any Loan Party or any Affiliate thereof, shall be deemed to constitute any representation or warranty by the Administrative Agent or any Arranger to any Lender or each L/C Issuer as to any matter, including whether the Administrative Agent or any Arranger has disclosed material information in their (or their Related Parties') possession. Each Lender and each L/C Issuer represents to the Administrative Agent and the Arrangers that it has, independently and without reliance upon the Administrative Agent ~~or~~, the Arrangers, 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~~of, appraisal of, and investigation into, the business, prospects, operations, property, financial and other condition and creditworthiness of the Loan Parties and their Subsidiaries, and all applicable bank or other regulatory Laws relating to the transactions contemplated hereby, and made its own decision to enter into this Agreement and to extend credit to the Borrower hereunder. Each Lender and each L/C Issuer also acknowledges that it will, independently and without reliance upon the Administrative Agent ~~or~~, the Arrangers, 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 credit analysis, appraisals and 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., and to make such investigations as it deems necessary to inform itself as to the business, prospects, operations, property, financial and other condition and creditworthiness of the Loan Parties. Each Lender and each L/C Issuer represents and warrants that (i) the Loan Documents set forth the terms of a commercial lending facility and (ii) it is engaged in making, acquiring or holding commercial loans in the ordinary course and is entering into this Agreement as a Lender or L/C Issuer for the purpose of making, acquiring or holding commercial loans and providing other facilities set forth herein as may be applicable to such Lender or L/C Issuer, and not for the purpose of purchasing, acquiring or holding any other type of financial instrument, and each Lender and each L/C Issuer agrees not to assert a claim in contravention of the foregoing. Each Lender and each L/C Issuer represents and warrants that it is sophisticated with respect to decisions to make, acquire and/or hold commercial loans and to provide other facilities set forth herein, as may be applicable to such Lender or such L/C Issuer, and either it, or the Person exercising discretion in making its decision to make, acquire and/or hold such commercial loans or to provide such other facilities, is experienced in making, acquiring or holding such commercial loans or providing such other facilities.

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, a Lender or an L/C Issuer hereunder.

9.09 Administrative Agent May File Proofs of Claim.

(a) 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 Borrowers) shall be entitled and empowered, by intervention in such proceeding or otherwise:

(i) 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 Guaranteed 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

(ii) 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, examiner, 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.

(b) 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 Guaranteed 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.

9.10 Guaranty Matters.

(a) 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,

(i) to release any Guarantor from its obligations under the Guaranty if (A) such Person ceases to be a Subsidiary or a Loan Party as a result of a transaction permitted under the Loan Documents (including pursuant to Section 7.04) or (B) such Person is designated as an Unrestricted Subsidiary hereunder; and

(ii) to release any Designated Foreign Borrower from its obligations under each Loan Document if such Person ceases to be a Designated Foreign Borrower as provided in Section 2.16(e).

(b) Upon request by the Administrative Agent at any time, the Required Lenders will confirm in writing the Administrative Agent's authority to release any Guarantor from its obligations under the Guaranty and/or any Designated Foreign Borrower from its obligations under the Loan Documents pursuant to this Section 9.10. In each case as specified in this Section 9.10, the Administrative Agent will promptly, at the Borrowers' expense, execute and deliver to the applicable Loan Party such documents as such Loan Party may reasonably request to evidence the release of such Guarantor from its obligations under the Guaranty and/or such Designated Foreign Borrower from its obligations under the Loan Documents, 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 Credit Party as the result of effectuating or executing any document evidencing any release of any 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.

9.11 Guaranteed Cash Management Agreements and Guaranteed 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 or the Guaranty by virtue of the provisions hereof shall have any right to notice of or to consent to any amendment, waiver or modification of the provisions hereof or of the Guaranty (or to notice of or to consent to any amendment, waiver or modification of the provisions hereof of or the Guaranty) other than in its capacity as a Lender and, in such case, only to the extent expressly provided in the Loan Documents (it being understood that Administrative Agent may take any and all action expressly specified in Section 9.10). 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, Guaranteed Obligations arising under Guaranteed Cash Management Agreements and Guaranteed Hedge Agreements except to the extent expressly provided herein and unless the Administrative Agent has received a Guaranteed Party Designation Notice of such Guaranteed 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, Guaranteed Obligations arising under Guaranteed Cash Management Agreements and Guaranteed 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 Company or any of its Subsidiaries under any Guaranteed Cash Management Agreement or Guaranteed Hedge Agreement shall be guaranteed pursuant to the Guaranty only until such time as the Guaranty terminates pursuant to Section 10.06 and (y) any release of Guarantors and/or Designated Foreign Borrowers effected in a manner not prohibited by this Agreement and the other Loan Documents shall not require the consent of holders of obligations under Guaranteed Cash Management Agreements or Guaranteed Hedge Agreements.

9.12 Certain ERISA Matters.

(a) Each Lender (x) represents and warrants, as of the date such Person became a Lender party hereto, to, and (y) covenants, from the date such Person became a Lender party hereto to the date such Person ceases being a Lender party hereto, for the benefit of, the Administrative Agent and not, for the avoidance of doubt, to or for the benefit of the Company or any other Loan Party, that at least one of the following is and will be true:

(i) such Lender is not using "plan assets" (within the meaning of Section 3(42) of ERISA or otherwise) of one or more benefit plans with respect to such Lender's entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Revolving Commitments, or this Agreement;

(ii) the transaction exemption set forth in one or more PTEs, such as PTE 84–14 (a class exemption for certain transactions determined by independent qualified professional asset managers), PTE 95–60 (a class exemption for certain transactions involving insurance company general accounts), PTE 90–1 (a class exemption for certain transactions involving insurance company pooled separate accounts), PTE 91–38 (a class exemption for certain transactions involving bank collective investment funds) or PTE 96–23 (a class exemption for certain transactions determined by in-house asset managers), is applicable with respect to such Lender's entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Revolving Commitments and this Agreement;

(iii) (A) such Lender is an investment fund managed by a "Qualified Professional Asset Manager" (within the meaning of Part VI of PTE 84–14), (B) such Qualified Professional Asset Manager made the investment decision on behalf of such Lender to enter into, participate in, administer and perform the Loans, the Letters of Credit, the Revolving Commitments and this Agreement, (C) the entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Revolving Commitments and this Agreement satisfies the requirements of sub-sections (b) through (g) of Part I of PTE 84–14 and (D) to the best knowledge of such Lender, the requirements of subsection (a) of Part I of PTE 84–14 are satisfied with respect to such Lender's entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Revolving Commitments and this Agreement, or

(iv) such other representation, warranty and covenant as may be agreed in writing between the Administrative Agent, in its sole discretion, and such Lender.

(b) In addition, unless either (1) clause (i) in the immediately preceding clause (a) is true with respect to a Lender or (2) a Lender has provided another representation, warranty and covenant in accordance with clause (iv) in the immediately preceding clause (a), such Lender further (x) represents and warrants, as of the date such Person became a Lender party hereto, to, and (y) covenants, from the date such Person became a Lender party hereto to the date such Person ceases being a Lender party hereto, for the benefit of, the Administrative Agent and not, for the avoidance of doubt, to or for the benefit of the Company or any other Loan Party, that the Administrative Agent is not a fiduciary with respect to the assets of such Lender involved in such Lender's entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Revolving Commitments and this Agreement (including in connection with the reservation or exercise of any rights by the Administrative Agent under this Agreement, any Loan Document or any documents related hereto or thereto).

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 Obligations and Additional Obligations (or, if the scope of such Guarantor's Guaranty is limited to a portion of the Obligations and/or Additional Obligations under the definition of "Guarantors", such portion) (collectively, 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, (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, (c) for avoidance of doubt, the Designated Foreign Borrowers shall not be liable under this Guaranty for any Obligations or Additional Obligations of or attributable to any U.S. Loan Party or any other Domestic Subsidiary, (d) the guaranty given by a Guarantor which is incorporated in England and Wales does not apply to any liability to the extent that it would result in this Guaranty constituting unlawful financial assistance within the meaning of sections 678 or 679 of the Companies Act 2006, and (e) notwithstanding anything contrary in this Section 10.1, the guaranty under this Section 10.1 of any Guarantor incorporated in Ireland does not apply to any liability to the extent that it would (A) result in this Guaranty constituting unlawful financial assistance within the meaning of section 82 of the Companies Act 2014 of Ireland; or (B) constitute a breach of section 239 of the Companies Act 2014 of Ireland. Without limiting the generality of the foregoing, the Guaranteed Obligations shall include any such indebtedness, obligations, and liabilities with respect to Guaranteed 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 Guaranteed Obligations absent manifest error. This Guaranty shall not be affected by the genuineness, validity, regularity or enforceability of the Guaranteed Obligations or any instrument or agreement evidencing any Guaranteed 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 Guaranteed 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 Credit 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 Guaranteed 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 Guaranteed 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 Guaranteed 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 Borrowers or any other guarantor, or the cessation from any cause whatsoever (including any act or omission of any Credit Party) of the liability of the Borrowers 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 Borrowers 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 Borrowers or any other Loan Party, proceed against or exhaust any security for the Guaranteed Obligations, or pursue any other remedy in the power of any Credit Party whatsoever; (e) any benefit of and any right to participate in any security now or hereafter held by any Credit 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 other than the occurrence of the Facility Termination Date and the payment in full in cash (or other arrangement satisfactory to the applicable Cash Management Bank or Hedge Bank) of all Additional Obligations to the extent then due and payable. 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 Guaranteed Obligations, and all notices of acceptance of this Guaranty or of the existence, creation or incurrence of new or additional Guaranteed 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 Guaranteed 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 Borrowers 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 Guaranteed 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 Credit Parties and shall forthwith be paid to the Credit Parties to reduce the amount of the Guaranteed Obligations, whether matured or unmatured.

10.06 Termination; Reinstatement.

This Guaranty is a continuing and irrevocable guaranty of all Guaranteed Obligations now or hereafter existing and shall remain in full force and effect until the Facility Termination Date and the payment in full in cash (or other arrangement satisfactory to the applicable Cash Management Bank or Hedge Bank) of all Additional Obligations to the extent then due and payable. 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 Borrowers or a Guarantor is made, or any of the Credit Parties exercises its right of setoff, in respect of the Guaranteed 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 Credit Parties in their discretion) to be repaid to a trustee, receiver, examiner 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 Credit 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 Section 10.06 shall survive termination of this Guaranty.

10.07 Stay of Acceleration.

If acceleration of the time for payment of any of the Guaranteed Obligations is stayed, in connection with any case commenced by or against a Guarantor or the Borrowers 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 Credit Parties.

10.08 Condition of Borrowers.

Each Guarantor acknowledges and agrees that it has the sole responsibility for, and has adequate means of, obtaining from the Borrowers and any other guarantor such information concerning the financial condition, business and operations of the Borrowers and any such other guarantor as such Guarantor requires, and that none of the Credit Parties has any duty, and such Guarantor is not relying on the Credit Parties at any time, to disclose to it any information relating to the business, operations or financial condition of the Borrowers or any other guarantor (each Guarantor waiving any duty on the part of the Credit Parties to disclose such information and any defense relating to the failure to provide the same).

10.09 Appointment of Company.

Each of the Loan Parties hereby appoints the Company 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 Company may execute such documents and provide such authorizations on behalf of such Loan Parties as the Company 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 Company 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 Company 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 10.11 shall remain in full force and effect until the Guaranteed Obligations have been indefeasibly paid and performed in full. Each Loan Party intends this Section 10.11 to constitute, and this Section 10.11 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.

(a) No amendment or waiver of any provision of this Agreement or any other Loan Document, and no consent to any departure by the Company 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 Company 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:

(i) 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;

(ii) 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;

(iii) 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);

(iv) 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 Borrowers to pay interest or Letter of Credit Fees at the Default Rate;

(v) 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 Borrowers 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;

(vi) 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) Section 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;

(vii) 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;

(viii) 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);

(ix) amend Section 1.06 or the definition of "Alternative Currency" without the written consent of each Lender and each L/C Issuer;

(x) release any Borrower or permit any 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, except to the extent the release of any Designated Foreign Borrower is permitted pursuant to Section 9.10 (in which case such release may be made by the Administrative Agent acting alone); or

(xi) amend Section 2.16(b) to permit the designation of a Designated Foreign Borrower without the consent of the Administrative Agent, the Lenders and the L/C Issuers to such designation, without the written consent of each Lender;

and provided, further, that (A) 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; (B) 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; (C) 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; (D) the 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.

(b) Notwithstanding anything to the contrary herein (including the other provisions of this Section 11.01) (i) the Administrative Agent may, with the prior written consent of the Company only, amend, modify or supplement this Agreement or any of the other Loan Documents to cure any omission, mistake, defect or inconsistency, and (ii) this Agreement may be amended, amended and restated or otherwise supplemented or modified without the consent of any Lender (but with the consent of Company 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 Borrowers under this Agreement and such Lender shall have been paid in full all Obligations (other than (A) contingent indemnification and expense reimbursement obligations as to which no claim has been asserted and (B) for the avoidance of any doubt, any Additional 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 Company as may be necessary or appropriate in the reasonable opinion of the Administrative Agent and the Company in order to give effect to, and the reflect the existence of, any Incremental Revolving Facility pursuant to Section 2.18 or any Revolving Extension Series pursuant to Section 2.19.

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 Company 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 Company 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 Company 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 (to the extent applicable), 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 Borrowers).

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.

(i) 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, the Swingline Lender or such L/C Issuer, as applicable, has notified the Administrative Agent that it is incapable of receiving notices under such Article II by electronic communication. The Administrative Agent, the Swingline Lender, any L/C Issuer or the Borrowers 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.

(ii) Unless the Administrative Agent otherwise prescribes, (A) 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 (B) 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 (A) and (B), 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 Borrowers, 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 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 Borrowers 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 Borrowers, the Administrative Agent, the L/C Issuers and the Swingline Lender may change its address, fax number (to the extent applicable) 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 Company, 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 Company 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.

(a) 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.

(b) 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 an 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. Each Credit Party, whether or not a party hereto, will be deemed, by its acceptance of the benefits of the Guarantees of the Guaranteed Obligations provided under the Loan Documents, to have agreed to the foregoing provisions.

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 out-of-pocket fees, charges and disbursements of one primary counsel for the Administrative Agent and the Arrangers, taken as a whole, and, after consultation with the Company, 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 (z) solely in the event of a conflict of interest where the Administrative Agent, Lender or applicable L/C Issuer informs the Company 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 Company 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 Company 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 Company or any other Loan Party or any of the Company'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 Company 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 Company 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 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 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, none of the parties hereto shall assert, and each party hereto hereby waives, and acknowledges that no other Person shall have, any claim against any other party hereto or 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; provided, that nothing contained in this sentence shall limit the Loan Parties' indemnity obligations to the extent set forth in Section 11.04(b). 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 11.04 shall be payable not later than ten (10) Business Days after demand therefor. Notwithstanding anything to the

contrary herein, the Designated Foreign Borrowers shall not be required to make any payment under this Section 11.04 in respect of any Obligations of or attributable to any U.S. Loan Party, and all other payments under this Section 11.04 shall be made by the ~~Administrative Borrower~~Company and/or the U.S. Loan Parties.

(f) Survival. The agreements in this Section 11.04 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 Guaranteed Obligations.

11.05 Payments Set Aside.

To the extent that any payment by or on behalf of the Company 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, examiner 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 applicable Overnight Rate from time to time in effect, in the applicable currency of such recovery or payment. 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 Company 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 Section 11.06(b), (ii) by way of participation in accordance with the provisions of Section 11.06(d), or (iii) by way of pledge or assignment of a security interest subject to the restrictions of Section 11.06(e) (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

Section 11.06(d) 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 Section 11.06(b)(i)(B) 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 Section 11.06(b)(i)(A), 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 Company 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 Section 11.06(b)(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 Section 11.06(b)(i)(B) and, in addition:

(A) the consent of the Company (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 Company 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 any Borrower or any of the Borrowers' 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 Company 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 Section 11.06(b)(vi), then the assignee of such interest shall be deemed to be a Defaulting Lender for all purposes of this Agreement until such compliance occurs.

(vii) Subject to acceptance and recording thereof by the Administrative Agent pursuant to Section 11.06(c), 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 Borrowers (at their 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 Section 11.06(b) 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 Section 11.06(d).

(c) Register. The Administrative Agent, acting solely for this purpose as a non-fiduciary agent of the Borrowers (and such agency being solely for tax purposes), shall maintain at the Administrative Agent's Office, or if the Administrative Agent's Office is not located in the United States, at such other office of the Administrative Agent that is located within the United States, 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 Borrowers, 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. Any assignment of any Loans or other obligations hereunder shall be effective only upon appropriate entries with respect thereto being made in the Register.

The Register shall be available for inspection by the Borrowers and any Lender, at any reasonable time and from time to time upon reasonable prior notice.

(d) Participations.

(i) Any Lender may at any time, without the consent of, or notice to, the Borrowers 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 any Borrower or any of the Borrowers' 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 Borrowers, 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.

(ii) 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 Borrowers agree 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), 3.01(f), 3.01(g) and 3.01(h) (it being understood that the documentation required under Section 3.01(e), 3.01(f), 3.01(g) and 3.01(h) 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 Section 11.06(b); 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 Section 11.06(b) 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 Borrowers' request and expense, to use reasonable efforts to cooperate with the Borrowers 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 Borrowers, 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 or to comply with Section 3.01(g) or 3.01(h). 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 Section 11.06(b), Bank of America may, (i) upon thirty (30) days' notice to the Company and the Lenders, resign as L/C Issuer and/or (ii) upon thirty (30) days' notice to the Company, resign as Swingline Lender. In the event of any such resignation as L/C Issuer or Swingline Lender, the Company 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 Company 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) [Reserved].

(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 Company 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 Section 11.06(h)(i) shall not be void, but the other provisions of this Section 11.06(h) shall apply.

(ii) If any assignment is made to any Disqualified Institution without the Company's prior consent in violation of Section 11.06(h)(i), the Borrowers may, at their 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 Borrowers 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 Company, 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 Borrowers hereby expressly authorize the Administrative Agent, to (A) post the list of Disqualified Institutions provided by the Company 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 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) (in which case, such Person agrees to inform the Company promptly thereof prior to such disclosure unless (x) such Person is prohibited from doing so under applicable Law or (y) such disclosure is pursuant to a regulatory audit or exam conducted by bank accountants or any governmental bank regulatory authority exercising examination or regulatory authority), (iii) to the extent required by applicable Laws or regulations or by any subpoena or similar legal process (in which case, such Person agrees to inform the Company promptly thereof prior to such disclosure unless such Person is prohibited from doing so under applicable Law), (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 11.07, 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 2.18 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 Borrowers and their 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) 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 (B) 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 Company or to the extent such Information (1) becomes publicly available other than as a result of a breach of this Section 11.07 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 Borrowers, their Subsidiaries or their attorneys or accountants. For purposes of this Section 11.07, "Information" means all information received from the Company or any Subsidiary relating to the Company 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 Company or any Subsidiary~~,~~; provided that, in the case of information received from the Company 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 11.07 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 Administrative Agent 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.

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 Company or any other Loan Party against any and all of the obligations of the Company 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 Company 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 Guaranteed 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 11.08 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 Company 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 Company 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 Borrowers. 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 11.12, 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.

(a) If the Company 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 Company the right to replace a Lender as a party hereto, then the Company 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:

(i) the Company shall have paid (or caused a Designated Foreign Borrower to pay) to the Administrative Agent the assignment fee (if any) specified in Section 11.06(b);

(ii) 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 Company or applicable Designated Foreign Borrower (in the case of all other amounts);

(iii) 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;

(iv) such assignment does not conflict with applicable Laws; and

(v) 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.

(b) 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 Company to require such assignment and delegation cease to apply. Each Lender agrees that, if the Company elects to replace such Lender in accordance with this Section 11.13, it shall (subject to the Company's compliance with the provisions of this Section 11.13) promptly execute and deliver to the Administrative Agent an Assignment and Assumption to evidence the assignment and shall deliver to the Administrative Agent any Revolving Note (if Revolving Notes have been issued in respect of such Lender's Loans and/or Revolving Commitments) subject to such Assignment and Assumption; provided that the failure of any such Lender to execute an Assignment and Assumption shall not render such assignment invalid and such assignment shall be recorded in the Register.

11.14 Governing Law; Jurisdiction; Etc.

(a) GOVERNING LAW. THIS AGREEMENT AND THE OTHER LOAN DOCUMENTS 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 COMPANY 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 COMPANY OR ANY OTHER LOAN PARTY OR ITS PROPERTIES IN THE COURTS OF ANY JURISDICTION.

(c) WAIVER OF VENUE. THE COMPANY 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 COMPANY 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; PROCESS AGENT. 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. WITHOUT LIMITING THE FOREGOING, EACH LOAN PARTY THAT IS A FOREIGN SUBSIDIARY IRREVOCABLY DESIGNATES AND APPOINTS THE COMPANY AS SUCH LOAN PARTY'S AUTHORIZED AGENT, TO ACCEPT AND ACKNOWLEDGE ON ITS BEHALF, SERVICE OF ANY AND ALL PROCESS WHICH MAY BE SERVED IN ANY ACTION, LITIGATION OR PROCEEDING, AND AGREES THAT THE FAILURE OF THE COMPANY TO GIVE ANY NOTICE OF ANY SUCH SERVICE SHALL NOT IMPAIR OR AFFECT THE VALIDITY OF SUCH SERVICE OR OF ANY JUDGMENT RENDERED IN ANY ACTION, LITIGATION OR PROCEEDING BASED THEREON. THE COMPANY HEREBY CONFIRMS THAT IT HAS AGREED TO ACCEPT SUCH APPOINTMENT (AND ANY SIMILAR APPOINTMENT BY A LOAN PARTY THAT IS A FOREIGN SUBSIDIARY). SAID DESIGNATION AND APPOINTMENT SHALL BE IRREVOCABLE BY THE COMPANY AND EACH LOAN PARTY THAT IS A FOREIGN SUBSIDIARY. TO THE EXTENT THAT ANY LOAN PARTY THAT IS A FOREIGN SUBSIDIARY HAS OR HEREAFTER MAY ACQUIRE ANY IMMUNITY

FROM JURISDICTION OF ANY COURT OR FROM ANY LEGAL PROCESS (WHETHER THROUGH SERVICE OR NOTICE, ATTACHMENT PRIOR TO JUDGMENT, ATTACHMENT IN AID OF EXECUTION, EXECUTION OR OTHERWISE) WITH RESPECT TO ITSELF OR ITS PROPERTY, SUCH LOAN PARTY HEREBY IRREVOCABLY WAIVES SUCH IMMUNITY IN RESPECT OF ITS OBLIGATIONS UNDER THIS AGREEMENT AND THE OTHER LOAN DOCUMENTS.

11.15 ~~Waiver of Jury Trial~~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 11.15.

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 Credit Parties or resulting from such Subordinating Loan Party's performance under Article X, to the occurrence of the Facility Termination Date and the indefeasible payment in full in cash (or other arrangement satisfactory to the applicable Cash Management Bank or Hedge Bank) of all Additional Obligations to the extent then due and payable. If the Credit 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 Credit Parties and the proceeds thereof shall be paid over to the Credit Parties on account of the Guaranteed 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 11.16, 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 Company 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 Company, 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 Company 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 Company 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 the Company, 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 Company, 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 Company, 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 Company, any other Loan Party or any of their respective Affiliates. To the fullest extent permitted by law, each of the Company 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; Electronic Records.

(a) 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, after the First Amendment Effective Date, 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, that, without limiting the foregoing, upon the request of the Administrative Agent, any electronic signature shall be promptly followed by such manually executed counterpart. For the avoidance of doubt, the authorization under this paragraph may include, without limitation, use or acceptance by the Administrative Agent and each of the Lenders of a manually signed paper document, amendment, approval, consent, information, notice, certificate, request, statement, disclosure or authorization related to this Agreement (each a "Communication") which has been converted into electronic form (such as scanned into PDF format), or an electronically signed Communication converted into another format, for transmission, delivery and/or retention.***

(b) The Borrowers hereby acknowledge the receipt of a copy of this Agreement and all other Loan Documents. The Administrative Agent and each Lender may, on behalf of the Borrowers, create a microfilm or optical disk or other electronic image of this Agreement and any or all of the other Loan Documents. The Administrative Agent and each Lender may store the electronic image of this Agreement and the other Loan Documents in its electronic form and then destroy the paper original as part of the Administrative Agent's and each Lender's normal business practices, with the electronic image deemed to be an original and of the same legal effect, validity and enforceability as the paper originals.

11.19 USA PATRIOT Act Notice.

Each Lender that is subject to the Patriot Act and the Administrative Agent (for itself and not on behalf of any Lender) hereby notifies the Company 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 "Patriot Act"), it is required to obtain, verify and record information that identifies the Company and each other Loan Party, which information includes the name and address of the Company and each other Loan Party and other information that will allow such Lender or the Administrative Agent, as applicable, to identify the Company and each other Loan Party in accordance with the Patriot Act. The Company and each other Loan Party shall, 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 Patriot Act.

11.20 Acknowledgement and Consent to Bail-In of ~~EEA~~Affected Financial Institutions.

~~Notwithstanding~~Solely to the extent any Lender or L/C issuer that is an Affected 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~~Affected 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~~Write-Down and Conversion Powers of the applicable 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~~the applicable Resolution Authority to any such liabilities arising hereunder which may be payable to it by any Lender or L/C Issuer that is an ~~EEA~~Affected 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~~Affected 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~~Write-Down and Conversion Powers of the applicable Resolution Authority.

11.21 Acknowledgement Regarding Any Supported QFCs.

To the extent that the Loan Documents provide support, through a guarantee or otherwise, for any Swap Contract or any other agreement or instrument that is a QFC (such support, "QFC Credit Support", and each such QFC, a "Supported QFC"), the parties acknowledge and agree as follows with respect to the resolution power of the Federal Deposit Insurance Corporation under the Federal Deposit Insurance Act and Title II of the Dodd-Frank Wall Street Reform and Consumer Protection Act (together with the regulations promulgated thereunder, the "U.S. Special Resolution Regimes") in respect of such Supported QFC and QFC Credit Support (with the provisions below applicable notwithstanding that the Loan Documents and any Supported QFC may in fact be stated to be governed by the laws of the State of New York and/or of the United States or any other state of the United States): In the event a Covered Entity that is party to a Supported QFC (each, a "Covered Party") becomes subject to a proceeding under a U.S. Special Resolution Regime, the transfer of such Supported QFC and the benefit of such QFC Credit Support (and any interest and obligation in or under such Supported QFC and such QFC Credit Support, and any rights in property securing such Supported QFC or such QFC Credit Support) from such Covered Party will be effective to the same extent as the transfer would be effective under the U.S. Special Resolution Regime if the Supported QFC and

such QFC Credit Support (and any such interest, obligation and rights in property) were governed by the laws of the United States or a state of the United States. In the event a Covered Party or a BHC Act Affiliate of a Covered Party becomes subject to a proceeding under a U.S. Special Resolution Regime, Default Rights under the Loan Documents that might otherwise apply to such Supported QFC or any QFC Credit Support that may be exercised against such Covered Party are permitted to be exercised to no greater extent than such Default Rights could be exercised under the U.S. Special Resolution Regime if the Supported QFC and the Loan Documents were governed by the laws of the United States or a state of the United States. Without limitation of the foregoing, it is understood and agreed that rights and remedies of the parties with respect to a Defaulting Lender shall in no event affect the rights of any Covered Party with respect to a Supported QFC or any QFC Credit Support.

11.22 [Reserved].

11.23 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).

11.24 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.

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Vertex Pharmaceuticals Incorporated Annual Non-Employee Board Compensation

Annual Retainer	$100,000
Committee Chair Compensation	
Audit & Finance Committee Chair	$30,000 annual retainer
Management Development & Compensation Committee Chair	$25,000 annual retainer
Corporate Governance & Nominating Committee Chair	$20,000 annual retainer
Science & Technology Committee Chair	$20,000 annual retainer
Committee Membership Fee (Non-Chairs)	
Audit & Finance Committee Member	$15,000 annual retainer
Management Development & Compensation Committee Member	$12,500 annual retainer
Corporate Governance & Nominating Committee Member	$10,000 annual retainer
Science & Technology Committee Member	$10,000 annual retainer
Lead Independent Director Compensation	$40,000 annual retainer

Annual Equity Grants

Annually on May 1, $400,000 in value-based awards, comprised at the director's election of restricted stock units and/or options

- Options are fully vested upon grant
- Restricted stock units cliff vest on the 1 year anniversary of the grant date

Initial Equity Grants

On date director joins the board of directors, a $400,000 restricted stock unit award that vests on the first anniversary of the grant date.

Each of our non-employee directors is eligible to defer the cash and restricted stock portion of his/her compensation set forth above and elect to receive deferred stock units that convert to common stock in specified circumstances.

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 II) Limited, a Cayman Islands company

Vertex Pharmaceuticals (Cayman III) Limited, a Cayman Islands company (5)

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 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)

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)

Vertex Pharmaceuticals (Poland) sp. z.o.o (5) (6)

The Vertex Foundation, Inc., a Delaware corporation

Torreyana Insurance Company, Inc., a Vermont corporation

Vertex Pharmaceuticals (Czech Republic) s.r.o (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

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. 333-229656) of Vertex Pharmaceuticals Incorporated,

(2) Registration Statements (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),

(3) Registration Statement (Form S-8 Nos. 333-184784 and 333-232945) pertaining to the Vertex Pharmaceuticals Incorporated Employee Stock Purchase Plan, and

(4) Registration Statements (Form S-8 Nos. 333-226363, 333-219559, 333-188737, 333-197466, 333-206075 and 333-232948) 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 11, 2021, 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, 2020.

/s/ Ernst & Young LLP

Boston, Massachusetts
February 11, 2021

Exhibit 31.1

CERTIFICATION

I, Reshma Kewalramani, 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 11, 2021

/s/ Reshma Kewalramani

Reshma Kewalramani
Chief Executive Officer and President

Exhibit 31.2

CERTIFICATION

I, Charles F. Wagner, Jr., 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 11, 2021

/s/ Charles F. Wagner, Jr.

Charles F. Wagner, Jr.
Executive Vice President 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, 2020 (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 11, 2021

/s/ Reshma Kewalramani

Reshma Kewalramani
Chief Executive Officer and President

Date: February 11, 2021

/s/ Charles F. Wagner, Jr.

Charles F. Wagner, Jr.
Executive Vice President 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.