

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

Form 10-Q

(Mark One)

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

For the quarterly period ended June 30, 2023

Or

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

For the transition period from to

Commission File Number 001-34899



Pacific Biosciences of California, Inc.
(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

1305 O'Brien Drive
Menlo Park, CA
(Address of principal executive offices)

16-1590339
(I.R.S. Employer
Identification No.)

94025
(Zip Code)

(650) 521-8000
(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value \$0.001 per share	PACB	The NASDAQ Stock Market LLC

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.

Large accelerated filer	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
Emerging growth company	<input type="checkbox"/>		

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

Number of shares outstanding of the issuer's common stock as of July 31, 2023: 250,558,293.

TABLE OF CONTENTS

	<u>PAGE No.</u>
PART I. FINANCIAL INFORMATION	
Item 1. Financial Statements (unaudited):	
Condensed Consolidated Balance Sheets as of June 30, 2023 and December 31, 2022	3
Condensed Consolidated Statements of Operations and Comprehensive Loss for the Three and Six Months Ended June 30, 2023 and 2022	4
Condensed Consolidated Statements of Stockholders' Equity for the Three and Six Months Ended June 30, 2023 and 2022	5
Condensed Consolidated Statements of Cash Flows for the Six Months Ended June 30, 2023 and 2022	6
Notes to Condensed Consolidated Financial Statements	7
Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations	23
Item 3. Quantitative and Qualitative Disclosures About Market Risk	32
Item 4. Controls and Procedures	33
PART II. OTHER INFORMATION	
Item 1. Legal Proceedings	33
Item 1A. Risk Factors	35
Item 2. Unregistered Sales of Equity Securities and Use of Proceeds	73
Item 3. Defaults Upon Senior Securities	73
Item 4. Mine Safety Disclosures	73
Item 5. Other Information	73
Item 6. Exhibits	74

PART I. FINANCIAL INFORMATION

Item 1. Financial Statements

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.
Condensed Consolidated Balance Sheets
(Unaudited)

(in thousands, except per share amounts)	June 30, 2023	December 31, 2022
Assets		
Current assets		
Cash and cash equivalents	\$ 209,287	\$ 325,089
Investments	620,575	447,229
Accounts receivable, net	24,034	18,786
Inventory, net	67,608	50,381
Prepaid expenses and other current assets	13,748	10,289
Short-term restricted cash	300	300
Total current assets	935,552	852,074
Property and equipment, net	40,317	41,580
Operating lease right-of-use assets, net	36,444	39,763
Long-term restricted cash	2,422	2,922
Intangible assets, net	409,779	410,245
Goodwill	409,974	409,974
Other long-term assets	13,143	10,528
Total assets	\$ 1,847,631	\$ 1,767,086
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	\$ 16,512	\$ 12,028
Accrued expenses	27,010	32,596
Deferred revenue, current	24,983	30,498
Operating lease liabilities, current	9,243	8,886
Other liabilities, current	7,336	7,233
Contingent consideration liability, current	186,325	172,094
Total current liabilities	271,409	263,335
Deferred revenue, non-current	4,992	1,794
Operating lease liabilities, non-current	36,599	41,070
Convertible senior notes, net, non-current	891,795	896,683
Other liabilities, non-current	837	1,300
Total liabilities	1,205,632	1,204,182
Commitments and contingencies		
Stockholders' equity		
Preferred stock, \$0.001 par value:		
Authorized 50,000 shares; No shares issued or outstanding	—	—
Common stock, \$0.001 par value:		
Authorized 1,000,000 shares; issued and outstanding 250,473 and 226,505 shares at June 30, 2023 and December 31, 2022, respectively	250	227
Additional paid-in capital	2,334,623	2,099,782
Accumulated other comprehensive loss	(2,686)	(4,765)
Accumulated deficit	(1,690,188)	(1,532,340)
Total stockholders' equity	641,999	562,904
Total liabilities and stockholders' equity	\$ 1,847,631	\$ 1,767,086

See accompanying [notes](#) to the condensed consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.
Condensed Consolidated Statements of Operations and Comprehensive Loss
(Unaudited)

(in thousands, except per share amounts)	Three Months Ended June 30,		Six Months Ended June 30,	
	2023	2022	2023	2022
Revenue:				
Product revenue	\$ 43,655	\$ 30,175	\$ 78,309	\$ 58,419
Service and other revenue	3,918	5,292	8,164	10,221
Total revenue	47,573	35,467	86,473	68,640
Cost of Revenue:				
Cost of product revenue	28,432	15,499	53,596	30,319
Cost of service and other revenue	3,412	3,592	7,204	7,607
Amortization of intangible assets	183	183	366	366
Total cost of revenue	32,027	19,274	61,166	38,292
Gross profit	15,546	16,193	25,307	30,348
Operating Expense:				
Research and development	46,173	50,348	95,112	103,285
Sales, general and administrative	40,573	39,252	80,391	79,056
Change in fair value of contingent consideration	1,975	(5,438)	14,231	(6,501)
Total operating expense	88,721	84,162	189,734	175,840
Operating loss	(73,175)	(67,969)	(164,427)	(145,492)
Loss on extinguishment of debt	(2,033)	—	(2,033)	—
Interest expense	(3,554)	(3,681)	(7,184)	(7,378)
Other income (expense), net	8,929	256	15,796	(23)
Loss before expense (benefit) from income taxes	(69,833)	(71,394)	(157,848)	(152,893)
Expense (benefit) from income taxes	—	—	—	—
Net loss	(69,833)	(71,394)	(157,848)	(152,893)
Other comprehensive (loss) income:				
Unrealized (loss) gain on investments	(762)	(1,372)	2,079	(4,370)
Comprehensive loss	\$ (70,595)	\$ (72,766)	\$ (155,769)	\$ (157,263)
Net loss per share:				
Basic	\$ (0.28)	\$ (0.32)	\$ (0.64)	\$ (0.68)
Diluted	\$ (0.28)	\$ (0.32)	\$ (0.64)	\$ (0.68)
Weighted average shares outstanding used in calculating net loss per share:				
Basic	250,070	224,499	246,074	223,400
Diluted	250,070	224,499	246,074	223,400

See accompanying [notes](#) to the condensed consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.
Condensed Consolidated Statements of Stockholders' Equity
(Unaudited)

(in thousands)	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive (Loss) Income	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
<i>For the three months ended June 30, 2023</i>						
Balance at March 31, 2023	249,803	\$ 250	\$ 2,314,146	\$ (1,924)	\$ (1,620,355)	\$ 692,117
Net loss	—	—	—	—	(69,833)	(69,833)
Other comprehensive loss	—	—	—	(762)	—	(762)
Issuance of common stock in conjunction with equity plans	670	—	2,586	—	—	2,586
Share-based compensation expense	—	—	17,891	—	—	17,891
Balance at June 30, 2023	250,473	\$ 250	\$ 2,334,623	\$ (2,686)	\$ (1,690,188)	\$ 641,999
<i>For the three months ended June 30, 2022</i>						
Balance at March 31, 2022	224,329	\$ 224	\$ 2,038,030	\$ (4,085)	\$ (1,299,591)	\$ 734,578
Net loss	—	—	—	—	(71,394)	(71,394)
Other comprehensive loss	—	—	—	(1,372)	—	(1,372)
Issuance of common stock in conjunction with equity plans	427	1	847	—	—	848
Share-based compensation expense	—	—	19,226	—	—	19,226
Balance at June 30, 2022	224,756	\$ 225	\$ 2,058,103	\$ (5,457)	\$ (1,370,985)	\$ 681,886
<i>For the six months ended June 30, 2023</i>						
Balance at December 31, 2022	226,505	\$ 227	\$ 2,099,782	\$ (4,765)	\$ (1,532,340)	\$ 562,904
Net loss	—	—	—	—	(157,848)	(157,848)
Other comprehensive income	—	—	—	2,079	—	2,079
Issuance of common stock from Underwritten Public Equity Offering, net of issuance costs	20,125	20	189,180	—	—	189,200
Issuance of common stock in conjunction with equity plans	3,843	3	9,818	—	—	9,821
Share-based compensation expense	—	—	35,843	—	—	35,843
Balance at June 30, 2023	250,473	\$ 250	\$ 2,334,623	\$ (2,686)	\$ (1,690,188)	\$ 641,999
<i>For the six months ended June 30, 2022</i>						
Balance at December 31, 2021	220,978	\$ 221	\$ 2,009,945	\$ (1,087)	\$ (1,218,092)	\$ 790,987
Net loss	—	—	—	—	(152,893)	(152,893)
Other comprehensive loss	—	—	—	(4,370)	—	(4,370)
Issuance of common stock in conjunction with equity plans	3,778	4	6,436	—	—	6,440
Share-based compensation expense	—	—	41,722	—	—	41,722
Balance at June 30, 2022	224,756	\$ 225	\$ 2,058,103	\$ (5,457)	\$ (1,370,985)	\$ 681,886

See accompanying [notes](#) to the condensed consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.
Condensed Consolidated Statements of Cash Flows
(Unaudited)

(in thousands)	Six Months Ended June 30,	
	2023	2022
Cash flows from operating activities		
Net loss	\$ (157,848)	\$ (152,893)
Adjustments to reconcile net loss to net cash used in operating activities		
Depreciation	5,584	4,591
Amortization of intangible assets	466	456
Amortization of right-of-use assets	3,330	3,412
Amortization of debt discount and financing costs	324	319
Share-based compensation expense	35,843	41,722
Accretion of discount and amortization of premium on marketable securities, net	(6,113)	1,143
Change in the estimated fair value of contingent consideration	14,231	(6,501)
Loss on extinguishment of debt	2,033	—
Inventory provision	4,295	1,789
Loss on disposition of equipment	45	77
Changes in assets and liabilities		
Accounts receivable, net	(5,248)	(2,817)
Inventory	(19,703)	(14,955)
Prepaid expenses and other assets	(6,085)	(340)
Accounts payable	4,262	1,331
Accrued expenses	(5,956)	(11,357)
Deferred revenue	(2,317)	(2,115)
Operating lease liabilities	(4,114)	(3,833)
Other liabilities	539	379
Net cash used in operating activities	(136,432)	(139,592)
Cash flows from investing activities		
Purchase of property and equipment	(5,989)	(7,657)
Purchases of investments	(476,879)	(241,086)
Sales of investments	595	—
Maturities of investments	311,129	230,515
Net cash used in investing activities	(171,144)	(18,228)
Cash flows from financing activities		
Proceeds from issuance of common stock under equity offerings, net of issuance costs	189,200	—
Proceeds from issuance of common stock from equity plans	9,821	6,440
Payment of debt issuance costs	(6,836)	—
Notes payable principal payoff	(911)	(770)
Net cash provided by financing activities	191,274	5,670
Net decrease in cash, cash equivalents, and restricted cash	(116,302)	(152,150)
Cash, cash equivalents, and restricted cash at beginning of period	328,311	465,817
Cash, cash equivalents, and restricted cash at end of period	\$ 212,009	\$ 313,667
Cash and cash equivalents at end of period	209,287	310,445
Restricted cash at end of period	2,722	3,222
Cash, cash equivalents, and restricted cash at end of period	\$ 212,009	\$ 313,667

See accompanying [notes](#) to the condensed consolidated financial statements.

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.
Notes to Condensed Consolidated Financial Statements
(Unaudited)

NOTE 1. ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES

We are a life science technology company that is designing, developing, and manufacturing advanced sequencing solutions that enable scientists and clinical researchers to improve their understanding of the genome and ultimately, resolve genetically complex problems. Our products and technology under development stem from two highly differentiated core technologies focused on accuracy, quality, and completeness, which include our existing HiFi long-read sequencing technology and our emerging short-read Sequencing by Binding (SBB™) technology. Our products address solutions across a broad set of applications including human genomics, plant and animal sciences, infectious disease and microbiology, oncology, and other emerging applications. Our focus is on providing our customers with advanced sequencing solutions with higher throughput and improved workflows that we believe will enable dramatic advancements in routine healthcare. Our customers include academic and governmental research institutions, commercial testing and service laboratories, genome centers, public health labs, hospitals and clinical research institutes, contract research organizations ("CROs"), pharmaceutical companies, and agricultural companies.

References in this report to "PacBio," "we," "us," the "Company," and "our" refer to Pacific Biosciences of California, Inc. and its consolidated subsidiaries.

Basis of Presentation and Consolidation

Our unaudited condensed consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States, or U.S. GAAP, as set forth in the Financial Accounting Standards Board, or FASB, Accounting Standards Codification, or ASC. The unaudited condensed consolidated financial statements include the accounts of Pacific Biosciences and our wholly owned subsidiaries. Certain information and footnote disclosures typically included in our audited financial statements have been condensed or omitted. The accompanying unaudited condensed consolidated financial statements have been prepared on a consistent basis with the December 31, 2022 audited consolidated financial statements and include all adjustments, consisting of only normal recurring adjustments, necessary to fairly state our financial position, results of operations, comprehensive loss, and cash flows for the period, but are not necessarily indicative of the results to be expected for the entire year or any future periods. All intercompany transactions and balances have been eliminated. Certain prior period amounts have been reclassified to conform to current period presentation.

The financial statements should be read in conjunction with the audited consolidated financial statements and notes included in our Annual Report on Form 10-K for the year ended December 31, 2022.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires us to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes to the financial statements. On an ongoing basis, we evaluate our significant estimates including, but not limited to, the valuation of inventory, the determination of stand-alone selling prices for revenue recognition, the fair value of contingent consideration, the valuation of acquired intangible assets, the fair value of certain equity awards, the useful lives assigned to long-lived assets, the computation of provisions for income taxes, the borrowing rate used in calculating the operating lease right-of-use assets and operating lease liabilities, the probability associated with variable payments under partnership development agreements, and the valuations related to our convertible senior notes. While the extent of the potential impact of the current macroeconomic conditions on our business is highly uncertain, we considered information available related to assumptions and estimates used to determine the results reported and asset valuations as of June 30, 2023. Actual results could differ materially from these estimates.

Cash, Cash Equivalents, Restricted Cash and Investments

We consider all highly liquid investments purchased with an original maturity of 90 days or less to be cash equivalents. Cash equivalents may be comprised of money market funds, certificates of deposit, commercial paper, corporate bonds and notes, and government agencies' securities.

We classify our investments in debt securities as available-for sale and report the investments at fair value in current assets. We evaluate our available-for-sale investments in unrealized loss positions and assess whether the unrealized loss is credit-related. Unrealized gains and losses that are not credit-related are recognized in accumulated other comprehensive loss in stockholders' equity. Realized gains and losses, expected credit losses, as well as interest income, on available-for-sale securities are also reported in other income (expense), net. The cost used in the determination of gains and losses of securities sold is based on the specific identification method. The cost of marketable securities is adjusted for the amortization of premiums and discounts to expected maturity. Premium and discount amortization is recorded in other income (expense), net.

Our investment portfolio at any point in time contains investments in cash deposits, money market funds, commercial paper, corporate debt securities and U.S. government and agency securities with high credit ratings. We have established guidelines regarding diversification and maturities of investments with the objectives of maintaining safety and liquidity, while maximizing yield.

Restricted cash includes cash that is not readily available for use in the Company's operating activities. Restricted cash is primarily comprised of cash pledged under letters of credit.

Concentration and Other Risks

For the three months ended June 30, 2023, one customer accounted for approximately 10% of total revenue during the period. For the three months ended June 30, 2022, one customer accounted for approximately 11% of total revenue during the period. For the six months ended June 30, 2023 and 2022, no customers accounted for approximately 10% or greater of total revenue during the respective periods. No other customers exceeded 10% during those periods.

As of June 30, 2023, 45% of our accounts receivable were from domestic customers, compared to 57% as of December 31, 2022. As of June 30, 2023, no customer represented 10% or greater of our accounts receivable, while one customer represented approximately 10% of our net accounts receivable as of December 31, 2022.

Recent Accounting Pronouncements

Recently Adopted Accounting Standards

In October 2021, the FASB issued Accounting Standards Update ("ASU") No. 2021-08, Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers. This ASU provides specific guidance on how to recognize contract assets and contract liabilities related to revenue contracts with customers acquired in a business combination. This amendment improves comparability for both the recognition and measurement of acquired revenue contracts with customers at the date of and after a business combination. We adopted this ASU on January 1, 2023. The adoption of this guidance did not have a material effect on our consolidated financial statements.

Significant Accounting Policies

There have been no changes to our significant accounting policies as disclosed in the Annual Report on Form 10-K for the fiscal year ended December 31, 2022.

NOTE 2. FINANCIAL INSTRUMENTS

Fair Value of Financial Instruments

Fair value is the exchange price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

The fair value hierarchy established under GAAP requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The three levels of inputs that may be used to measure fair value are as follows:

- Level 1: quoted prices in active markets for identical assets or liabilities;

- Level 2: inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices in active markets for similar assets or liabilities, quoted prices for identical or similar assets or liabilities in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities; and
- Level 3: unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

We consider an active market as one in which transactions for the asset or liability occurs with sufficient frequency and volume to provide pricing information on an ongoing basis. Conversely, we view an inactive market as one in which there are few transactions for the asset or liability, the prices are not current, or price quotations vary substantially either over time or among market makers. Where appropriate, our non-performance risk, or that of our counterparty, is considered in determining the fair values of liabilities and assets, respectively.

We classify our cash deposits and money market funds within Level 1 of the fair value hierarchy because they are valued using bank balances or quoted market prices. We classify our investments as Level 2 instruments based on market pricing and other observable inputs. We did not classify any of our investments within Level 3 of the fair value hierarchy.

Assets and liabilities measured at fair value are classified in their entirety based on the lowest level input that is significant to the fair value measurement. Our assessment of the significance of a particular input to the entire fair value measurement requires management to make judgments and consider factors specific to the asset or liability.

The carrying amount of our accounts receivable, prepaid expenses, other current assets, accounts payable, accrued expenses and other liabilities, current, approximate fair value due to their short maturities.

Assets and Liabilities Measured at Fair Value on a Recurring Basis

The following table sets forth the fair value of our financial assets and liabilities that were measured on a recurring basis (in thousands):

	June 30, 2023				December 31, 2022			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Assets								
Cash and cash equivalents	\$ 93,902	\$ 115,385	\$ —	\$ 209,287	\$ 137,636	\$ 187,453	\$ —	\$ 325,089
Investments:								
Commercial paper	—	94,124	—	94,124	—	127,302	—	127,302
Corporate debt securities	—	74,584	—	74,584	—	49,491	—	49,491
U.S. government & agency securities	—	451,867	—	451,867	—	270,436	—	270,436
Total investments	—	620,575	—	620,575	—	447,229	—	447,229
Short-term restricted cash	300	—	—	300	300	—	—	300
Long-term restricted cash	2,422	—	—	2,422	2,922	—	—	2,922
Total assets measured at fair value	\$ 96,624	\$ 735,960	\$ —	\$ 832,584	\$ 140,858	\$ 634,682	\$ —	\$ 775,540
Liabilities								
Contingent consideration	\$ —	\$ —	\$ 186,325	\$ 186,325	\$ —	\$ —	\$ 172,094	\$ 172,094
Total liabilities measured at fair value	\$ —	\$ —	\$ 186,325	\$ 186,325	\$ —	\$ —	\$ 172,094	\$ 172,094

We classify contingent consideration, which was incurred in connection with the acquisition of Omniome, within Level 3 as factors used to develop the estimate of fair value include unobservable inputs that are not supported by market activity and are significant to the fair value.

We estimate the fair value of the contingent consideration liability by discounting the probability-weighted outcomes to present value using an estimate of our borrowing rate and the risk-free rate. The potential outcomes of milestone achievement dates are within the period from September 30, 2023 to June 30, 2024. A decrease in the probability of an earlier scenario within this range would result in a decrease in the fair value of the liability. The discount rates used are the sum of the U.S. risk-free rate and the estimated subordinated credit spread for B- and B credit rating, which ranges from 10.1% to 10.2%. Changes in our estimated subordinated credit spread can result in changes in the fair value of the contingent consideration liability, where a lower credit spread may result in an increased liability valuation.

Changes in the estimated fair value of the contingent consideration liability for the six months ended June 30, 2023 were as follows (in thousands):

	Level 3
Beginning balance as of December 31, 2022	\$ 172,094
Change in estimated fair value	14,231
Ending balance as of June 30, 2023	<u>\$ 186,325</u>

Changes to the fair value are recorded as change in fair value of contingent consideration in the Condensed Consolidated Statement of Operations and Comprehensive Loss.

In August 2023, we commenced customer shipments of the Onso short-read sequencing instrument, with shipments of related consumables expected to occur later in August 2023. The milestone payment associated with PacBio's acquisition of Omniome will be triggered once both the Onso instrument and related consumables have shipped to one customer.

For the six months ended June 30, 2023, there were no transfers between Level 1, Level 2, or Level 3 assets or liabilities reported at fair value on a recurring basis, and our valuation techniques did not change compared to the prior year.

The following tables summarize our cash, cash equivalents and investments (in thousands):

As of June 30, 2023				
	Amortized Cost	Gross unrealized gains	Gross unrealized losses	Fair Value
Cash and cash equivalents	209,279	17	(9)	209,287
Investments:				
Commercial paper	94,247	—	(123)	94,124
Corporate debt securities	74,930	6	(352)	74,584
U.S. government & agency securities	454,092	57	(2,282)	451,867
Total investments	623,269	63	(2,757)	620,575
Total cash, cash equivalents and investments	\$ 832,548	\$ 80	\$ (2,766)	\$ 829,862
Short-term restricted cash	\$ 300	\$ —	\$ —	\$ 300
Long-term restricted cash	\$ 2,422	\$ —	\$ —	\$ 2,422

As of December 31, 2022				
	Amortized Cost	Gross unrealized gains	Gross unrealized losses	Fair Value
Cash and cash equivalents	325,144	6	(61)	325,089
Investments:				
Commercial paper	127,626	9	(333)	127,302
Corporate debt securities	49,998	—	(507)	49,491
U.S. government & agency securities	274,315	1	(3,880)	270,436
Total investments	451,939	10	(4,720)	447,229
Total cash, cash equivalents and investments	\$ 777,083	\$ 16	\$ (4,781)	\$ 772,318
Short-term restricted cash	\$ 300	\$ —	\$ —	\$ 300
Long-term restricted cash	\$ 2,922	\$ —	\$ —	\$ 2,922

The following table summarizes the contractual maturities of our cash equivalents and available-for-sale investments, excluding money market funds, as of June 30, 2023 (in thousands):

	Fair Value
Due in one year or less	\$ 652,574
Due after one year through five years	83,386
Total	\$ 735,960

Actual maturities may differ from contractual maturities because issuers may have the right to call or prepay obligations without call or prepayment penalties.

NOTE 3. BALANCE SHEET COMPONENTS
Inventory, net

Our inventory, net, consisted of the following components (in thousands):

	June 30, 2023	December 31, 2022
Purchased materials	\$ 25,225	\$ 24,139
Work in process	22,598	14,062
Finished goods	19,785	12,180
Inventory, net	<u>\$ 67,608</u>	<u>\$ 50,381</u>

Intangible Assets and Goodwill

Intangible assets include acquired in-process research and development ("IPR&D") of \$400 million as a result of the Omniome acquisition in September 2021. The IPR&D will remain on our Consolidated Balance Sheet as an indefinite-lived intangible asset until the completion or abandonment of the associated research and development activities. During the development period following the acquisition, IPR&D will not be amortized, but instead will be tested for impairment annually and more frequently if events or changes in circumstances indicate that it is more likely than not that the asset is impaired. Upon completion of the development, we will begin to amortize the asset over the life of the product or record an impairment charge if the asset is determined to be impaired.

In addition to IPR&D, definite-lived intangible assets included the following (in thousands, except years):

	Estimated Useful Life (in years)	As of June 30, 2023			As of December 31, 2022		
		Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Developed technology	15	\$ 11,179	\$ (1,415)	\$ 9,764	\$ 11,179	\$ (1,039)	\$ 10,140
Customer relationships	2	360	(345)	15	360	(255)	105
Total		<u>\$ 11,539</u>	<u>\$ (1,760)</u>	<u>\$ 9,779</u>	<u>\$ 11,539</u>	<u>\$ (1,294)</u>	<u>\$ 10,245</u>

The estimated future amortization expense of intangible assets with definite lives is as follows (in thousands):

Remainder of 2023	\$ 387
2024	745
2025	745
2026	745
2027	746
2028 and thereafter	6,411
Total	<u>\$ 9,779</u>

We review definite-lived intangible assets for impairment when indication of potential impairment exists, such as a significant reduction in cash flows associated with the assets.

Goodwill is reviewed for impairment at least annually during the second quarter, or more frequently if an event occurs indicating the potential for impairment. We performed our annual assessment for goodwill impairment in the second quarter of 2023, noting no impairment.

Deferred Revenue

As of June 30, 2023, we had a total of \$30.0 million of deferred revenue, \$25.0 million of which was recorded as deferred revenue, current, and primarily relates to future performance obligations under the Amended and Restated Agreement with Invitae Corporation ("Invitae") and deferred service contract revenues. The deferred revenue, non-current balance of \$5.0 million primarily relates to future performance obligations under the Amended and Restated Agreement with Invitae and deferred service contract revenues and is scheduled to be recognized in the next 6 years. The deferred revenue, non-current balance includes \$3.0 million that was reclassified from deferred revenue, current to deferred revenue, non-current following receipt of a non-cancellable order from Invitae during the three months ended June 30, 2023 for partial utilization of the available credits, which is expected to be recognized in revenue after 12 months from June 30, 2023. Revenue recorded in the three and six months ended June 30, 2023 includes \$4.5 million and \$8.0 million, respectively, that was included in deferred revenue as of December 31, 2022, of which \$2.1 million was product revenue recognized from the partial utilization of available credits by Invitae during the three and six months ended June 30, 2023. Refer to Note 3 – *Invitae Collaboration*, in Part II, Item 8 of the Annual Report on Form 10-K for the year ended December 31, 2022 for more information.

Product Warranties

We generally provide a one-year warranty on instruments. In addition, we provide a limited warranty on consumables. At the time revenue is recognized, an accrual is established for estimated warranty costs based on historical experience as well as anticipated product performance. We periodically review the warranty reserve for adequacy and adjust the warranty accrual, if necessary, based on actual experience and estimated costs to be incurred. Warranty expense is recorded as a component of cost of product revenue. There were no material changes in estimates for the periods presented below.

Changes in the reserve for product warranties were as follows for the periods indicated (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2023	2022	2023	2022
Balance at beginning of period	\$ 1,624	\$ 1,174	\$ 1,651	\$ 594
Additions charged to cost of product revenue	2,247	912	2,851	1,865
Repairs and replacements	(1,009)	(477)	(1,640)	(850)
Balance at end of period	\$ 2,862	\$ 1,609	\$ 2,862	\$ 1,609

Term loans

In connection with the acquisition of Omniome, we acquired \$1.3 million in short-term debt and \$3.0 million in long-term debt relating to a term loan facility that Omniome obtained in April 2020. Borrowings on the term loan facility were used to fund Omniome's purchases of equipment, which serves as collateral. Each term loan has a term of 43 months and bears a fixed interest rate of approximately 17% annually. The fee for the elective option to prepay all, but not less than all, of the borrowed amounts at any time after the 24th month and before the 43rd month after the commencement date, is 4% of the outstanding loan balance. Payments are made in equal monthly installments including principal and interest.

As of June 30, 2023, the carrying value of term loans outstanding was \$1.4 million, recorded as part of other liabilities, current on the Condensed Consolidated Balance Sheet. The interest expense was \$0.1 million and \$0.2 million for the three and six months ended June 30, 2023, which was included as part of interest expense in the Condensed Consolidated Statement of Operations and Comprehensive Loss.

The following table presents the future principal payments on the term loans (in thousands):

Remainder of 2023	\$ 930
2024	490
Total	\$ 1,420

NOTE 4. CONVERTIBLE SENIOR NOTES

2030 Convertible Senior Notes

In June, 2023, we entered into a privately negotiated exchange agreement with a holder of our outstanding 1.50% Convertible Senior Notes due 2028 (the "2028 Notes"), pursuant to which we issued \$441.0 million in aggregate principal amount of our 1.375% Convertible Senior Notes due 2030 (the "2030 Notes") in exchange for \$441.0 million principal amount of the 2028 Notes (the "Exchange Transaction"), pursuant to exemptions from registration under the Securities Act of 1933, as amended, and the rules and regulations thereunder. The 2030 Notes were issued on June 30, 2023.

The 2030 Notes are governed by an indenture (the "2030 Indenture") between the Company and U.S. Bank Trust Company, National Association, as trustee. The 2030 Notes bear interest at a rate of 1.375% per annum. Interest on the 2030 Notes is payable semi-annually in arrears on June 15 and December 15, commencing on December 15, 2023. The 2030 Notes will mature on December 15, 2030, subject to earlier conversion, redemption or repurchase.

The 2030 Notes are convertible at the option of the holder at any time until the second scheduled trading day prior to the maturity date, including in connection with a redemption by the Company. The 2030 Notes are convertible into shares of our common stock based on an initial conversion rate of 46.5116 shares of common stock per \$1,000 principal amount of the 2030 Notes (which is equal to an initial conversion price of \$21.50 per share of common stock), in each case subject to customary anti-dilution and other adjustments as a result of certain extraordinary transactions. Upon conversion of the 2030 Notes, we may elect to settle such conversion obligation in shares of our common stock, cash or a combination of shares of our common stock and cash.

On or after June 20, 2028, the 2030 Notes will be redeemable by the Company in the event that the closing sale price of our common stock has been at least 150% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period (including the last trading day of such period) ending on, and including, the trading day immediately preceding the date on which we provide the redemption notice at a redemption price of 100% of the principal amount of such 2030 Notes, plus accrued and unpaid interest up to, but excluding, the redemption date.

Upon the occurrence of a Fundamental Change (as defined in the 2030 Indenture), the holders of the 2030 Notes may require that we repurchase all or part of the principal amount of the 2030 Notes at a purchase price equal to 100% of the principal amount of the notes to be repurchased, plus any accrued and unpaid interest up to, but excluding, the fundamental change repurchase date, and all unpaid interest from the fundamental change repurchase date thereon, but excluding, the maturity date.

The 2030 Indenture includes customary "events of default," which may result in the acceleration of the maturity of the 2030 Notes under the 2030 Indenture. The 2030 Indenture also includes customary covenants for convertible notes of this type.

To the extent we elect, the sole remedy for an event of default relating to our failure to comply with certain of our reporting obligations shall, for the first 360 calendar days after the occurrence of such an event of default, consist exclusively of the right to receive additional interest on the 2030 Notes at a rate equal to (i) 0.25% per annum of the principal amount of the 2030 Notes outstanding for each day during the first 180 calendar days of the 360-day period after the occurrence of such an event of default during which such event of default is continuing (or, if earlier, the date on which such event of default is cured or waived) and (ii) 0.50% per annum of the principal amount of the 2030 Notes outstanding for each day from, and including, the 181st calendar day to, and including, the 360th calendar day after the occurrence of such an event of default during which such event of default is continuing (or, if earlier, the date on which such event of default is cured or waived as provided for in the 2030 Indenture). On the 361st day after such event of default (if the event of default relating to our failure to comply with its obligations is not cured or waived prior to such 361st day), the 2030 Notes shall be subject to acceleration as provided for in the 2030 Indenture.

The 2030 Notes are accounted for in accordance with the authoritative guidance for convertible debt instruments that may be settled in cash upon conversion. Under ASU 2020-06, the guidance requires that debt with an embedded conversion feature is accounted for in its entirety as a liability and no portion of the proceeds from the issuance of the convertible debt instrument is accounted for as attributable to the conversion feature unless the conversion feature is required to be accounted for separately as an embedded derivative or the conversion feature results in a substantial premium. The conversion feature of the 2030 Notes is not accounted for as an embedded derivative because it is considered to be indexed to our common stock, and the 2030 Notes were not issued at a substantial premium; therefore, the 2030 Notes are accounted for in their entirety as a liability. Because we may elect to settle any conversions entirely in shares, and because settlement in shares is the default settlement method, the liability is classified as non-current.

The requirement to repurchase the 2030 Notes, including unpaid interest to the maturity date in the event of a Fundamental Change, is considered a put option for certain periods requiring bifurcation under ASC 815 – *Derivatives and Hedging*. However, given the low probability of such a Fundamental Change occurring during the applicable periods, the value of the embedded derivative is immaterial.

The additional interest feature in the event of our failure to comply with certain reporting obligations is also considered an embedded derivative requiring bifurcation under ASC 815. However, due to the nature and terms of the reporting obligations, the value of the embedded derivative is immaterial.

The Exchange Transaction was accounted for as an extinguishment driven by the change in fair value of the embedded conversion option. We recorded a loss on extinguishment of debt of approximately \$2.0 million in connection with the Exchange Transaction during the three and six months ended June 30, 2023, which represents the difference between the fair value and the principal amount of the 2030 Notes of the debt at the modification date, plus unamortized debt issuance costs of \$1.5 million related to the respective portion of the 2028 Notes.

We incurred issuance costs related to the 2030 Notes of approximately \$7.2 million, which were recorded as debt issuance costs and are presented as a reduction to the 2030 Notes on our Consolidated Balance Sheets and are amortized to interest expense using the effective interest method over the term of the 2030 Notes, resulting in an effective interest rate of 1.6%. We also paid accrued but unpaid interest of \$2.5 million on the 2028 Notes in connection with the Exchange Transaction on June 30, 2023.

We did not receive any cash proceeds from the Exchange Transaction. In exchange for issuing the 2030 Notes pursuant to the Exchange Transaction, we received and cancelled the exchanged 2028 Notes. Following the closing of the Exchange Transaction, \$459.0 million in aggregate principal amount of 2028 Notes remained outstanding with terms unchanged.

The net carrying amount of the liability for the 2030 Notes is included as convertible senior notes, net, non-current in the Condensed Consolidated Balance Sheets as follows (in thousands):

	June 30, 2023	December 31, 2022
Principal amount	\$ 441,000	\$ —
Unamortized debt premium	560	—
Unamortized debt issuance costs	(7,232)	—
Net carrying amount	\$ 434,328	\$ —

For the three and six months ended June 30, 2023 and 2022, interest expense for the 2030 Notes was not material.

As of June 30, 2023, the estimated fair value (Level 2) of the 2030 Notes was \$441.6 million. The fair value of the 2030 Notes is estimated using a binomial lattice model that is primarily affected by the trading price of our common stock, market interest rates and volatility.

2028 Convertible Senior Notes

On February 9, 2021, we entered into an investment agreement (the "Investment Agreement") with SB Northstar LP (the "Purchaser"), a subsidiary of SoftBank Group Corp., relating to the issuance and sale to the Purchaser of \$900.0 million in aggregate principal amount of the 2028 Notes. The 2028 Notes were issued on February 16, 2021. As discussed above, in June 2023 we completed an exchange of \$441.0 million in aggregate principal amount of our 2028 Notes for \$441.0 million aggregate principal amount of the 2030 Notes, leaving approximately \$459.0 million in aggregate principal amount of 2028 Notes outstanding.

The 2028 Notes are governed by an indenture (the "2028 Indenture") between the Company and U.S. Bank National Association, as trustee. The 2028 Notes bear interest at a rate of 1.50% per annum. Interest on the 2028 Notes is payable semi-annually in arrears on February 15 and August 15 and commenced on August 15, 2021. The 2028 Notes will mature on February 15, 2028, subject to earlier conversion, redemption or repurchase.

The 2028 Notes are convertible at the option of the holder at any time until the second scheduled trading day prior to the maturity date, including in connection with a redemption by the Company. The 2028 Notes are convertible into shares of our common stock based on an initial conversion rate of 22.9885 shares of common stock per \$1,000 principal amount of the 2028 Notes (which is equal to an initial conversion price of \$43.50 per share of common stock), in each case subject to customary anti-dilution and other adjustments as a result of certain extraordinary transactions. Upon conversion of the 2028 Notes, we may elect to settle such conversion obligation in shares of our common stock, cash or a combination of shares of our common stock and cash.

On or after February 20, 2026, the 2028 Notes will be redeemable by the Company in the event that the closing sale price of our common stock has been at least 150% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period (including the last trading day of such period) ending on, and including, the trading day immediately preceding the date on which we provide the redemption notice at a redemption price of 100% of the principal amount of such 2028 Notes, plus accrued and unpaid interest up to, but excluding, the redemption date.

Upon the occurrence of a Fundamental Change (as defined in the 2028 Indenture), the holders of the 2028 Notes may require that we repurchase all or part of the principal amount of the 2028 Notes at a purchase price of par plus unpaid interest up to, but excluding, the maturity date.

The 2028 Indenture includes customary "events of default," which may result in the acceleration of the maturity of the 2028 Notes under the 2028 Indenture. The 2028 Indenture also includes customary covenants for convertible notes of this type.

To the extent we elect, the sole remedy for an event of default relating to our failure to comply with certain of our reporting obligations shall, for the first 360 calendar days after the occurrence of such an event of default, consist exclusively of the right to receive additional interest on the 2028 Notes at a rate equal to (i) 0.25% per annum of the principal amount of the 2028 Notes outstanding for each day during the first 180 calendar days of the 360-day period after the occurrence of such an event of default during which such event of default is continuing (or, if earlier, the date on which such event of default is cured or waived) and (ii) 0.50% per annum of the principal amount of the 2028 Notes outstanding for each day from, and including, the 181st calendar day to, and including, the 360th calendar day after the occurrence of such an event of default during which such event of default is continuing (or, if earlier, the date on which such event of default is cured or waived as provided for in the 2028 Indenture). On the 361st day after such event of default (if the event of default relating to our failure to comply with its obligations is not cured or waived prior to such 361st day), the 2028 Notes shall be subject to acceleration as provided for in the 2028 Indenture.

The 2028 Notes are accounted for in accordance with the authoritative guidance for convertible debt instruments that may be settled in cash upon conversion. Under ASU 2020-06, the guidance requires that debt with an embedded conversion feature is accounted for in its entirety as a liability and no portion of the proceeds from the issuance of the convertible debt instrument is accounted for as attributable to the conversion feature unless the conversion feature is required to be accounted for separately as an embedded derivative or the conversion feature results in a substantial premium. The conversion feature of the 2028 Notes is not accounted for as an embedded derivative because it is considered to be indexed to our common stock, and the 2028 Notes were not issued at a premium; therefore, the 2028 Notes are accounted for in their entirety as a liability. Because we may elect to settle any conversions entirely in shares, and because settlement in shares is the default settlement method, the liability is classified as non-current.

The requirement to repurchase the 2028 Notes, including unpaid interest to the maturity date in the event of a Fundamental Change, is considered a put option for certain periods requiring bifurcation under ASC 815 – *Derivatives and Hedging*. However, given the low probability of such a Fundamental Change occurring during the applicable periods, the value of the embedded derivative is immaterial.

The additional interest feature in the event of our failure to comply with certain reporting obligations is also considered an embedded derivative requiring bifurcation under ASC 815. However, due to the nature and terms of the reporting obligations, the value of the embedded derivative is immaterial.

We incurred issuance costs related to the 2028 Notes of approximately \$4.5 million, which were recorded as debt issuance costs and are presented as a reduction to the 2028 Notes on our Consolidated Balance Sheets and are amortized to interest expense using the effective interest method over the term of the 2028 Notes, resulting in an effective interest rate of 1.6%.

The net carrying amount of the liability for the 2028 Notes is included as convertible senior notes, net, non-current in the Condensed Consolidated Balance Sheets as follows (in thousands):

	June 30, 2023	December 31, 2022
Principal amount	\$ 459,000	\$ 900,000
Unamortized debt issuance costs	(1,533)	(3,317)
Net carrying amount	<u>\$ 457,467</u>	<u>\$ 896,683</u>

For the three and six months ended June 30, 2023 and 2022, interest expense for the 2028 Notes was as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2023	2022	2023	2022
Contractual interest expense	\$ 3,319	\$ 3,375	\$ 6,694	\$ 6,750
Amortization of debt issuance costs	155	154	311	307
Total interest expense	<u>\$ 3,474</u>	<u>\$ 3,529</u>	<u>\$ 7,005</u>	<u>\$ 7,057</u>

As of June 30, 2023, the estimated fair value (Level 2) of the 2028 Notes was \$388.0 million. The fair value of the 2028 Notes is estimated using a binomial lattice model that is primarily affected by the trading price of our common stock, market interest rates and volatility.

NOTE 5. COMMITMENTS AND CONTINGENCIES

The Company has entered into various operating lease agreements, primarily relating to our corporate offices. See *Note 8 – Commitments and Contingencies*, subsection titled “Leases”, in Part II, Item 8 of the Annual Report on Form 10-K for the year ended December 31, 2022 for information regarding the Company’s maturity of lease liabilities under its lease agreements.

Contingencies

We may become involved in legal proceedings, claims and assessments from time to time in the ordinary course of business. We accrue liabilities for such matters when it is probable that future expenditures will be made and such expenditures can be reasonably estimated.

We do not believe that the ultimate outcome of any such pending matters is probable or reasonably estimable, or that these matters will have a material adverse effect on our business; however, the results of litigation and claims are inherently unpredictable. Regardless of the outcome, litigation can have an adverse impact on us because of litigation and settlement costs, diversion of management resources, and other factors.

Please see subsection titled [Legal Proceedings, in Part II, Item 1](#) of this Quarterly Report on Form 10-Q.

Indemnification

Pursuant to Delaware law and agreements entered into with each of our directors and officers, we may have obligations, under certain circumstances, to hold harmless and indemnify each of our directors and officers against losses suffered or incurred by the indemnified party in connection with their service to us, and judgements, fines, settlements and expenses related to claims arising against such directors and officers to the fullest extent permitted under Delaware law, our bylaws and our certificate of incorporation. We also enter and have entered into indemnification agreements with our directors and officers that may require us to indemnify them against liabilities that arise by reason of their status or service as directors or officers, except as prohibited by applicable law. In addition, we may have obligations to hold harmless and indemnify third parties involved with our fundraising efforts and their respective affiliates, directors, officers, employees, agents or other representatives against any and all losses, claims, damages and liabilities related to claims arising against such parties pursuant to the terms of agreements entered into between such third parties and us in connection with such fundraising efforts. To the extent that any such indemnification obligations apply to the lawsuits described above, any associated expenses incurred are included within the related accrued litigation expense amounts. No additional liability associated with such indemnification obligations has been recorded as of June 30, 2023 and December 31, 2022.

NOTE 6. STOCKHOLDERS' EQUITY

Underwritten Public Equity Offering

In January 2023, we entered into an underwriting agreement, relating to the public offering of 17.5 million shares of our common stock, \$0.001 par value per share, at a price to the public of \$10.00 per share. Under the terms of the underwriting agreement, we also granted the underwriters a 30-day option to purchase up to an additional 2.6 million shares of our common stock, which was subsequently exercised in full, and the offering, including the sale of shares of common stock subject to the underwriters' option, closed in January 2023. In total, we sold 20.1 million shares of our common stock. We paid a commission equal to 5.75% of the gross proceeds from the sale of shares of our common stock. The total net proceeds to us from the offering after deducting the underwriting discount were approximately \$189.7 million, excluding approximately \$0.5 million of offering expenses.

Refer to *Note 10 – Stockholders' Equity*, in Part II, Item 8 of the Annual Report on Form 10-K for the year ended December 31, 2022 for more information on the Company's underwritten public equity offerings and private placement of common stock.

Equity Plans

At June 30, 2023, the Company had share-based compensation awards outstanding under the 2020 Equity Incentive Plan (the "2020 Plan"), the 2020 Inducement Equity Incentive Plan (the "Inducement Plan"), the 2021 adopted Omniome Equity Incentive Plan of Pacific Biosciences of California, Inc. (the "Omniome Plan") and the 2010 Employee Stock Purchase Plan, from which we issued equity awards and employee stock.

As of June 30, 2023, we had 12.2 million shares remaining and available for future issuance under the 2020 Plan, Inducement Plan, and the Omniome Plan. Shares remaining and available for future issuance reflect shares that may become eligible to vest upon the achievement of maximum targets for certain equity awards.

Refer to *Note 10 – Stockholders' Equity*, in Part II, Item 8 of the Annual Report on Form 10-K for the year ended December 31, 2022 for more information on the Company's equity plans.

Stock Options

Time-based Stock Options

The following table summarizes stock option activity for time-based awards (shares in thousands):

	Number of shares	Weighted average exercise price
Outstanding at December 31, 2022	14,618	\$ 10.60
Granted	232	11.94
Exercised	(707)	4.76
Canceled	(581)	18.99
Outstanding at June 30, 2023	<u>13,562</u>	<u>\$ 10.57</u>

Performance-based Stock Options

The following table summarizes stock option activity for performance-based awards (shares in thousands):

	Number of shares	Weighted average exercise price
Outstanding at December 31, 2022	258	\$ 4.71
Granted	—	—
Exercised	(251)	4.71
Canceled	(4)	4.71
Outstanding at June 30, 2023	<u>3</u>	<u>\$ 4.74</u>

Restricted Stock Units ("RSU") and Performance Stock Units ("PSU")

We issue RSUs for which the respective shares vest when the requisite service period is achieved. We issue PSUs for which the number of shares issuable in the third year of the performance period based on performance relative to specified revenue targets and continued employment through the vesting period. Maximum achievement of the revenue goal under the PSUs will result in up to 200% of the target number of shares subject to the PSUs to become eligible to vest, while not meeting the minimum achievement of the revenue goal under the PSUs will result in no shares subject to the PSUs becoming eligible to vest. The following table summarizes the time-based RSUs and PSUs activity (shares in thousands):

	Restricted Stock Units (RSU)	Performance Stock Units (PSU)	Weighted average grant date fair value	
			RSU	PSU
Outstanding at December 31, 2022	8,535	—	\$ 15.16	\$ —
Granted	6,626	564	9.59	9.43
Vested	(1,831)	—	15.99	—
Forfeited	(687)	—	16.89	—
Outstanding at June 30, 2023	<u>12,643</u>	<u>564</u>	<u>\$ 12.03</u>	<u>\$ 9.43</u>

Employee Stock Purchase Plan ("ESPP")

Shares issued under our ESPP were 1,052,908 and 1,316,923 during the six months ended June 30, 2023 and 2022, respectively. In February 2023, an additional 4.0 million shares were reserved under the ESPP. As of June 30, 2023, 12.9 million shares of our common stock remain available for issuance under our ESPP.

Share-Based Compensation

The following table summarizes share-based compensation expense (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2023	2022	2023	2022
Cost of revenue	\$ 1,177	\$ 988	\$ 3,126	\$ 2,746
Research and development	5,423	7,748	12,128	16,713
Sales, general and administrative	11,291	10,283	20,589	22,263
Total share-based compensation expense	\$ 17,891	\$ 19,019	\$ 35,843	\$ 41,722

Determining Fair Value

We estimate the fair value of stock options granted using the Black-Scholes valuation method and a single option award approach. When determining the current share prices underlying the stock options for calculating the grant-date fair value, we reference the observable market prices of our stock. This fair value is then amortized on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period. The fair market value of RSUs and PSUs granted is the closing price of our shares on the date of grant and is generally recognized as compensation expense on a straight-line basis over the respective vesting period. For shares purchased under our ESPP, we estimate the grant-date fair value, and the resulting share-based compensation expense, using the Black-Scholes option-pricing model. We estimate forfeitures of stock options, RSUs and shares purchased under our ESPP which is utilized to determine the compensation expense to be recorded over the requisite service period.

- **Expected Term** - The expected term used in the Black-Scholes valuation method represents the period that the stock options are expected to be outstanding and is determined based on historical experience of similar awards, giving consideration to the contractual terms of the stock options and vesting schedules.
- **Expected Volatility** - The expected volatility used in the Black-Scholes valuation method is derived from the implied volatility related to our share price over the expected term.
- **Expected Dividend** - We have never paid dividends on our shares and, accordingly, the dividend yield percentage is zero for all periods.
- **Risk-Free Interest Rate** - The risk-free interest rate used in the Black-Scholes valuation method is the implied yield currently available on U.S. Treasury constant maturities issued with a term equivalent to the expected terms.

The fair value of employee stock options was estimated using the following assumptions:

	Six Months Ended June 30,	
	2023	2022
Expected term in years	4.9	4.6
Expected volatility	78%	70% — 72%
Risk-free interest rate	3.73%	1.76% — 2.77%
Dividend yield	—	—
Weighted average grant date fair value per share	\$7.76	\$6.05

The fair value of shares to be issued under the ESPP was estimated using the following assumptions:

	Six Months Ended June 30,	
	2023	2022
Expected term in years	0.5 — 2.0	0.5 — 2.0
Expected volatility	97%	70%
Risk-free interest rate	4.89% — 5.20%	0.60% — 1.31%
Dividend yield	—	—
Weighted average grant date fair value per share	\$5.00	\$5.42

NOTE 7. NET LOSS PER SHARE

Basic net loss per share is computed by dividing net loss by the weighted average number of shares of common stock outstanding during the period. Diluted net loss per share is computed using the weighted-average number of shares of common stock outstanding and potential shares assuming the dilutive effect of the convertible senior notes, using the if-converted method, and outstanding equity awards using the treasury stock method.

The following table presents the calculation of the basic and diluted net loss per share amounts presented in the Condensed Consolidated Statements of Operations and Comprehensive Loss (in thousands, except per share amounts):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2023	2022	2023	2022
Numerator:				
Net loss	\$ (69,833)	\$ (71,394)	\$ (157,848)	\$ (152,893)
Denominator:				
Basic				
Weighted average shares used in computing basic net loss	250,070	224,499	246,074	223,400
Basic net loss per share	\$ (0.28)	\$ (0.32)	\$ (0.64)	\$ (0.68)
Diluted				
Weighted average shares used in computing diluted net loss per share	250,070	224,499	246,074	223,400
Diluted net loss per share	\$ (0.28)	\$ (0.32)	\$ (0.64)	\$ (0.68)

The following shares issuable upon conversion of the convertible senior notes and outstanding equity awards were excluded from the computation of diluted net loss per share for the periods presented because the effect of including such shares would have been antidilutive (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2023	2022	2023	2022
Shares issuable upon conversion of convertible senior notes	31,063	20,690	31,063	20,690
Equity Awards	29,773	25,925	29,773	25,925

As described in Note 2 – Business Acquisitions in Part II, Item 8 of the Annual Report on Form 10-K for the year ended December 31, 2022, the contingently issuable shares would be due upon the achievement of a milestone.

NOTE 8. REVENUE

A summary of our revenue by geographic location is as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2023	2022	2023	2022
Americas	\$ 23,960	\$ 21,722	\$ 43,031	\$ 40,804
Europe, Middle East and Africa	10,730	5,735	18,600	11,435
Asia-Pacific	12,883	8,010	24,842	16,401
Total	\$ 47,573	\$ 35,467	\$ 86,473	\$ 68,640

A summary of our revenue by category is as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2023	2022	2023	2022
Instrument revenue	\$ 29,923	\$ 15,619	\$ 50,623	\$ 31,169
Consumable revenue	13,732	14,556	27,686	27,250
Product revenue	43,655	30,175	78,309	58,419
Service and other revenue	3,918	5,292	8,164	10,221
Total revenue	\$ 47,573	\$ 35,467	\$ 86,473	\$ 68,640

NOTE 9. SUBSEQUENT EVENTS

On August 2, 2023, we entered into an agreement and plan of reorganization (the "Merger Agreement"), pursuant to which we acquired Apton Biosystems, Inc., a privately held genomics company ("Apton"). The transaction closed on August 2, 2023.

Pursuant to the Merger Agreement, upon the closing of the acquisition, we will, among other things, issue to holders of Apton's outstanding equity interests ("Apton Securityholders") approximately 6.3 million shares of the Company's common stock, par value \$0.001 per share ("Common Stock"). Additionally, subject to the terms and conditions of the Merger Agreement and the achievement of \$50 million in revenue associated with a high throughput sequencer using Apton's technology, Apton Securityholders will also be entitled to receive \$25.0 million, which we may elect to pay in cash, shares of Common Stock or a combination of cash and shares of Common Stock. At this time, the number of shares, if any, to be issued in connection with the achievement of the specified milestone is not known, and will be calculated based on the daily volume-weighted average price of the Common Stock for the twenty trading days ending on and including the fifth trading day immediately prior to the occurrence of the specified milestone. Under the terms of the Merger Agreement, we may pay cash in lieu of Common Stock to ensure that the issuance of Common Stock as contemplated by the Merger Agreement does not exceed 19.9% of the shares of Common Stock then outstanding.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

You should read the following discussion and analysis of our financial condition and results of operations together with the unaudited condensed consolidated financial statements and related notes that are included elsewhere in this Quarterly Report on Form 10-Q and the consolidated financial statements and the related notes included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2022 filed with the U.S. Securities and Exchange Commission, or the SEC, on February 28, 2023, or our Annual Report on Form 10-K. This discussion contains forward-looking statements based upon current plans, expectations and beliefs that involve risks and uncertainties. The words "anticipates," "believes," "could," "estimates," "expects," "intends," "may," "might," "plans," "potential," "predicts," "projects," "seeks," "should," "target," "will," "would" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including, but not limited to, those discussed in the section entitled "Risk Factors" and elsewhere in this Quarterly Report on Form 10-Q, and you should not place undue reliance on our forward-looking statements. We do not assume any obligation to update any forward-looking statements. In preparing this MD&A, we presume that readers have access to and have read the MD&A in our Annual Report on Form 10-K, pursuant to Instruction 2 to paragraph (b) of Item 303 of Regulation S-K.

Our Management's Discussion and Analysis (MD&A) is organized into the following sections:

- Overview and Outlook
- Results of Operations
- Liquidity and Capital Resources
- Critical Accounting Policies and Estimates
- Recent Accounting Pronouncements
- Off Balance Sheet Arrangements

Overview and Outlook

About PacBio

We are a premier life science technology company that is designing, developing, and manufacturing advanced sequencing solutions that enable scientists and clinical researchers to improve their understanding of the genome and ultimately, resolve genetically complex problems.

Our products and technology under development stem from two highly differentiated core technologies focused on accuracy, quality and completeness which include our existing HiFi long-read sequencing solutions and our emerging Sequencing by Binding ("SBB") short-read sequencing solution. Our products address solutions across a broad set of research applications including human genomics, plant and animal sciences, infectious disease and microbiology, oncology, and other emerging applications.

Our focus is on providing our customers with advanced sequencing solutions with higher throughput and improved workflows that we believe will enable dramatic advancements in routine healthcare.

Our customers include academic and governmental research institutions, commercial testing and service laboratories, genome centers, public health labs, hospitals and clinical research institutes, contract research organizations ("CROs"), pharmaceutical companies and agricultural companies.

As of June 30, 2023, our commercial team consisted of approximately 206 employees, including 62 quota-carrying representatives, many with advanced degrees in biology and significant experience in the genomics industry.

Strategic Objectives

Our 2023 strategic objectives are to:

- Drive rapid adoption of Revio™ by converting existing Sequel® II/IIe customers and attracting new PacBio customers
- Demonstrate Onso's extraordinary level of accuracy in the field and show how it can transform research in needle-in-haystack applications

- Progress development of ultra-high-throughput and benchtop long-read sequencers and next generation SBB™ short-read sequencer
- Leverage current infrastructure to drive toward positive cash flow
- Expand partnerships across ecosystem and workflow to drive customer adoption of SBB short-read sequencing and HiFi long-read sequencing

We will continue to leverage our commercial organization and make significant improvements in the efficiency and usability of our products to seek to reach a broader customer base. We believe the commercial investments we have recently made will further help drive growth in our business.

To increase the adoption of HiFi sequencing, we have various development programs in progress to expand our product portfolio as well as increase the throughput and improve the usability of our existing sequencing solutions. We continue to focus on programs to accelerate new platform launches in the near to mid-term as well as increase applications for our technologies. In October 2022, we announced Revio, our new HiFi long-read sequencing system. We began taking orders in the fourth quarter of 2022 and commenced commercial Revio shipments in the first quarter of 2023. To address the oncology research markets with a highly differentiated alternative to existing third-party short-read sequencing products already on the market, we also progressed development of and, subsequent to the quarter ended June 30, 2023, commercialized Onso™, our SBB short-read platform. We began taking orders in the first quarter of 2023, and in August 2023, we commenced customer shipments of the Onso short-read sequencing instrument, with shipments of related consumables expected to occur later in August 2023. The milestone payment associated with PacBio's acquisition of Omniome will be triggered once both the Onso instrument and related consumables have shipped to one customer.

We continue to believe that with the capabilities of our HiFi chemistry and SMRT™ technology, we can be a market leader in whole-genome clinical sequencing. Leading institutions have adopted our products to study rare and inherited disease. We believe the market opportunity for clinical sequencing is significant and could drive substantial revenue growth for the company. We plan to continue to pursue partner collaborations where the technologies being developed or applications being considered extend beyond whole-genome clinical sequencing. Collaborative arrangements add to the awareness of our products and service offerings and may drive new applications for use of our technology.

Financial Overview

Key highlights of the six months ended June 30, 2023 consolidated financial results include the following:

- Revenue increased \$17.8 million, or 26%, to \$86.5 million for the six months ended June 30, 2023, as compared to \$68.6 million for the six months ended June 30, 2022. Revenue was comprised of \$50.6 million in instrument revenue, \$27.7 million in consumables revenue and \$8.2 million in service and other revenue for the six months ended June 30, 2023. The increase was primarily driven by the launch of Revio in the first quarter of 2023, which is sold at a higher average selling price than our previous Sequel II and IIe platform. We ended the quarter with an installed base of 77 Revio systems, and we shipped 8 Sequel IIe systems during the six months ended June 30, 2023.
- Gross profit as a percentage of revenue (gross margin) was 29% for the six months ended June 30, 2023, compared to 44% for the six months ended June 30, 2022. Gross margin declined due in part to instrument mix, as Revio instruments sold during the six months ended June 30, 2023 had a lower margin primarily due to loyalty discounts provided and higher initial manufacturing costs, as well as adjustments of approximately \$3.5 million recognized in the first quarter of 2023 primarily relating to excess consumables inventory resulting from a faster-than-expected decline in demand of Sequel II/IIe consumables due to the product transition to Revio. Our gross margin in future periods will depend on several factors, including new product transitions and offerings, strategic product pricing; product mix as a result of higher-margin consumables; supply chain constraints and inflation increasing costs of raw materials; manufacturing capacity and production volumes impacting the cost of inventory; freight costs; and excess or obsolete inventories.

- Loss from operations increased \$18.9 million, or 13%, to \$164.4 million for the six months ended June 30, 2023, as compared to \$145.5 million for the six months ended June 30, 2022, driven primarily by an increase of \$13.9 million of operating expenses, including a \$8.2 million decrease in research and development expenses and a \$20.7 million increase in the change in the fair value of the contingent consideration, and a decline in gross profit of \$5.0 million. We anticipate operating expenses to increase slightly during the remainder of the year as compared to the prior year, primarily driven by changes in the fair value of the contingent consideration relating to the Omniome acquisition and merger related costs attributable to Apton.
- Cash, cash equivalents, and short-term investments were \$829.9 million at June 30, 2023, which represents a 7% increase compared to the balance at December 31, 2022.

Macroeconomic dynamics including rising inflation, global supply chain constraints, volatile capital markets, competition, and fluctuating exchange rates have adversely impacted our customers and lengthened customer sales cycles. These factors could impact our revenues and results of operations throughout 2023; however, the size and duration of these impacts is uncertain, and as a result, we cannot reasonably estimate the future impact to our operations and financial results.

See the [Risk Factors](#) section for further discussion of the possible impact of the COVID-19 pandemic and other macroeconomic factors on our business.

Recent Developments

Note Exchange Transaction

In June 2023, we entered into a privately negotiated exchange agreement with a holder of our outstanding 1.50% Convertible Senior Notes due 2028 (the "2028 Notes"), pursuant to which we issued \$441.0 million in aggregate principal amount of our 1.375% Convertible Senior Notes due 2030 (the "2030 Notes" and, together with the 2028 Notes, the "Notes") in exchange for \$441.0 million principal amount of the 2028 Notes (the "Exchange Transaction"), pursuant to exemptions from registration under the Securities Act of 1933, as amended, and the rules and regulations thereunder. Following the Exchange Transaction, approximately \$459.0 million in aggregate principal amount of the 2028 Notes remained outstanding.

Apton Merger Agreement

On August 2, 2023, we entered into an agreement and plan of reorganization (the "Merger Agreement"), pursuant to which we acquired Apton Biosystems, Inc., a privately held genomics company ("Apton"). The transaction closed on August 2, 2023.

Pursuant to the Merger Agreement, upon the closing of the acquisition, we will, among other things, issue to holders of Apton's outstanding equity interests ("Apton Securityholders") approximately 6.3 million shares of the Company's common stock, par value \$0.001 per share ("Common Stock"). Additionally, subject to the terms and conditions of the Merger Agreement and the achievement of \$50 million in revenue associated with a high throughput sequencer using Apton's technology, Apton Securityholders will also be entitled to receive \$25.0 million, which we may elect to pay in cash, shares of Common Stock or a combination of cash and shares of Common Stock. At this time, the number of shares, if any, to be issued in connection with the achievement of the specified milestone is not known, and will be calculated based on the daily volume-weighted average price of the Common Stock for the twenty trading days ending on and including the fifth trading day immediately prior to the occurrence of the specified milestone. Under the terms of the Merger Agreement, we may pay cash in lieu of Common Stock to ensure that the issuance of Common Stock as contemplated by the Merger Agreement does not exceed 19.9% of the shares of Common Stock then outstanding.

Results of Operations

Comparison of the Three Months Ended June 30, 2023 and 2022

(in thousands, except percentages)

	Three Months Ended June 30,		\$ Change	% Change
	2023	2022		
Revenue:				
Product revenue	\$ 43,655	\$ 30,175	\$ 13,480	45 %
Service and other revenue	3,918	5,292	(1,374)	(26) %
Total revenue	47,573	35,467	12,106	34 %
Cost of Revenue:				
Cost of product revenue	28,432	15,499	12,933	83 %
Cost of service and other revenue	3,412	3,592	(180)	(5) %
Amortization of intangible assets	183	183	—	— %
Total cost of revenue	32,027	19,274	12,753	66 %
Gross profit	15,546	16,193	(647)	(4) %
Operating Expense:				
Research and development	46,173	50,348	(4,175)	(8) %
Sales, general and administrative	40,573	39,252	1,321	3 %
Change in fair value of contingent consideration	1,975	(5,438)	7,413	(136) %
Total operating expense	88,721	84,162	4,559	5 %
Operating loss	(73,175)	(67,969)	(5,206)	8 %
Loss on extinguishment of debt	(2,033)	—	(2,033)	100 %
Interest expense	(3,554)	(3,681)	127	(3) %
Other income (expense), net	8,929	256	8,673	3388 %
Net loss	\$ (69,833)	\$ (71,394)	\$ 1,561	(2) %

Revenue

Revenue increased \$12.1 million, or 34%, to \$47.6 million for the three months ended June 30, 2023, as compared to \$35.5 million for the three months ended June 30, 2022.

Instrument revenue increased \$14.3 million, or 92%, to \$29.9 million for the three months ended June 30, 2023, as compared to \$15.6 million for the three months ended June 30, 2022, primarily due to the sale of 45 Revio systems that have a higher average selling price as compared to the Sequel IIe platform. We continue to expect the installed base of Revio instruments to grow, reflecting customer demand for the new product. As a result of this new product launch, we anticipate installed base and sales volumes of Sequel II/IIe to continue to decline compared to prior periods.

Consumables revenue decreased \$0.8 million, or 6%, to \$13.7 million for the three months ended June 30, 2023, as compared to \$14.6 million for the three months ended June 30, 2022. The decrease in consumable sales was primarily due to lower Sequel consumable sales attributable to the product transition to Revio. We expect Revio consumable sales to increase as the installed base grows. While we expect to see a decline in Sequel consumable sales resulting from the product transition, there is uncertainty as to the rate at which these sales will decline.

Service and other revenue decreased \$1.4 million, or 26%, to \$3.9 million for the three months ended June 30, 2023, as compared to \$5.3 million for the three months ended June 30, 2022, primarily due to the change in our terms of the warranty provided with the instrument during the first quarter of 2022 to remove the service component. As a result, the warranty is no longer a separate performance obligation and, accordingly, we accrue for the cost of the assurance warranty when revenue of the instrument is recognized, and no longer recognize a component of the instrument revenue in service and other revenue over the warranty period. We expect service revenue to continue to decline during the remainder of the year as we anticipate customers transitioning their service contracts to Revio following the standard warranty period, with fewer customers renewing Sequel and Sequel II/IIe service contracts.

Cost of Revenue, Gross Profit and Gross Margin

Cost of product revenue increased \$12.9 million, or 83%, for the three months ended June 30, 2023, compared to the three months ended June 30, 2022. The cost of product revenue increased primarily due to an increase in system placements and higher overall product costs on the Revio platform. Cost of revenue included share-based compensation expense of \$1.2 million and \$1.0 million during the three months ended June 30, 2023 and 2022, respectively.

Gross profit decreased \$0.6 million, or 4%, to \$15.5 million for the three months ended June 30, 2023, compared to \$16.2 million for the three months ended June 30, 2022. Gross margin was 33% for the three months ended June 30, 2023, compared to gross margin of 46% for the three months ended June 30, 2022. The decrease in gross margin was due in part to instrument mix, as Revio instruments sold during the quarter had a lower margin primarily due to loyalty discounts provided and higher initial manufacturing costs on the Revio platform. While we expect gross margin to expand during the remainder of the year, gross margin could fluctuate depending on the pace at which Sequel II/IIe consumable revenue declines, Revio consumable revenue ramps, and manufacturing efficiencies improve, as well as fluctuations in average selling prices.

Research and Development Expense

Research and development expense decreased by \$4.2 million, or 8%, to \$46.2 million for the three months ended June 30, 2023, compared to \$50.3 million for the three months ended June 30, 2022. The decrease was primarily driven by the transition of Revio from development to commercialization, in addition to lower headcount. Research and development expense included share-based compensation expense of \$5.4 million and \$7.7 million during the three months ended June 30, 2023 and 2022, respectively.

Sales, General and Administrative Expense

Sales, general and administrative expense increased by \$1.3 million, or 3%, to \$40.6 million for the three months ended June 30, 2023, compared to \$39.3 million for the three months ended June 30, 2022. Sales, general, and administrative expense included share-based compensation expense of \$11.3 million and \$10.3 million during the three months ended June 30, 2023 and 2022, respectively.

Change in Fair Value of Contingent Consideration

Change in fair value of contingent consideration of \$2.0 million during the three months ended June 30, 2023, represents the remeasurement impact of the contingent consideration liability of \$200 million (composed of \$100 million in cash and \$100 million in shares of our common stock) that is due upon the achievement of a milestone, defined as the first commercial shipment to a customer of both an instrument and related consumables, utilizing SBB technology. The increase in contingent consideration liability was due to the passage of time and changes in the discount rates and probabilities of milestone achievement.

Loss on Extinguishment of Debt

Loss on extinguishment of debt of \$2.0 million during the six months ended June 30, 2023, represents the loss resulting from the difference in the fair value of the 2030 Notes and the principal, in addition to the write-off of the unamortized debt issuance costs on the portion of the 2028 Notes that were exchanged as part of the debt modification during the six months ended June 30, 2023.

Interest Expense

Interest expense for the three months ended June 30, 2023, was \$3.6 million compared to \$3.7 million for the three months ended June 30, 2022 and was primarily comprised of interest on the convertible senior notes.

Other Income (Expense), net

Other income (expense), net for the three months ended June 30, 2023, was \$8.9 million compared to \$0.3 million for the three months ended June 30, 2022. The \$8.7 million increase was primarily due to investment income.

Comparison of the Six Months Ended June 30, 2023 and 2022

(in thousands, except percentages)

	Six Months Ended June 30,		\$ Change	% Change
	2023	2022		
Revenue:				
Product revenue	\$ 78,309	\$ 58,419	\$ 19,890	34 %
Service and other revenue	8,164	10,221	(2,057)	(20) %
Total revenue	86,473	68,640	17,833	26 %
Cost of Revenue:				
Cost of product revenue	53,596	30,319	23,277	77 %
Cost of service and other revenue	7,204	7,607	(403)	(5) %
Amortization of intangible assets	366	366	—	— %
Total cost of revenue	61,166	38,292	22,874	60 %
Gross profit	25,307	30,348	(5,041)	(17) %
Operating Expense:				
Research and development	95,112	103,285	(8,173)	(8) %
Sales, general and administrative	80,391	79,056	1,335	2 %
Change in fair value of contingent consideration	14,231	(6,501)	20,732	(319) %
Total operating expense	189,734	175,840	13,894	8 %
Operating loss	(164,427)	(145,492)	(18,935)	13 %
Loss on extinguishment of debt	(2,033)	—	(2,033)	100 %
Interest expense	(7,184)	(7,378)	194	(3) %
Other income (expense), net	15,796	(23)	15,819	(68778) %
Net loss	\$ (157,848)	\$ (152,893)	\$ (4,955)	3 %

Revenue

Revenue increased \$17.8 million, or 26%, to \$86.5 million for the six months ended June 30, 2023, as compared to \$68.6 million for the six months ended June 30, 2022.

Instrument revenue increased \$19.5 million, or 62%, to \$50.6 million for the six months ended June 30, 2023, as compared to \$31.2 million for the six months ended June 30, 2022, primarily due to the sale of 77 Revio systems that have a higher average selling price as compared to the Sequel IIe platform. We expect the installed base of Revio instruments to grow, reflecting customer demand for the new product. As a result of this new product launch, we anticipate installed base and sales volumes of Sequel II/IIe to continue to decline compared to recent quarters.

Consumables revenue increased \$0.4 million, or 2%, to \$27.7 million for the six months ended June 30, 2023, as compared to \$27.3 million for the six months ended June 30, 2022. The increase in consumable sales was primarily due to higher Revio consumables sales attributable to the growth in the Revio instrument installed base, partially offset by a decline in Sequel consumables as customers transition to the new platform.

Service and other revenue decreased \$2.1 million, or 20%, to \$8.2 million for the six months ended June 30, 2023, as compared to \$10.2 million for the six months ended June 30, 2022, primarily due to the change in our terms of the warranty provided with the instrument during the first quarter of 2022 to remove the service component. As a result, the warranty is no longer a separate performance obligation and, accordingly, we accrue for the cost of the assurance warranty when revenue of the instrument is recognized, and no longer recognize a component of the instrument revenue in service and other revenue over the warranty period. We expect service revenue to continue to decline during the remainder of the year as we anticipate customers transitioning their service contracts to Revio following the standard warranty period, with fewer customers renewing Sequel and Sequel II/IIe service contracts.

Cost of Revenue, Gross Profit and Gross Margin

Cost of product revenue increased \$22.9 million, or 60%, for the six months ended June 30, 2023, compared to the six months ended June 30, 2022. The cost of product revenue increased primarily due to higher overall product costs on the Revio platform, as well as adjustments of approximately \$3.5 million recognized during the first quarter of 2023 primarily relating to excess consumables inventory resulting from a faster-than-expected decline in demand of Sequel II/IIe consumables due to the product transition to Revio. Cost of revenue included share-based compensation expense of \$3.1 million and \$2.7 million during the six months ended June 30, 2023 and 2022, respectively.

Gross profit decreased \$5.0 million, or 17%, to \$25.3 million for the six months ended June 30, 2023, compared to \$30.3 million for the six months ended June 30, 2022. Gross margin was 29% for the six months ended June 30, 2023, compared to gross margin of 44% for the six months ended June 30, 2022. The decrease in gross margin was due in part to instrument mix, as Revio instruments sold during the quarter had a lower margin primarily due to loyalty discounts provided and higher initial manufacturing costs, as well as adjustments of approximately \$3.5 million recognized during the first quarter of 2023 primarily relating to excess consumables inventory resulting from a faster-than-expected decline in demand of Sequel II/IIe consumables due to the product transition to Revio. While we expect gross margin to expand during the remainder of the year, gross margin could fluctuate depending on the pace at which Sequel II/IIe consumable revenue declines, Revio consumable revenue ramps, and manufacturing efficiencies improve, as well as fluctuations in average selling prices.

Research and Development Expense

Research and development expense decreased by \$8.2 million, or 8%, to \$95.1 million for the six months ended June 30, 2023, compared to \$103.3 million for the six months ended June 30, 2022. The decrease was primarily driven by the transition of Revio from development to commercialization, in addition to lower headcount. Research and development expense included share-based compensation expense of \$12.1 million and \$16.7 million during the six months ended June 30, 2023 and 2022, respectively.

Sales, General and Administrative Expense

Sales, general and administrative expense increased by \$1.3 million, or 2%, to \$80.4 million for the six months ended June 30, 2023, compared to \$79.1 million for the six months ended June 30, 2022. The increase in sales, general, and administrative expense was primarily driven by an increase in marketing expenses in connection with the Revio launch and increased sales and marketing headcount as we continue to grow our commercial footprint. Sales, general, and administrative expense included share-based compensation expense of \$20.6 million and \$22.3 million during the six months ended June 30, 2023 and 2022, respectively.

Change in Fair Value of Contingent Consideration

Change in fair value of contingent consideration of \$14.2 million during the six months ended June 30, 2023, represents the remeasurement impact of the contingent consideration liability of \$200 million (composed of \$100 million in cash and \$100 million in shares of our common stock) that is due upon the achievement of a milestone, defined as the first commercial shipment to a customer of both an instrument and related consumables, utilizing SBB technology. The increase in contingent consideration liability was primarily due to the passage of time and changes in the discount rates and probabilities of milestone achievement.

Loss on Extinguishment of Debt

Loss on extinguishment of debt of \$2.0 million during the six months ended June 30, 2023, represents the loss resulting from the difference in the fair value of the 2030 Notes and the principal, in addition to the write-off of the unamortized debt issuance costs on the portion of the 2028 Notes that were exchanged as part of the debt modification during the six months ended June 30, 2023.

Interest Expense

Interest expense for the six months ended June 30, 2023, was \$7.2 million compared to \$7.4 million for the six months ended June 30, 2022 and was primarily comprised of interest on the convertible senior notes.

Other Income (Expense), net

Other income (expense), net for the six months ended June 30, 2023, was \$15.8 million compared to \$23.0 thousand for the six months ended June 30, 2022. The \$15.8 million increase was primarily due to investment income.

Liquidity and Capital Resources

Our primary sources of liquidity, other than our holdings of cash, cash equivalents, and investments, has primarily been through the issuance of debt or equity securities, together with cash flow from operating activities. We have historically incurred, and expect to continue to incur, operating losses and generate negative cash flows from operations on an annual basis, and as a result, we may require additional capital resources to execute our strategic initiatives to grow our business.

January 2023 Public Offering

On January 27, 2023, we issued and sold an aggregate of 20,125,000 shares of our common stock at a purchase price of \$10.00 per share pursuant to an automatic shelf registration statement filed on Form S-3 with the Securities and Exchange Commission, resulting in aggregate gross proceeds of approximately \$201.3 million. After deducting underwriting discounts and commissions and offering costs paid or payable by us of approximately \$12.1 million, the net proceeds from the offering were approximately \$189.2 million.

June 2023 Note Exchange

As discussed above under [Recent Developments](#), in June 2023, we entered into a privately negotiated exchange with a holder of our 2028 Notes, pursuant to which we issued \$441.0 million in aggregate principal amount of our 2030 Notes. Following the Exchange Transaction, approximately \$459.0 million in aggregate principal amount of the 2028 Notes remained outstanding.

Contingent Consideration

In connection with the acquisition of Omniome in the third quarter of 2021, we entered into an arrangement where we are obligated to pay approximately \$200.0 million in cash and equity dependent upon the achievement of a milestone event upon the first commercial shipment of products developed from our acquired sequencing solution. See *Note 2 – Business Acquisitions* in Part II, Item 8 of the Annual Report on Form 10-K for the year ended December 31, 2022 for further information. In August 2023, we commenced customer shipments of the Onso short-read sequencing instrument, with shipments of related consumables expected to occur later in August 2023. The milestone payment associated with PacBio's acquisition of Omniome will be triggered once both the Onso instrument and related consumables have shipped to one customer.

In connection with the acquisition of Apton, we entered into an arrangement where we are obligated to pay holders of Apton's outstanding equity interests \$25.0 million upon the achievement of \$50 million in revenue associated with a high throughput sequencer using Apton's technology, which the Company may elect to pay in cash, shares of Company common stock or a combination of cash and shares of Company common stock. See [Note 9. Subsequent Events](#) in Part I, Item 1 of this Quarterly Report on Form 10-Q for further information.

As of June 30, 2023, we had cash, cash equivalents and investments of \$829.9 million compared to \$772.3 million as of December 31, 2022. We believe that our existing cash, cash equivalents and investments will be sufficient to fund our projected operating requirements beyond the next 12 months from the date of filing of this Quarterly Report on Form 10-Q for the quarter ended June 30, 2023.

Factors that may affect our capital needs include, but are not limited to, the pace of adoption of our products, which affects the sales of our products and services; our ability to obtain new collaboration and customer arrangements and maintain existing collaborations and arrangements; the progress of our research and development programs; initiation or expansion of research programs and collaborations; the purchase of patent licenses; manufacturing costs; service costs; the impact of product quality; litigation costs, including the costs involved in preparing, filing, prosecuting, defending and enforcing intellectual property rights; costs of developing new and enhanced products; acquisitions of complementary businesses, technologies or assets; achievement of milestones in connection with acquisitions; and other factors. There can be no assurance that funds will be available on favorable terms, or at all.

Summary of Cash Flows

(in thousands)	Six Months Ended June 30,	
	2023	2022
Cash used in operating activities	\$ (136,432)	\$ (139,592)
Cash used in investing activities	(171,144)	(18,228)
Cash provided by financing activities	191,274	5,670
Net decrease in cash, cash equivalents and restricted cash	\$ (116,302)	\$ (152,150)

Operating Activities

Our primary uses of cash in operating activities include the development of future products and product enhancements, manufacturing, and support functions related to our sales, general and administrative activities.

Cash used in operating activities for the six months ended June 30, 2023 of \$136.4 million was due primarily to a \$157.8 million net loss that included non-cash items such as share-based compensation of \$35.8 million, change in estimated fair value of contingent consideration of \$14.2 million, depreciation expense of \$5.6 million, inventory provisions of \$4.3 million, amortization of right-of-use assets of \$3.3 million, and loss on extinguishment of debt of \$2.0 million. This was offset by the accretion of discount and amortization of premium on marketable securities, net of \$6.1 million and \$38.6 million in net changes to operating assets and liabilities. Cash flow impact from changes in net operating assets and liabilities was primarily driven by increases in inventory, accounts receivable and prepaid and other assets, as well as decreases in accrued expenses, operating lease liabilities and deferred revenue. These uses of cash were partially offset by an increase in accounts payable.

Cash used in operating activities for the six months ended June 30, 2022, of \$139.6 million was due primarily to a \$152.9 million net loss that included non-cash items such as stock-based compensation of \$41.7 million, depreciation expense of \$4.6 million, amortization of right-of-use assets of \$3.4 million, amortization of investment premium of \$1.1 million, partially offset by a \$6.5 million decrease in liability due to the change in estimated fair value of contingent consideration, and a net cash outflow due to \$31.9 million in net changes to operating assets and liabilities. The change in net operating assets and liabilities was primarily attributable to increases in inventory and accounts receivable, as well as decreases in accrued expenses, operating lease liabilities and deferred revenue. These uses of cash were partially offset by an increase in accounts payable.

Investing Activities

Our investing activities consist primarily of capital expenditures and investment purchases, sales, and maturities. Cash used in investing activities for the six months ended June 30, 2023, was due to \$311.7 million of maturities and sales of investments offset by \$476.9 million in purchases of investments, and \$6.0 million in purchases of property and equipment.

Our investing activities consist primarily of capital expenditures and investment purchases, sales and maturities. Cash used in investing activities for the six months ended June 30, 2022, was due to \$241.1 million in purchases of investments offset by \$230.5 million in maturities of investments, and \$7.7 million in purchases of property and equipment.

Financing Activities

Cash provided by financing activities during the six months ended June 30, 2023 primarily resulted from \$189.2 million in net proceeds related to the issuance of common stock from the underwritten public equity offering and \$9.8 million from the issuance of common stock through our equity compensation plans offset by \$6.8 million from the payment of debt issuance costs.

Cash provided by financing activities during the six months ended June 30, 2022 primarily resulted from proceeds of \$6.4 million from the issuance of common stock through our equity compensation plans.

Critical Accounting Policies and Estimates

The discussion and analysis of our financial condition and results of operations are based upon our unaudited condensed consolidated financial statements, which have been prepared in accordance with the rules and regulations of the SEC. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses. We evaluate our critical accounting policies and estimates on an ongoing basis. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

There have been no changes to our significant accounting policies as disclosed in the Annual Report on Form 10-K for the year ended December 31, 2022.

Recent Accounting Pronouncements

Please see [Note 1. Organization and Significant Accounting Policies](#), subsection titled "Recent Accounting Pronouncements", in Part I, Item 1 of this Quarterly Report on Form 10-Q for information regarding applicable recent accounting pronouncements.

Off-Balance Sheet Arrangements

As of June 30, 2023, we did not have any off-balance sheet arrangements.

In the ordinary course of business, we enter into standard indemnification arrangements. Pursuant to these arrangements, we indemnify, hold harmless, and agree to reimburse the indemnified parties for losses suffered or incurred by the indemnified party in connection with any trade secret, copyright, patent or other intellectual property infringement claim by any third party with respect to its technology, or from claims relating to our performance or non-performance under a contract, any defective products supplied by us, or any acts or omissions, or willful misconduct, committed by us or any of our employees, agents or representatives. The term of these indemnification agreements is generally perpetual after the execution of the agreement. The maximum potential amount of future payments we could be required to make under these agreements is not determinable because it involves claims that may be made against us in future periods but have not yet been made. To date, we have not incurred costs to defend lawsuits or settle claims related to these indemnification agreements.

We also enter and have entered into indemnification agreements with our directors and officers that may require us to indemnify them against liabilities that arise by reason of their status or service as directors or officers, except as prohibited by applicable law. In addition, we may have obligations to hold harmless and indemnify third parties involved with our fundraising efforts and their respective affiliates, directors, officers, employees, agents or other representatives against any and all losses, claims, damages and liabilities related to claims arising against such parties pursuant to the terms of agreements entered into between us and such third parties in connection with such fundraising efforts. To the extent that such indemnification obligations apply to the lawsuits described in [Note 5. Commitments and Contingencies](#) in Part I, Item 1 of this Quarterly Report on Form 10-Q, any associated expenses incurred are included within the related accrued litigation expense amounts. No additional liability associated with such indemnification agreements has been recorded as of June 30, 2023.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

Interest Rate and Market Risk

The 2030 Notes were recorded at fair value as of the closing date of the Exchange Transaction, less debt issuance costs, on our Condensed Consolidated Balance Sheets. We carry our remaining 2028 Notes at the principal amount, less unamortized debt issuance costs, on our Condensed Consolidated Balance Sheets. Because the 2030 Notes and 2028 Notes have fixed annual interest rates of 1.375% and 1.50%, respectively, we do not have any economic interest rate exposure or financial statement risk associated with changes in interest rates. The fair value of the notes, however, may fluctuate when interest rates and the market price of our stock changes. See [Note 4. Convertible Senior Notes](#) in Part I, Item 1 of this Quarterly Report on Form 10-Q for additional information.

During the six months ended June 30, 2023, we invested in cash equivalents, U.S. government and agency securities, U.S. Treasury securities, and corporate debt securities which were designated as cash equivalents and available-for-sale investments. Our cash equivalents and available-for-sale securities as of June 30, 2023 was \$830 million.

Our exposure to market risk for changes in interest rates relates primarily to our investment portfolio comprising of marketable securities. We invest in a number of securities including U.S. government and agency securities, U.S. Treasury securities, and corporate debt securities and money market funds. We attempt to ensure the safety and preservation of our invested principal funds by limiting default risk, market risk and reinvestment risk. We mitigate default risk by investing in high grade investment securities. The fair market value of our fixed rate securities may be adversely impacted by increases in interest rates while income earned may decline as a result of decreases in interest rates. A hypothetical 100 basis-point (one percentage point) increase or decrease in interest rates compared to rates at June 30, 2023 would have affected the fair value of our investment portfolio by approximately \$2.9 million.

There have been no other material changes in market risk from the information provided in our Annual Report on Form 10-K for the fiscal year ended December 31, 2022.

Item 4. Controls and Procedures

Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer, our Chief Financial Officer and our Chief Accounting Officer evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) of the Exchange Act) as of the end of the period covered by this Quarterly Report on Form 10-Q. Based on this evaluation, our chief executive officer and our chief financial officer concluded that our disclosure controls and procedures are designed at a reasonable assurance level and are effective to provide reasonable assurance that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and that such information is accumulated and communicated to our management, including our chief executive officer and our chief financial officer, as appropriate, to allow timely decisions regarding required disclosure.

In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply its judgment in evaluating the benefits of possible controls and procedures relative to their costs.

Changes in Internal Control Over Financial Reporting

An evaluation was performed under the supervision and with the participation of our management, including our Chief Executive Officer, Chief Financial Officer and Chief Accounting Officer to determine whether any change in our internal control over financial reporting occurred during the fiscal quarter ended June 30, 2023 that materially affected, or is reasonably likely to materially affect, our internal control over financial reporting. There were no material changes in our internal control over financial reporting during the fiscal quarter ended June 30, 2023, that have materially affected, or were reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1. Legal Proceedings

U.S. District Court Proceedings

On September 26, 2019, Personal Genomics of Taiwan, Inc. ("PGI") filed a complaint in the U.S. District Court for the District of Delaware against us for patent infringement (C.A. No. 19-cv-1810) (the "PGI District Court matter"). The matter from this complaint is based on PGI's U.S. Patent No. 7,767,441 (the "'441 Patent"). We plan to vigorously defend in this matter. On November 20, 2019, we filed our answer to the complaint, denying infringement and seeking a declaratory judgement of invalidity of the '441 Patent.

On June 22, 2020, we filed a petition requesting institution of an inter-partes review ("IPR") to the Patent Trial and Appeals Board (the "Board") at the United States Patent Office requesting the Board to find a set of claims in the '441 Patent invalid. On June 27, 2020, we filed a second petition requesting institution of an IPR requesting the Board to find another set of claims in the '441 Patent invalid. The two petitions (the "PacBio IPR Petitions") requesting IPRs assert that all of the claims relevant to the PGI complaint are invalid. On January 19, 2021, the Board ordered that both PacBio IPR Petitions be instituted on all grounds presented. On January 18, 2022, the Board issued decisions on the two IPRs. In one IPR, all challenged claims were found unpatentable, including PGI's core device claims. In the second IPR, the Board did not find the disputed claims unpatentable. We are appealing the decision in the second IPR to the U.S. Court of Appeals for the Federal Circuit.

On August 19, 2020, the court ordered a stay of the PGI District Court matter based on a joint stipulation by the parties pending a final written decision on the IPRs. Following the final decision on the IPRs described above, on February 2, 2022, the judge ordered that the PGI District Court matter be reopened. However, in a subsequent order dated September 15, 2022, the judge stayed the PGI District Court matter pending a final decision by the U.S. Court of Appeals for the Federal Circuit regarding the appeal described above. We plan to vigorously defend against the remaining claims.

In December 2022, Take2 Technologies, Ltd. and the Chinese University of Hong Kong filed a complaint in the U.S. District Court for Delaware against us alleging infringement of U.S. Patent No. 11,091,794 (the "'794 Patent") (C.A. No. 22- cv-01595). The complaint alleges that our Sequel™ II systems, Sequel IIe Systems, and Revio™ Systems that operate version 11.0 or later of the SMRT™ Link software, infringe the '794 Patent. The complaint seeks unspecified monetary damages and an order enjoining us from infringing the '794 Patent. We filed a motion to dismiss on February 14, 2023. We also filed a motion to transfer the case to the Northern District of California on March 2, 2023, and, on August 2, 2023, that motion was granted. We believe the infringement allegations in the complaint lack merit and we intend to vigorously defend in this matter.

Proceedings in China

On May 12, 2020, PGI filed a complaint in the Wuhan Intermediate People's Court in China alleging infringement of one or more claims of China patent No. CN101743321B (the "CN321 Patent"), which is related to the '441 Patent. On November 23, 2020 we filed an Invalidation Petition at the China National Intellectual Property Administration (CNIPA) demonstrating the invalidity of the claims in the CN321 Patent on grounds of insufficient disclosure, and the lack of support, essential technical features, clarity, novelty, and inventiveness. A hearing in the invalidation proceeding at the CNIPA was held on April 29, 2021. On September 2, 2021, the CNIPA issued its decision on the Invalidation Petition and determined that all claims (1-61) of the CN321 patent were invalid. On December 1, 2021, PGI filed an appeal with the Beijing IP Court, contesting the CNIPA decision. We filed a petition with the Wuhan Intermediate People's court requesting dismissal of the infringement action based on the CNIPA invalidation decision, and PGI filed a petition to withdraw its complaint. The Wuhan Intermediate People's court granted PGI's petition and dismissed the infringement action in May 2022.

Other Proceedings

From time to time, we may also be involved in a variety of other claims, lawsuits, investigations, and proceedings relating to securities laws, product liability, patent infringement, contract disputes, employment, and other matters that arise in the normal course of our business. In addition, third parties may, from time to time, assert claims against us in the form of letters and other communications.

We record a provision for contingent losses when it is both probable that a liability has been incurred and the amount of the loss can be reasonably estimated. We currently do not believe that the ultimate outcome of any of the matters described above is probable or reasonably estimable, or that these matters will have a material adverse effect on our business; however, the results of litigation and claims are inherently unpredictable. Regardless of the outcome, litigation can have an adverse impact on us because of litigation and settlement costs, diversion of management resources, and other factors.

Item 1A. Risk Factors

You should carefully consider the risks and uncertainties described below, together with all of the other information in our public filings with the SEC, which could materially affect our business, financial condition, results of operations and prospects. The risks described below are not the only risks facing us. Risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially affect our business, financial condition, results of operations and prospects. In addition, any worsening of the economic environment and the ongoing COVID-19 pandemic may exacerbate the risks described below, any of which could have a material impact on us. This situation is changing rapidly, and additional impacts may arise that we are not aware of currently.

Summary Risk Factors

The following is a summary of the principal risks that could adversely affect our business, operations, and financial results. Such risks are discussed more fully below and include, but are not limited to, risks related to:

- our ability to successfully market, commercialize, and sell current and future products and related maintenance services;
- our ability to achieve profitability for our business;
- our ability to successfully leverage and integrate our acquisitions and future acquisitions;
- our ability to successfully research, develop and timely manufacture our current and future products;
- management of new product introductions and transitions, resultant costs, and ability of new products to generate promised performance;
- recent significant changes to our leadership team and resultant disruptions to our business;
- retention, recruitment, and training of senior management, key personnel, scientists and engineers;
- our ability to further penetrate nucleic acid sequencing applications, as well as grow product demand;
- our reliance on outsourcing to other companies for manufacturing certain components and sub-assemblies, some of which are sole-sourced;
- our ability to consistently manufacture our instruments and consumables to meet customers' specifications, quantity, cost, or performance requirements;
- the high amount of competition we face in our industry;
- our ability to attract customers and increase sales of current and future products;
- reliance on a limited number of customers for a significant portion of our revenues, including academic, research and government institutions;
- the complexity of our products giving rise to defects or errors;
- our unpredictable and lengthy sales cycles;
- our business, financial condition and results of operations could be adversely affected by political and economic tensions between the United States and other countries, including China and Russia;
- securing and maintaining patent or other intellectual property protection for our products and related improvements;
- current and future legal proceedings filed against us claiming intellectual property infringement;
- the potential adverse impact of health epidemics, including the ongoing COVID-19 pandemic;
- governmental regulations that burden operations or narrow the market for our products;
- evolving ethical, legal, privacy, social, and regulatory concerns regarding genetic testing;
- volatility of the price of our common stock; and
- our stock price falling as a result of future offerings or sales of securities.

Our risk factors are not guarantees that no such conditions exist as of the date hereof and should not be interpreted as an affirmative statement that such risks or conditions have not materialized, in whole or in part.

Risks Related to Our Business

The commercialization and sales of our current or future products may be unsuccessful or less successful than anticipated. While we plan to continue pursuing new products and expand into adjacent markets, we have limited experience in managing and selling multiple products and, as a result, may face challenges selling in new markets and fail to successfully carry out these initiatives, which may adversely impact our business, financial condition or results of operation.

We have made and expect to continue making substantial investments to develop new products and enhance our existing products through our acquisitions and research and development efforts. For example, we recently announced our new Revio™ long-read sequencing system in the fourth quarter of 2022, and commenced commercial Revio shipments in the first quarter of 2023, and we also progressed development of and, subsequent to the quarter ended June 30, 2023, commercialized Onso™, our SBB short-read platform. We began taking orders in the first quarter of 2023, and in August 2023, we commenced customer shipments of the Onso short-read sequencing instrument, with shipments of related consumables expected to occur later in August 2023. The milestone payment associated with PacBio's acquisition of Omniome will be triggered once both the Onso instrument and related consumables have shipped to one customer. Our future success is substantially dependent on our ability to successfully develop and commercialize our products, including Revio and Onso, as well as acquired technologies, which are anticipated to be used in demanding scientific research that requires substantial levels of accuracy and precision. In addition, we may not be successful in transitioning our Revio product from our prior generation products, or transitioning users of other third party short-read sequencing platforms to Onso, and could incur related obsolete inventory charges. Customers may also be slower than we anticipate in making new capital equipment acquisitions, especially in the current economic environment. However, due to challenges we may experience in developing and marketing our existing products and launching new products, we may not be able to effectively:

- manage the timeliness of our new product introductions and the rate at which sales of our new products may cannibalize sales of our older products or manage sales and marketing of multiple sequencing platforms;
- drive adoption of our current and future products, including the Sequel III/IIe Systems, the Revio system, the Onso system, and products under development, including acquired technologies;
- maintain our competitive position by continuing to attract and retain customers for our products;
- provide appropriate levels of customer training and support for our products;
- implement an effective marketing strategy to promote awareness of our products;
- develop and implement an effective sales and distribution strategy for our current and future products;
- develop, manufacture and commercialize new products or achieve an acceptable return on our manufacturing or research and development efforts and expenses;
- comply with regulatory requirements applicable to our products;
- anticipate and adapt to changes in our market;
- accommodate customer expectations and demands with respect to our products, increase product adoption by our existing customers or develop new customer relationships;
- deliver our beta systems to our external beta testing sites or complete our external beta testing program on our currently expected timelines;
- overcome unexpected challenges discovered during beta testing;
- complete the scientific and technical validation of new products on our currently expected timeline or at all;
- deliver our future products in a timely manner to our customers;
- grow our market share by marketing and selling our products for new and additional applications;
- manage the significant burdens that expanding our existing or future products into current and new markets may impose on marketing, compliance, and other administrative and managerial resources;
- maintain and develop strategic relationships with vendors, manufacturers, and other industry partners to acquire necessary materials for the production of, and to develop, manufacture and commercialize, our existing or future products;
- adapt or scale our manufacturing activities to meet performance specifications and potential demand at a reasonable cost;

- avoid infringement and misappropriation of third-party intellectual property;
- obtain and maintain any necessary licenses to third-party intellectual property on commercially reasonable terms;
- obtain valid and enforceable patents that give us a competitive advantage or enforce existing patents;
- protect our proprietary technology; and
- attract, retain, and motivate qualified personnel.

The risks noted above, especially with respect to the marketing, sales, and commercialization of our products, may be heightened by the impact of current uncertain market and other conditions. In addition, a high percentage of our expenses is and will continue to be fixed. Accordingly, if we do not generate revenue as and when anticipated, we could suffer a material adverse effect on our business, financial conditions, results of operations and prospects.

We have incurred losses to date, and we expect to continue to incur significant losses as we develop our business and may never achieve profitability.

We have generally incurred net losses each quarter since inception, and we cannot be certain if or when we will produce sufficient revenue from our operations to support our costs. Even if profitability is achieved in the future, we may not be able to sustain profitability on a consistent basis. We expect to continue to incur substantial losses and negative cash flow from operations for the foreseeable future.

Our net losses since inception and our expectation of incurring substantial losses and negative cash flow for the foreseeable future could:

- make it more difficult for us to satisfy our obligations;
- increase our vulnerability to general adverse economic and industry conditions;
- limit our ability to fund future working capital, capital expenditures, research and development and other business opportunities;
- increase the volatility of the price of our common stock;
- limit our flexibility to react to changes in our business and the industry in which we operate;
- place us at a disadvantage to other companies that offer nucleic acid sequencing equipment or consumables; and
- limit our ability to borrow additional funds.

In addition, inflationary pressure, including as a result of supply shortages, has adversely impacted and could continue to adversely impact our financial results, and our operating costs may increase. We may not fully offset these cost increases by raising prices for our products and services, which could result in downward pressure on our margins. Further, our customers may choose to reduce their business with us if we increase our pricing.

Any or all of the foregoing may have a material adverse effect on our business, operations, financial condition, and prospects. An impairment in value of our tangible or intangible assets could also be recorded as a result of weaker economic conditions.

We are not cash flow positive and may not have sufficient cash to make required payments under the terms of our debt or fund our long-term planned operations.

Our operations have consumed substantial amounts of cash since inception, and we expect to continue to incur substantial losses and negative cash flow from operations for the foreseeable future. Additional funds may not be available on terms acceptable to us or at all. We have incurred significant debt, and we may incur additional debt in the future. As of June 30, 2023, after taking into account the Exchange Transaction, we had outstanding approximately \$459.0 million aggregate principal amount of our 2028 Notes and \$441.0 million aggregate principal amount of our 2030 Notes. We may not have sufficient cash to make required payments under the terms of this debt, and should this occur, debt holders have rights senior to common stockholders to make claims on our assets. We may not be able to issue equity securities due to unacceptable terms and conditions to us in the capital markets. To the extent that we intend to raise additional funds through the sale of our common stock, downward fluctuations in our stock price could adversely affect such fundraising efforts. Furthermore, equity financings normally involve shares sold at a discount to the current market price and fundraising through sales of additional shares of common stock or other equity securities will have a dilutive effect on our existing investors. The shares may also be sold at a time when the market price for our common stock is low because we are in need of the funds, which will further dilute existing holders more than if the market price for our common stock was higher.

We believe that our growth will depend, in part, on our ability to fund our commercialization efforts and our efforts to develop new products, including any improvements to our existing products. To the extent our existing resources are not sufficient, it may require us to delay, or even not allow us to conduct any or all of these activities that we believe would be beneficial for our future growth. We may need to raise additional funds through public or private debt or equity financing or alternative financing arrangements, which may include collaborations or licensing arrangements. If we are unable to raise funds on favorable terms, or at all, we may have to reduce our cash burn rate and may not be able to support our commercialization efforts, launching of new products, or operations, or to increase or maintain the level of our research and development activities.

If we are unable to generate sufficient cash flows or to raise adequate funds to finance our forecasted expenditures, we may have to make significant changes to our operations, including delaying or reducing the scope of, or eliminating some or all of, our development programs. We also may have to reduce sales, marketing, engineering, customer support or other resources devoted to our existing or new products, or we may need to cease operations. Any of these actions could materially impede our ability to achieve our business objectives and could materially harm our operating results. If our cash, cash equivalents and investments are insufficient to fund our projected operating requirements and we are unable to raise capital, it could have a material adverse effect on our business, financial condition and results of operations and prospects.

We have made acquisitions and, in the future, may continue to acquire businesses, technologies or assets, form joint ventures or make other strategic investments with companies that could adversely affect our operating results, dilute our stockholders' ownership, or cause us to incur debt or significant expense.

As part of our business strategy, we have acquired and expect to continue to pursue acquisitions of complementary businesses, technologies, or assets. We may also pursue technology license arrangements, strategic alliances or investments that complement our business. In July 2021, we acquired Circulomics, in September 2021, we acquired Omniome, and in August 2023, we acquired Apton. We recorded goodwill and intangible assets in connection with the Circulomics and Omniome acquisitions as included on the Condensed Consolidated Balance Sheets as of June 30, 2023. See *Note 2 – Business Acquisitions* in Part II, Item 8 of the Annual Report on Form 10-K for the year ended December 31, 2022.

Acquisitions and strategic transactions involve numerous risks, any of which could harm our business and negatively affect our financial condition and results of operations, including:

- intense competition for suitable acquisition targets, which could increase prices and adversely affect our ability to consummate deals on favorable or acceptable terms;
- failure or material delay in closing a transaction;
- transaction-related lawsuits or claims;
- difficulties in integrating the technologies, operations, existing contracts, and personnel of an acquired company;
- difficulties in retaining key employees or business partners of an acquired company;
- difficulties in retaining suppliers, partners, or customers of an acquired company;

- challenges with integrating the brand identity of an acquired company with our own;
- diversion of financial and management resources from existing operations or alternative acquisition opportunities;
- failure to realize the anticipated benefits or synergies of a transaction;
- difficulties in developing technology post-acquisition;
- failure to identify the problems, liabilities, or other shortcomings or challenges of an acquired company or technology, including issues related to intellectual property, regulatory compliance practices, litigation, revenue recognition or other accounting practices, or employee or user issues;
- risks that regulatory bodies may enact new laws or promulgate new regulations that are adverse to an acquired company or business;
- risks that regulatory bodies do not approve our acquisitions or business combinations or delay such approvals;
- theft of our trade secrets or confidential information that we share with potential acquisition candidates or other potential strategic partners;
- risk that an acquired company or investment in new services cannibalizes a portion of our existing business; and
- adverse market reaction to an acquisition or other strategic transaction.

To finance any acquisitions or other strategic investments, we may raise additional funds, which could adversely affect our existing stockholders and our business. If the price of our common stock is low or volatile, we may not be able to acquire other companies for stock. In addition, our stockholders may experience substantial dilution as a result of additional securities we may issue for acquisitions. Open market sales of substantial amounts of our common stock issued to stockholders of companies we acquire could also depress our stock price. Additional funds may not be available on terms that are favorable to us, or at all.

If we fail to address the foregoing risks or other problems encountered in connection with past or future acquisitions of businesses, new technologies, services, and other assets and strategic investments, or if we fail to successfully integrate such acquisitions or investments, our business, financial condition, and results of operations could be adversely affected, including potential impairments of goodwill and intangible assets.

If we are unable to successfully develop and timely manufacture our current and future products, including with respect to SMRT Cells, Sequel III/IIe Systems, Revio, Onso, and other SMRT Cell, HiFi, and SBB products under development, and related products, our business may be adversely affected.

In light of the highly complex technologies involved in our products, there can be no assurance that we will be able to manufacture and commercialize our current and future products on a timely basis or continue providing adequate support for our existing products. The commercial success of our products, including the Sequel, Sequel II/IIe, Revio and Onso Systems, and the products under development, including acquired technologies, depends on a number of factors, including performance and reliability of the systems, our anticipating and effectively addressing customer preferences and demands, the success of our sales and marketing efforts, effective forecasting and management of product demand, purchase commitments and inventory levels, effective management of manufacturing and supply costs, and the quality of our products, including consumables such as SMRT Cells and reagents. Should we face delays in or discover unexpected defects during the further development or manufacturing process of instruments or consumables related to our products, including with respect to SMRT Cells, reagents, Sequel II/IIe Systems, Revio, Onso, and other SMRT Cell, HiFi, and SBB products under development, including acquired technologies, and including any delays or defects in software development or product functionality, the timing and success of the continued rollout and scaling of our products may be significantly impacted, which may materially and negatively impact our revenue and gross margin. The ability of our customers to successfully utilize our products will also depend on our ability to deliver high quality SMRT Cells and reagents. We have designed SMRT Cells and other consumables specifically for the Sequel, Sequel II/IIe, and Revio Systems, and may need to develop in the future, other customized SMRT Cells and consumables for our future products. Our production of the SMRT Cells for the Sequel and Sequel II/IIe Systems has been and may in the future, including with respect to the Revio system, be below desired levels and yields, and we have experienced and may experience in the future manufacturing delays, product or quality defects, SMRT Cell variability, and other issues. For example, the COVID-19 pandemic outbreak has impacted and could result in more pronounced impacts to our manufacturing and our ability to supply products. The performance of our consumables is critical to our customers' successful utilization of our products, and any defects or performance issues with our consumables would adversely affect our business.

All of the foregoing could materially negatively impact our ability to sell our products or result in other material adverse effects on our business, operations, financial condition, operations and prospects.

The development of our products is complex and costly. Problems in the design or quality of our products may have a material and adverse effect on our brand, business, financial condition, and operating results, and could result in us losing our certifications from the International Organization for Standardization ("ISO"). If we were to lose ISO certification, then our customers might choose not to purchase products from us and this could adversely impact our ability to develop products approved for clinical uses. Unanticipated problems with our products could divert substantial resources, which may impair our ability to support our new and existing products and could substantially increase our costs. If we encounter development challenges or discover errors in our products late in our development cycle, including during external beta testing, we may be forced to undertake design and/or production changes, delay product shipments or the scaling of manufacturing or supply. The completion of the production and external testing of our beta systems may also take longer than currently planned, cost more than currently expected and the scientific and technical validation may not be completed on our currently expected timelines or at all. Such testing may also expose fundamental flaws in our products that may cause us to abandon the further development of such products.

If the continued rollout of our current and future products, including with respect to the SMRT Cell, the Sequel II/IIe, Revio, and Onso Systems, is delayed or is not successful or less successful than anticipated, then we may not be able to achieve an acceptable return, if any, on our substantial research and development efforts, and our business may be materially and adversely affected. The expenses or losses associated with delayed or unsuccessful product development or lack of market acceptance of our existing and new products, including the SMRT Cell, Sequel II/IIe Systems, Revio, and Onso, could materially and adversely affect our business, operations, financial condition, and prospects.

Our research and development efforts may not result in the benefits that we anticipate, and our failure to successfully market, sell, and commercialize our current and future products could have a material adverse effect on our business, financial condition and results of operations.

We have dedicated significant resources to developing our current products, including sequencing systems and consumables based on our proprietary SMRT sequencing technology and our Sequel and Sequel II/IIe Systems. We are also engaged in substantial and complex research and development efforts, which, if successful, may result in the introduction of new products in the future, including in connection with the SMRT Cell, the Sequel II/IIe Systems, Revio and Onso, in addition to other products currently under development, including acquired technologies. Our research and development efforts are complex and require us to incur substantial expenses. We may not be able to develop, manufacture and commercialize new products, obtain regulatory approval if necessary, or achieve an acceptable return, if any, on our research and development efforts and expenses or joint research and development efforts with partners. Our joint research and development efforts with partners require significant management attention and operational resources. If we are unable to successfully manage such joint research and development efforts, our future results may be adversely impacted. For example, in January 2021, we entered into a development agreement with Invitae, which was amended and restated on June 24, 2022 (the "Invitae Development Agreement"), regarding a multi-year collaboration for the development of a production-scale high-throughput sequencing platform. While we anticipate that in connection with the Invitae Development Agreement, we will continue to receive feedback, input and insight from Invitae in connection with our intended development of new high-throughput sequencing systems, such feedback is not contractually required and Invitae has no contractual right to participate in decisions regarding the development program for such new sequencing systems. Invitae is not contractually obligated to reimburse us for development costs under the Invitae Development Agreement. We do not expect to receive any additional revenue under the Invitae Development Agreement apart from potential purchases by Invitae of our instruments and consumables. In consideration of non-refundable Development Costs (as defined in the Invitae Development Agreement) paid by Invitae to us pursuant to the Invitae Development Agreement, we have provided Invitae with credits in connection with Invitae's anticipated purchase of currently available and in-development sequencing systems (instruments and consumables). In addition, subject to certain conditions, Invitae will be entitled to most favored pricing for our Sequel IIe systems and certain in-development systems, including the Revio system and we may be required to sell instruments to Invitae at below-market prices. Furthermore, we will need to continue to expand our internal capabilities or seek new partnerships or collaborations, or both, in order to successfully develop, market, sell and commercialize our products for and in the markets we seek to reach. If we are unable to do so or are delayed, then this could materially and adversely affect our business, operations, financial condition, and prospects.

We must successfully manage new product introductions and transitions, including with respect to the SMRT Cell, the Sequel II/IIe, Revio and Onso Systems, and the development of acquired technologies, and we may incur significant costs during these transitions and development, and these efforts may not result in the benefits we anticipate.

If our products and services fail to deliver the performance, scalability or results expected by our current and future customers, or are not delivered on a timely basis, our reputation and credibility may suffer, our current and future sales and revenue may be materially harmed and our business may not succeed. For instance, if we are not able to realize the benefits we anticipate from the development and commercialization of the SMRT Cell, Sequel II/IIe Systems, the Revio HiFi long-read sequencing system, and the Onso SBB short-read sequencing system, and any future products that may be developed for research, medical and clinical uses, including acquired technologies, it could have a material adverse effect on our business, financial condition and results of operations. In addition, the introduction of future products, including with respect to future long-read and short-read products, and related consumables, has and may in the future lead to our limiting or ceasing development of further enhancements to our existing products as we focus our resources on new products, and has resulted and could in the future result in reduced marketplace acceptance and loss of sales of our existing products, materially adversely affecting our revenue and operating results. The introduction of new products, including the recent announcement of our Revio system, has had and may in the future also have a negative impact on our revenue in the near-term as our current and future customers have delayed or cancelled and may in the future delay or cancel orders of existing products in anticipation of new products and we may also be pressured to decrease prices for our existing products. Our experience in managing product transitions is limited, and we have experienced, and may in the future experience, difficulty in managing or forecasting customer reactions, purchasing decisions or transition requirements with respect to newly launched products. We have incurred and may continue to incur significant costs in completing these transitions, including costs of write-downs of our products, as current or future customers transition to new products. If we do not successfully manage these product transitions, including with respect to the SMRT Cell, Sequel II/IIe Systems, the Revio and Onso Systems, and any future long-read and short-read products, our business, operations, financial condition, and prospects may be materially and adversely affected.

Our business may be adversely affected by health epidemics, including any resurgence of COVID-19 cases or other outbreaks.

Our business has been and could be further adversely impacted by the effects of COVID-19 or other epidemics or pandemics. Although it is not possible at this time to estimate the impact that health epidemics, including the results of the COVID-19 pandemic and any future resurgence of COVID-19 cases or other outbreaks, could have on our business, any pandemic or public health outbreaks or related disruptions and the measures taken by the governments of countries affected could disrupt the supply chain and the manufacture of our products.

Our manufacturing partners and suppliers have been and could continue to be disrupted by conditions related to COVID-19 or other epidemics or pandemics, possibly resulting in disruption to the production of our products. If our manufacturing partners or suppliers are unable or fail to fulfill their obligations to us for any reason, we may not be able to manufacture our products and satisfy customer demand or our obligations under sales agreements in a timely manner, and our business could be harmed as a result. There is significant uncertainty relating to the long-term effect of COVID-19 on our business. Infections may resurge or become more widespread and any ensuing disruptions to business activities or supply chains could have a negative impact on our business, financial condition, and operating results. Because our semiconductor manufacturers are located in a region where immunization rates in certain communities may be low, new and emerging variants of COVID-19 could impact workforce availability at those locations and disrupt supply. For example, the Chinese government may re-impose lockdowns or similar measures to combat the spread of COVID-19 and such measures have had, and may continue to have in the future, a negative impact on manufacturing and/or supply chains, as well as customer demand for our products and demand through certain distributors.

The COVID-19 pandemic has caused us to modify our business practices, including limiting certain of our commercial operations and limiting certain employees from working in the office. We have offered, and may plan to continue to offer, a significant percentage of our employees flexibility in the amount of time they work in an office, which could adversely impact the productivity of certain employees and harm our business, including our future operating results. This may also present risks for our strategy and may present operational, cybersecurity, and workplace culture challenges that may adversely affect our business.

Even after the COVID-19 pandemic has subsided, we may continue to experience an adverse impact to our business as a result of its global economic impact, including recessionary effects and inflationary pressures. Specifically, difficult macroeconomic conditions, such as decreases in discretionary capital expenditure spending, changes to the government funding environment, a reduction in or the lapsing of COVID-19-related governmental stimulus measures, increased and prolonged unemployment or a decline in consumer confidence as a result of the COVID-19 pandemic, as well as limited or significantly reduced points of access of our products, could have a continuing adverse effect on the demand for some of our products and, consequently, related maintenance and support services. The degree of impact of COVID-19 on our business will depend on several factors, such as the duration and the extent of the pandemic, the risk of waning immunity among persons already vaccinated and an increase in fatigue or skepticism with respect to initial or booster vaccinations, as well as actions taken by governments, businesses, and consumers in response to the pandemic, all of which continue to evolve and remain uncertain at this time.

Significant changes to our leadership team and the resulting management transitions might harm our future operating results.

We have experienced significant changes to our leadership team. Our President and Chief Executive Officer Christian O. Henry was appointed effective September 14, 2020, succeeding Dr. Michael Hunkapiller who retired on December 31, 2020. Our Chief Financial Officer Susan G. Kim was appointed effective September 28, 2020, succeeding Susan K. Barnes who retired on August 7, 2020. Our Chief Operating Officer Mark Van Oene was appointed effective January 8, 2021. Jeff Eidel was appointed Chief Commercial Officer effective August 16, 2022, succeeding Peter Fromen who resigned effective May 20, 2022. Also, our Vice President and Chief Accounting Officer Michele Farmer was appointed effective May 17, 2021, and our Chair of the Board Dr. John F. Milligan was appointed effective September 14, 2020.

Although we believe these leadership transitions are in the best interest of our stakeholders, these transitions may result in the loss of personnel with deep institutional or technical knowledge. Further, the transition could potentially disrupt our operations and relationships with employees, suppliers, partners, and customers due to added costs, operational inefficiencies, decreased employee morale and productivity and increased turnover. We must successfully recruit and integrate our new leadership team members within our organization to achieve our operating objectives; as such, the leadership transition may temporarily affect our business performance and results of operations while the new members of our leadership team become familiar with our business. In addition, our competitors may seek to use this transition and the related potential disruptions to gain a competitive advantage over us. Furthermore, these changes increase our dependency on the other members of our leadership team that remain with us, who are not contractually obligated to remain employed with us and may leave at any time. Any such departure could be particularly disruptive given that we are already experiencing leadership transitions and, to the extent we experience additional management turnover, competition for top management is high such that it may take some time to find a candidate that meets our requirements. Our future operating results depend substantially upon the continued service of our key personnel and in significant part upon our ability to attract and retain qualified management personnel. If we are unable to mitigate these or other similar risks, our business, results of operations and financial condition may be materially and adversely affected.

We depend on the continuing efforts of our senior management team and other key personnel. If we lose members of our senior management team or other key personnel or are unable to successfully retain, recruit and train qualified scientists, engineers, sales personnel and other employees, our ability to maintain, develop and commercialize our products could be harmed and we may be unable to achieve our goals.

Our success depends upon the continuing services of members of our senior management team and scientific and engineering personnel. In particular, our scientists and engineers are critical to our technological and product innovations, and we will need to hire additional qualified personnel. Our industry is characterized by high demand and intense competition for talent, and the turnover rate has been and may continue to be high. We compete for qualified management and scientific personnel with other life science companies, academic institutions and research institutions, particularly those focusing on genomics. This competition had been exacerbated by the increase in employee resignations in 2021 and 2022, that had been experienced by us and reported by employers nationwide. In addition, we have experienced significant turnover in our senior management team in recent periods. To induce valuable employees to remain at our company, in addition to salary and cash incentives, we have issued stock options and restricted stock units that vest over time. The value to employees of stock options and restricted stock units that vest over time may be significantly affected by movements in our stock price that are beyond our control and may at any time be insufficient to counteract more lucrative offers from other companies. We may face challenges in retaining and recruiting such individuals due to sustained declines in our stock price that could reduce the retention value of equity awards.

The loss of qualified employees, or an inability to attract, retain, and motivate employees, could prevent us from pursuing collaborations and materially and adversely affect our support of existing products, product development and launches, business growth prospects, results of operations and financial condition. In addition, we will need to continue to recruit, hire and retain sales personnel to support the commercialization of our existing and new products. Our employees could leave our company with little or no prior notice and would be free to work for a competitor. In addition, changes to U.S. immigration policies, particularly to H-1B and other visa programs, could restrain the flow of technical and professional talent into the U.S. and may inhibit our ability to hire qualified personnel. If one or more of our senior executives or other key personnel were unable or unwilling to continue in their present positions, we may not be able to replace them easily or at all, and other senior management may be required to divert attention from other aspects of the business. In addition, we do not have "key person" life insurance policies covering any member of our management team or other key personnel. Further, our vaccination and return to office protocols related to COVID-19 may also impact the recruitment and retention of key employees. The loss of any of these individuals or any inability to attract or retain qualified personnel, including scientists, engineers, sales personnel and others, could prevent us from pursuing collaborations and materially and adversely affect our support of existing products, product development and introductions, business growth prospects, results of operations and financial condition.

Our success is highly dependent on our ability to further penetrate nucleic acid sequencing applications as well as on the growth and expansion of the demand for our products. If our products fail to achieve and sustain sufficient market acceptance, we will not generate expected revenue and our business may not succeed.

Although nucleic acid sequencing technology is well-established, our SMRT Sequencing technology is relatively new and evolving. We cannot be sure that our current or future products will gain acceptance in the marketplace at levels sufficient to support our costs. Our success depends, in part, on our ability to expand overall demand for nucleic acid sequencing to include new applications that are not practicable with other current technologies and to introduce new products that capture a larger share of growing overall demand for sequencing. To accomplish this, we must successfully commercialize, and continue development of, our proprietary SMRT Sequencing technology for use in a variety of life science and other research applications, including uses by academic, government and clinical laboratories, as well as pharmaceutical, diagnostic, biotechnology, and agriculture companies, among others. However, we may be unsuccessful in these efforts and the sale and commercialization of the SMRT Cell, Sequel II/IIe, Revio and Onso Systems, and related products may not grow sufficiently to cover our costs.

There can be no assurance that we will be successful in adding new products or securing additional customers for our current and future products, including with respect to the SMRT Cell, Sequel II/IIe Systems, Revio and Onso. If we are unable to successfully develop acquired technologies and sell acquired technology products, we may fail to achieve our strategic commercial initiatives in connection with the planned release of new products and anticipated entry into new markets. Our ability to further penetrate existing applications and any new applications depends on a number of factors, including the cost, performance and perceived value associated with our products, as well as customers' willingness to adopt a different approach to nucleic acid sequencing. Potential customers may have already made significant investments in other sequencing technologies and may be unwilling to invest in new technologies. We are experiencing pricing pressures caused by industry competition and increased demand for lower-priced instruments and lower operational costs. We have limited experience commercializing and selling products outside of the academic and research settings, and we cannot guarantee success in acquiring additional customers. Furthermore, we cannot guarantee that our products will be satisfactory to potential customers or that our products will perform in accordance with customer expectations.

Nucleic acid sequencing applications are new and dynamic, and there can be no assurance that they will develop as quickly as we anticipate, that they will reach their full potential or that our products will be appropriate or competitive for these applications. As a result, we may be required to refocus our marketing efforts, and we may have to make changes to the specifications of our products to enhance our ability to enter particular applications more quickly. We may also need to delay full-scale commercial deployment of new products as we develop them in order to perform quality control and early access user testing. We also need to maintain reliable supply chains for the various components in our new products and consumables to support large-scale commercial production. Even if we are able to implement our technology successfully, we and/or our sales and distribution partners may fail to achieve or sustain market acceptance of our current or future products across the full range of our intended life science and other applications. We need to continue to expand and update our internal capabilities or to collaborate with other partners, or both, in order to successfully expand sales of our products in the applications that we seek to reach, which we may be unable to do at the scale required to support our business.

If the demand for our products grows more slowly than anticipated, if we are unable to successfully scale or otherwise ensure sufficient manufacturing capacity for new products to meet demand, if we are not able to successfully market and sell our products, if competitors develop better or more cost-effective products, if our product launches and commercialization are not successful, or if we are unable to further grow our customer base or do not realize the growth with existing customers that we are expecting, our current and future sales and revenue may be materially and adversely harmed, or we may recognize an impairment loss, and our business may not succeed.

We rely on other companies for the manufacture of certain components and sub-assemblies and intend to outsource additional sub-assemblies in the future, some of which are sole sources. We may not be able to successfully scale the manufacturing process necessary to build and test multiple products on a full commercial basis, which could materially harm our business.

Our products are complex and involve a large number of unique components, many of which require precise manufacturing. The nature of our products requires customized components that are currently available only from a limited number of sources, and in some cases, single sources. We have chosen to source certain critical components from a single source, including suppliers for our SMRT Cells, reagents, and instruments. We cannot assure you that product supplies will not be limited or interrupted, especially with respect to our sole source third-party manufacturing and supply collaborators, or that product supplies will be of satisfactory quality or continue to be available at acceptable prices. In particular, any replacement of our manufacturers could require significant effort and expertise because there may be a limited number of qualified replacements. We may be unable to negotiate binding agreements with our current and future sole source third-party manufacturing and supply collaborators or, in the event that such collaborators' services become interrupted for any reason, find replacement manufacturers to support our development and commercial activities at commercially reasonable terms. We do not always have arrangements in place for a redundant or second-source supply for our sole source vendors in the event they cease to provide their products or services to us or fail to provide sufficient quantities in a timely manner. If we are required to purchase these components from alternative sources, it could take several months or longer to qualify the alternative sources. If we are unable to source these product components from sole-source third-party manufacturing and supply collaborators for any reason, including in connection with acts of terrorism, hostilities, military conflict and acts of war, including between China and Taiwan, or secure a sufficient supply of these product components on a timely basis, or if these components do not meet our expectations or specifications for quality and functionality, our operations and manufacturing would be materially and adversely affected, we could be unable to meet customer demand and our business and results of operations may be materially and adversely affected.

The operations of our third-party manufacturing partners and suppliers have been and could continue to be disrupted by conditions unrelated to our business or operations or that are beyond our control, including but not limited to international trade restrictions, inflation, supply chain disruptions, and conditions related to COVID-19 or other epidemics. If our manufacturing partners or suppliers are unable or fail to fulfill their obligations to us for any reason, we may not be able to manufacture our products and satisfy customer demand or our obligations under sales agreements in a timely manner, and our business could be harmed as a result. For example, the global shortage of semiconductors, which has been reported since early 2021, has caused challenges for us in our supply chain and resulted in some cost increases that have and may continue to adversely impact margins. During these periods of shortages or delays, the price of components may increase, or the components may not be available at all. Our suppliers have raised their prices and may continue to raise prices that we may not be able to pass on to our customers, which could adversely affect our business, including our competitive position, market share, revenues, and profit margins in material ways. We may not be able to secure enough components at reasonable prices or of acceptable quality to build new products in a timely manner in the quantities or configurations needed. For example, the Chinese government may re-impose lockdowns or similar measures to combat the spread of COVID-19 and these measures have had, and may continue to have in the future, a negative impact on manufacturing and/or supply chains, in addition to customer demand for our products and demand through certain distributors. If as a result of global economic or political instability, such as the political uncertainty associated with an escalation of the war in Ukraine, potential uncertainty related to Taiwan and its relationship with China, other disease outbreaks, or supply issues, we or our contractors could experience shortages, business disruptions or delays for materials sourced or manufactured in the affected countries, and their ability to supply us with instruments or product components may be affected. From time to time, certain components of our systems and reagents may reach the end of their life cycles or become obsolete by our suppliers, and we would have to procure alternative sources for these end-of-life products. If we encounter delays or difficulties in securing the quality and quantity of materials we require for our products, our supply chain would be interrupted, which would adversely affect sales. If any of these events occur, our business and operating results could be harmed. Accordingly, if any of the foregoing occurs, our ability to commercialize our products, revenue and gross margins could suffer until lockdowns from COVID-19 infections are reduced, supply issues or business disruptions are resolved and/or other sources can be developed.

In addition, because our semiconductor suppliers are in regions that may have communities with low vaccination rates, the Omicron variant of COVID-19, or any variants that evolve in the future, could lead to increased infections among workers that could further disrupt the supply chain. Our current manufacturing process is characterized by long lead times between the placement of orders for and delivery of our products. If we do not accurately anticipate our needs or if we receive insufficient components to manufacture our products on a timely basis to meet customer demand, our sales and our gross margin may be adversely affected, and our business could be materially harmed. If we are unable to reduce our manufacturing costs and establish and maintain reliable, high-volume manufacturing suppliers as we scale our operations and expand our product offerings, our business, operations, financial condition, and prospects could be materially and adversely harmed.

We may be unable to consistently manufacture our instruments and consumables, including SMRT Cells and reagents, to the necessary specifications or in quantities necessary to meet demand at an acceptable cost or at an acceptable performance level.

In order to successfully generate revenue from our products, we need to supply our customers with products that meet their expectations for quality and functionality in accordance with established specifications. Our customers have experienced variability in the performance of our products. We have experienced and may continue to experience delays, quality issues or other difficulties leading to customer dissatisfaction with our products. Our production of SMRT Cells, flow cells, and of reagents for both our long- and short-read technologies, involve a long and complex manufacturing process and has been and may in the future be below desired yields and resulting output levels. We have experienced and may experience in the future manufacturing delays, product defects, variability in the performance of SMRT Cells, flow cells and other products, inadequate reserves for inventory, or other issues.

There is no assurance that we will be able to manufacture our products so that they consistently achieve the product specifications and quality that our customers expect, including any products developed for clinical uses. Problems in the design or quality of our products, including low manufacturing yields of SMRT Cells, flow cells, or sub-performing reagent lots, may have a material adverse effect on our brand, business, financial condition, and operating results, and could result in us losing our ISO certifications. If we were to lose our ISO certifications, then our customers might choose not to purchase products from us. There is also no assurance that we will be able to increase manufacturing yields and decrease costs, particularly if high rates of inflation continue, or that we will be successful in forecasting customer demand or manufacturing and supply costs, or that product supplies, including reagents or integrated chips, will not be limited or interrupted, or will be of satisfactory quality or continue to be available at acceptable prices. Furthermore, while we are undertaking efforts to increase our manufacturing scale and capability, we may not be able to increase manufacturing to meet anticipated demand or may experience downtime in our manufacturing facilities, including, for example, if we experience increased cases of COVID-19 among our employees, or if our suppliers are unable to meet our increased demand at a time when the supply chain is under duress due to potential dislocations and disruptions in product and employee availability due to COVID-19. An inability to manufacture products and components that consistently meet specifications, in necessary quantities and at commercially acceptable costs, will have a negative impact, and may have a material adverse effect on our business, product development timelines, financial condition and results of operations.

Rapidly changing technology in life sciences and research diagnostics could make our products obsolete unless we continue to develop, manufacture and commercialize new and improved products and pursue new opportunities.

Our industry is characterized by rapid and significant technological changes, frequent new product introductions and enhancements and evolving industry standards. Our future success depends on our ability to continually improve our products, to develop and introduce new products that address the evolving needs of our customers on a timely and cost-effective basis and to pursue new opportunities. These new opportunities may be outside the scope of our proven expertise or in areas where demand is unproven, and new products and services developed by us may not gain market acceptance or may not adequately perform in order to capture market share. Our inability to develop and introduce new products and to gain market acceptance of our existing and new products could harm our future operating results. Unanticipated difficulties or delays in replacing existing products with new products or in commercializing our existing or new products in sufficient quantities and of acceptable quality to meet customer demand, including with respect to the SMRT Cell, Sequel II/IIe Systems, Revio and Onso, could diminish future demand for our products and may materially and adversely harm our future operating results.

The size of the markets for our products, including our Revio and Onso instruments, may be smaller than estimated, and new market opportunities may not develop as quickly as we expect, or at all, limiting our ability to successfully sell our products.

The market for sequencing systems and consumables products is evolving, making it difficult to accurately predict the size of the markets for our current and future products, including our Revio and Onso instruments. Our estimates of the total addressable market for our current and future products are based on a number of internal and third-party estimates and assumptions that may be incorrect, including the assumptions that academic, governmental, corporate, or other sources of funding will continue to be available to life sciences researchers at times and in amounts necessary to allow them to purchase our products. In addition, sales of new products may take time to develop and mature and we cannot be certain that these market opportunities will develop as we expect. While we believe our assumptions and the data underlying our estimates of the total addressable market for our products are reasonable, these assumptions and estimates may not be correct and the conditions supporting our assumptions or estimates, or those underlying the third-party data we have used, may change at any time, thereby reducing the accuracy of our estimates. As a result, our estimates of the total addressable market and growth opportunities for our products may be incorrect.

The future growth of the market for our current and future products depends on many factors beyond our control, including recognition and acceptance of our products by the research and scientific communities, the growth, prevalence and costs of competing products and solutions and the development of robust ecosystems supporting our products and their methodologies. For example, our long-read sequencers, such as Revio, require tools for effective, high quality sample collection and preparation as well as advanced bioinformatic tools to process results; if these tools are unavailable to our customers, whether at a reasonable cost or at all, the market acceptance and growth of our long-read sequencers, like Revio, may be negatively impaired. There can be no assurance that our current or future products will gain traction in the market. If the markets for our current and future products are smaller than estimated or do not develop as we expect, our growth may be limited, and it could materially and adversely affect our business, operations, financial condition and prospects.

Increased market adoption of our products by customers may depend on the availability of sample preparation and informatics tools, some of which may be developed by third parties.

Our commercial success may depend in part upon the development of sample preparation and software and informatics tools by third parties for use with our products. We cannot guarantee that product supplies, including reagents, will not be limited or interrupted, or will be of satisfactory quality or continue to be available at acceptable prices, or that third parties will develop tools that our current and future customers will find useful with our products, or that customers will adopt such third-party tools on a timely basis or at all. A lack of complementary sample preparation and informatics tools, or delayed updates of such tools, may impede the adoption of our products and may materially and adversely impact our business.

We operate in a highly competitive industry and if we are not able to compete effectively, our business and operating results will likely be harmed.

There are a significant number of companies offering nucleic acid sequencing products and/or services, including Illumina, BGI Genomics (also known as MGI or Complete Genomics), Thermo, ONT Ltd., Roche, Bionano, and Qiagen. Other companies recently entering the market include Ultima Genomics, Element Biosciences and Singular Genomics. Many of these companies currently have greater name recognition, more substantial intellectual property portfolios, longer operating histories, significantly greater financial, technical, research and/or other resources, more experience in new product development, larger and more established manufacturing capabilities and marketing, sales, and support functions, and/or more established distribution channels to deliver products to customers than we do. These companies may be able to respond more quickly and effectively than we can to new or changing opportunities, technologies, standards, or customer requirements.

There are also several companies that are in the process of developing or have already developed and commercialized new, competing or potentially competing technologies, products and/or services, including ONT Ltd. and its subsidiaries, against whom we have filed complaints for patent infringement in the U.S. District Court for the District of Delaware and, previously, with the U.S. International Trade Commission, in the High Court of England and Wales and in the District Court of Mannheim, Germany. ONT Ltd. previously filed claims against us in the High Court of England and Wales and the District Court of Mannheim, Germany, also for patent infringement, and its subsidiary, Oxford Nanopore Technologies, Inc. ("ONT Inc."), filed counterclaims against us in the U.S. District Court for the District of Delaware seeking declaratory judgements of non-infringement, invalidity and unenforceability of the asserted patents, as well as antitrust, false advertising and unfair competition counterclaims that were subsequently dismissed by that court. Roche is developing potentially competing sequencing products. Increased competition may result in pricing pressures, which could harm our sales, profitability or market share. Our failure to further enhance our existing products and to introduce new products to compete effectively could materially and adversely affect our business, operations, financial condition, and prospects.

We may be unable to successfully increase sales of our current products or market and sell our future products.

Our ability to achieve profitability depends, in part, on our ability to attract customers for our current and future products including Revio and Onso, and we may be unable to effectively market or sell our products or find appropriate partners to do so. To perform sales, marketing, distribution, and customer support functions successfully, we face a number of risks, including:

- our ability to attract, retain and manage qualified sales, marketing, and service personnel necessary to expand market acceptance for our technologies;
- the performance and commercial availability expectations of our existing and potential customers with respect to new and existing products;

- availability of potential sales and distribution partners to sell our technologies, and our ability to attract and retain such sales and distribution partners;
- the time and cost of maintaining and growing a specialized sales, marketing and service force for a particular application, which may be difficult to justify in light of the revenue generated; and
- our sales, marketing and service force may be unable to execute successful commercial activities.

We have enlisted and may continue to enlist third parties to assist with sales, distribution and customer support. There is no guarantee that we will be successful in attracting desirable sales and distribution partners, that we will be able to enter into arrangements with such partners on terms favorable to us or that we will be able to retain such partners on a going-forward basis. If our sales and marketing efforts, or those of any of our third-party sales and distribution partners, are not successful, or our products do not perform in accordance with customer expectations, our technologies and products may not gain market acceptance, which could materially and adversely impact our business, operations, financial condition, and prospects.

Large purchases by a limited number of customers represent a significant portion of our revenue, and any loss or delay of expected purchases has resulted, and in the future could result, in material quarter-to-quarter fluctuations of our revenue or otherwise adversely affect our results of operations.

We receive a significant portion of our revenue from a limited number of customers. For example, for the years ended December 31, 2022, 2021, and 2020, one of our customers, who is our primary distributor in China, accounted for approximately 12%, 13%, and 14% of our total revenue, respectively. Many of these customers make large purchases on a purchase-order basis rather than pursuant to long-term contracts. As a consequence of the concentrated nature of our customer base and their purchasing behavior, our quarterly revenue and results of operations have fluctuated, and may fluctuate in the future, from quarter to quarter and are difficult to forecast. For example, the cancellation of orders or acceleration or delay in anticipated product purchases or the acceptance of shipped products by our larger customers has materially affected, and in the future could materially affect, our revenue and results of operations in any quarterly period. We have been, and may in the future be, unable to sustain or increase our revenue from our larger customers, or offset any discontinuation or decrease of purchases by our larger customers with purchases by new or other existing customers. To the extent one or more of our larger customers experience significant financial difficulty, bankruptcy or insolvency, this could have a material adverse effect on our sales and our ability to collect on receivables, which could materially and adversely harm our financial condition and results of operations.

In addition, many of our customers, including some of our larger customers, have negotiated, or may in the future negotiate, volume-based discounts or other more favorable terms from us or our sales and distribution partners, which can and have had a negative effect on our gross margins or revenue.

We expect that such concentrated purchases will continue to contribute materially to our revenue for the foreseeable future and that our results of operations may fluctuate materially as a result of such larger customers' buying patterns. In addition, we may see consolidation of our customer base. The loss of one of our larger customers, a significant delay or reduction in its purchases, or any volume-based discount or other more favorable terms that we or our sales and distribution partner(s) may agree to provide, in light of the aggregated purchase volume or buying power resulting from such consolidation, has harmed, and in the future could harm, our business, financial condition, results of operations and prospects.

Our products are highly complex, have recurring support requirements and could have unknown defects or errors, which may give rise to claims against us or divert application of our resources from other purposes.

Products using our SMRT sequencing and SBB technology are highly complex and may develop or contain undetected defects or errors. Our customers have previously experienced reliability issues with our existing products, including the Sequel System and the Sequel II/IIe Systems. In addition, it is possible our customers could experience reliability issues with current or future products, including the Sequel II/IIe, Revio and Onso Systems. Despite internal and external testing, defects, or errors may arise in our products, which could result in a failure to obtain, maintain, or increase market acceptance of our products, diversion of development resources, injury to our reputation and increased warranty, service, and maintenance costs. New products, including Revio and Onso, or enhancements to our existing products, including the SMRT Cell and Sequel II/IIe Systems, in particular may contain undetected errors or performance problems that are discovered only after delivery to customers. If our products have reliability or other quality issues or require unexpected levels of support in the future, the market acceptance and utilization of our products may not grow to levels sufficient to support our costs and our reputation and business could be harmed. Low utilization rates of our products could cause our revenue and gross margins to be adversely affected. We provide a warranty for our sequencing instruments and consumables, which is generally limited to replacing, repairing, or at our option, giving credit for any sequencing instrument or consumable with defects in material or workmanship. Service contracts for our sequencing instruments may be separately purchased. Defects or errors in our products may also discourage customers from purchasing our products. The costs incurred in correcting any defects or errors may be substantial and could materially and adversely affect our operating margins. If our service and support costs increase, our business and operations may be materially and adversely affected.

In addition, such defects or errors could lead to the filing of product liability claims against us or against third parties whom we may have an obligation to indemnify against such claims, which could be costly and time-consuming to defend and result in substantial damages. Although we have product liability insurance, any product liability insurance that we have or procure in the future may not protect our business from the financial impact of a product liability claim. Moreover, we may not be able to obtain adequate insurance coverage on acceptable terms. Any insurance that we have or obtain will be subject to deductibles and coverage limits. A product liability claim could have a material adverse effect on our business, financial condition, and results of operations.

A significant portion of our sales depends on customers' spending budgets that may be subject to significant and unexpected variation which could have a negative effect on the demand for our products.

Our instruments represent significant capital expenditures for our customers in research applications. Current and potential customers for our current or future products include academic and government institutions, genome centers, medical research institutions, clinical laboratories, pharmaceutical, agricultural, biotechnology, diagnostic and chemical companies. Their spending budgets can have a significant effect on the demand for our products. Spending budgets are based on a wide variety of factors, including the allocation of available resources to make purchases, funding from government sources which is highly uncertain and subject to change, the spending priorities among various types of research equipment, policies regarding capital expenditures during economically uncertain periods and the impact of COVID-19. Any decrease in capital spending or change in spending priorities of our current and potential customers could significantly reduce the demand for our products. Any delay or reduction in purchases by current or potential customers or our inability to forecast fluctuations in demand could materially and adversely harm our future operating results.

We may not be able to convert our orders in backlog into revenue.

Our backlog represents product orders from our customers that we have confirmed but have not been able to fulfill, and, accordingly, for which we have not yet recognized revenue. We may not receive revenue from these orders, and any order backlog we report may not be indicative of our future revenue.

Many events can cause an order to be delayed or not completed at all, some of which may be out of our control, including the potential impacts from COVID-19 and our suppliers, especially our sole source suppliers, not being able to provide us with products or components. If we delay fulfilling customer orders or if customers reconsider their orders, those customers may seek to cancel or modify their orders with us. Customers may otherwise seek to cancel or delay their orders even if we are prepared to fulfill them. If our orders in backlog do not result in sales, our operating results may suffer.

Our sales cycles are unpredictable and lengthy, which makes it difficult to forecast revenue and may increase the magnitude of quarterly or annual fluctuations in our operating results.

The sales cycles for our sequencing instruments are lengthy because they represent a major capital expenditure and generally require the approval of our customers' senior management. This may contribute to substantial fluctuations in our quarterly or annual operating results, particularly during periods in which our sales volume is low. Because of these fluctuations, it is likely that in some future quarters our operating results will fall below the expectations of securities analysts or investors. If that happens, the market price of our stock would likely decrease. Past fluctuations in our quarterly and annual operating results have resulted in decreases in our stock price. Such fluctuations also mean that investors may not be able to rely on our operating results in any particular period as an indication of future performance. Sales to existing customers and the establishment of a business relationship with other potential customers is a lengthy process, generally taking several months and sometimes longer. Following the establishment of the relationship, the negotiation of purchase terms can be time-consuming, including as a result of seasonal factors, as discussed below, and a potential customer may require an extended evaluation and testing period. Our sales cycles may also lengthen as we introduce our Revio and Onso instruments and their associated consumables to the market, as our customers may have additional administrative, technical or other requirements associated with transitioning to new products and technologies. In anticipation of product orders, we may incur substantial costs before the sales cycle is complete and before we receive any customer payments. As a result, if a sale is not completed or is canceled or delayed, we may have incurred substantial expenses, making it more difficult for us to become profitable or otherwise negatively impacting our financial results. Even if our selling efforts are successful, the realization of revenue may be substantially delayed, our ability to forecast our future revenue may be more limited and our revenue may fluctuate significantly from quarter to quarter and year over year. For more information on the impact of these fluctuations on our results and stock price, see "[—Our operating results fluctuate from quarter to quarter and year over year, which makes our future results difficult to predict and could negatively impact the market price of our common stock,](#)" below.

Because some of our customers and suppliers are based in China, our business, financial condition and results of operations could be adversely affected by the political and economic tensions between the United States and China.

We are subject to risks associated with political conflicts between the U.S. and China. A significant portion of our revenue is generated from China. For example, for the years ended December 31, 2022, 2021, and 2020, one of our customers, who is our primary distributor in China, accounted for approximately 12%, 13%, and 14% of our total revenue, respectively. In addition, certain components, some of which are critical components, of our products are manufactured in China. These components are either sourced directly from companies in China or indirectly from third parties that source from companies in China.

Consequently, we are subject to significant risks associated with the trading relationship between the U.S. and China, which is currently characterized by significant uncertainty. Tariffs imposed by the U.S. and China have increased, and may continue to increase, our costs. Additionally, export restrictions imposed by the U.S. may impact our ability to export certain products to customers or distributors in China and restrict our ability to use certain integrated circuits in our products, and it is possible that additional restrictions will be put in place that could impact our ability to provide our products to customers or distributors in China or source components from China. Moreover, the Chinese government may retaliate against U.S. trade restrictions in ways that could impact our business. Given the relatively fluid regulatory environment in China and the United States and uncertainty how the U.S. or foreign governments will act with respect to export controls, tariffs, international trade agreements and policies, there could be additional import, export, tax, or other regulatory changes in the future. Any such changes could directly and adversely impact our financial results and results of operations. For more information, see "[—Enhanced trade tariffs, import restrictions, export restrictions, Chinese regulations or other trade barriers may materially harm our business,](#)" below.

Other risks could include:

- interruptions to operations in China as a result of the COVID-19 pandemic or other disease outbreaks and natural catastrophic events, which have in the past and can result in the future in business closures, transportation restrictions, import and export complications and cause shortages in the supply of raw materials or disruptions in manufacturing;
- product supply disruptions and increased costs as a result of heightened exposure to changes in the policies of the Chinese government, political unrest or unstable economic conditions in China; and
- the nationalization or other expropriation of private enterprises or intellectual property by the Chinese government.

Difficulties in this relationship may require us to take actions adverse to our business to comply with governmental restrictions on business and trade with China.

We face significant risks associated with doing business with Taiwanese suppliers and manufacturers due to the tense relationship between Taiwan and mainland China.

Substantially all of our consumable chips are partly manufactured by a company based in Taiwan. Our supply of consumables chips and other critical components may be materially and adversely affected by diplomatic, geopolitical, military and other developments affecting the relationship between China and Taiwan. Recent military exercises in the Taiwan Strait have contributed to geopolitical uncertainty regarding the future of the relationship between China and Taiwan. Current or future diplomatic, geopolitical, military or other tensions between China and Taiwan may lead to circumstances that negatively affect the availability of such consumable chips and other critical components to us, which could limit or prohibit our ability to manufacture consumable chips and other critical components or lead to an increase in our supply costs if we cannot find a similar cost alternative supplier, which could materially and adversely impact our business, operations, prospects, financial condition and results, and results of operations.

Our operating results fluctuate from quarter to quarter and year over year, which makes our future results difficult to predict and could negatively impact the market price of our common stock.

We operate on a December 31st year-end and believe that there are significant seasonal factors which may cause sales of our products, and particularly our sequencing instruments, to vary on a quarterly or yearly basis, contribute to lengthy sales cycles for our sequencing instruments, and increase the magnitude of quarterly or annual fluctuations in our operating results. We believe that this seasonality results from a number of factors, including the procurement and budgeting cycles of many of our customers, especially government-funded customers, which often coincide with government fiscal year ends. For example, the U.S. government's fiscal year-end occurs in our third quarter and may result in increased sales of our products during this quarter if government-funded customers have unused funds that may be forfeited, or future budgets that may be reduced if funds remain unspent at fiscal year-end. Furthermore, Lunar New Year celebrations, which occur during our first quarter, and may last for a week or longer, resulting in closure of many of our customers' offices in China and across the Asia-Pacific region have caused, and may in the future cause, decreased sales of our consumables during our first quarter. These factors have contributed, and in the future may contribute, to substantial fluctuations in our quarterly operating results.

Our operating results during any given period can also be impacted by numerous other factors, including the following:

- market acceptance for our products;
- our ability to attract new customers;
- the length of our sales cycles, as discussed above;
- our ability to achieve economies of scale and other manufacturing efficiencies at the rate we anticipate;
- publications of studies by us, our competitors or third parties;
- the timing and success of new product introductions by us or our competitors or other changes in the competitive dynamics of our industry, such as consolidation;
- the amount and timing of our costs and expenses;
- changes in our pricing policies or those of our competitors;
- general economic, industry and market conditions;

- the regulatory environment in which we operate;
- expenses associated with warranty obligations or unforeseen product quality issues;
- the hiring, training, and retention of key employees, including our ability to grow our sales organization;
- litigation or other claims against us for intellectual property infringement or otherwise;
- our ability to obtain additional financing as necessary;
- changes or trends in new technologies and industry standards; and the impact of COVID--19.

Consequently, it is possible that in some quarters our operating results will fall below the expectations of securities analysts or investors. If that happens, the market price of our common stock would likely decrease. These fluctuations, among other factors, also mean that our operating results in any particular period may not be relied upon as an indication of future performance. Seasonal or cyclical variations in our sales have in the past, and may in the future, become more or less pronounced over time, and have in the past materially affected, and may in the future materially affect, our business, financial condition, results of operations, and prospects.

Our ability to use net operating losses to offset future taxable income may be subject to substantial limitations, and changes to U.S. tax laws may cause us to make adjustments to our financial statements.

Under Section 382 of the Internal Revenue Code, a corporation that undergoes an "ownership change" is subject to limitations on its ability to utilize its pre-change net operating losses ("NOLs") to offset future taxable income. We believe that we have had one or more ownership changes, and as a result, our existing NOLs are currently subject to limitation. Future changes in our stock ownership could result in additional ownership changes, including potentially material changes, under Section 382. Consequently, we may not be able to utilize some or all of our NOLs even if we attain profitability.

Our facilities in California are located near earthquake faults, and the occurrence of an earthquake or other catastrophic disaster could cause damage to our facilities and equipment, which could require us to cease or curtail operations.

Our facilities in California are located near earthquake fault zones and are vulnerable to damage from earthquakes. We are also vulnerable to damage from other types of disasters, including fire, floods, power loss, communications failures and similar events. If any disaster were to occur, our ability to operate our business at our facilities would be seriously, or potentially completely, impaired. In addition, the nature of our activities could cause significant delays in our research programs and commercial activities and make it difficult for us to recover from a disaster. The insurance we maintain may not be adequate to cover our losses resulting from disasters or other business interruptions. Accordingly, an earthquake or other disaster could materially and adversely harm our ability to conduct business.

Risks Related to Our Intellectual Property

Failure to secure patent or other intellectual property protection for our products and improvements to our products may reduce our ability to maintain any technological or competitive advantage over our current and potential competitors.

Our ability to protect and enforce our intellectual property rights is uncertain and depends on complex legal and factual questions. Our ability to establish or maintain a technological or competitive advantage over our competitors may be diminished because of these uncertainties. For example:

- we or our licensors might not have been the first to make the inventions covered by each of our pending patent applications or issued patents;
- we or our licensors might not have been the first to file patent applications for these inventions;
- it is possible that neither our pending patent applications nor the pending patent applications of our licensors will result in issued patents;
- the scope of the patent protection we or our licensors obtain may not be sufficiently broad to prevent others from practicing our technologies, developing competing products, designing around our patented technologies or independently developing similar or alternative technologies;

- our and our licensors' patent applications or patents have been, are and may in the future be, subject to interference, opposition or similar administrative proceedings, which could result in those patent applications failing to issue as patents, those patents being held invalid or the scope of those patents being substantially reduced;
- our enforcement of patents and proprietary rights in other countries may be problematic or unpredictable;
- we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions;
- we or our partners may not adequately protect our trade secrets;
- we may not develop additional proprietary technologies that are patentable; or
- the patents of others may limit our freedom to operate and prevent us from commercializing our technology in accordance with our plans.

The occurrence of any of these events could impair our ability to operate without infringing upon the proprietary rights of others or prevent us from establishing or maintaining a competitive advantage over our competitors.

Variability in intellectual property laws may adversely affect our intellectual property position.

Intellectual property laws, and patent laws and regulations in particular, have been subject to significant variability either through administrative or legislative changes to such laws or regulations or changes or differences in judicial interpretation, and it is expected that such variability will continue to occur. Additionally, intellectual property laws and regulations differ by country. Variations in the patent laws and regulations or in interpretations of patent laws and regulations in the United States and other countries may diminish the value of our intellectual property and may change the impact of third-party intellectual property on us. Accordingly, we cannot predict the scope of the patents that may be granted to us with certainty, the extent to which we will be able to enforce our patents against third parties or the extent to which third parties may be able to enforce their patents against us.

Some of the intellectual property that is important to our business is owned by other companies or institutions and licensed to us, and changes to the rights we have licensed may adversely impact our business.

We license from third parties some of the intellectual property that is important to our business. If the third parties who license intellectual property to us fail to maintain the intellectual property that we have licensed, or lose rights to that intellectual property, the rights we have licensed may be reduced or eliminated, which would eliminate barriers against our competition. Termination of these licenses or reduction or elimination of our licensed rights may result in our having to negotiate new or reinstated licenses with less favorable terms, or could subject us to claims of intellectual property infringement or contract breach in litigation or other administrative proceedings that could result in damage awards against us and injunctions that could prohibit us from selling our products. In addition, some of our licenses from third parties limit the field in which we can use the licensed technology. Therefore, in order for us to use such licensed technology in potential future applications that are outside the licensed field of use, we may be required to negotiate new licenses with our licensors or expand our rights under our existing licenses. We cannot be certain that we will be able to obtain such licenses or expanded rights on reasonable terms or at all. In the event a dispute with our licensors were to occur, our licensors may seek to renegotiate the terms of our licenses, increase the royalty rates that we pay to obtain and maintain those licenses, limit the field or scope of the licenses, or terminate the license agreements. In addition, we have limited rights to participate in the prosecution and enforcement of the patents and patent applications that we have licensed. If we fail to meet our obligations under these licenses, or if we have a dispute regarding the terms of the licenses, these third parties could terminate the licenses, which could subject us to claims of intellectual property infringement. As a result, we cannot be certain that these patents and applications will be prosecuted and enforced in a manner consistent with the best interests of our business. Further, because of the rapid pace of technological change in our industry, we may need to rely on key technologies developed or licensed by third parties, and we may not be able to obtain licenses and technologies from these third parties at all or on reasonable terms. The occurrence of these events may have a material adverse effect on our business, financial condition or results of operations.

The measures that we use to protect the security of and enforce our intellectual property and other proprietary rights may not be adequate, which could result in the loss of legal protection for, and thereby diminish the value of, such intellectual property and other rights.

In addition to patents, we also rely upon trademarks, trade secrets, copyrights, and unfair competition laws, as well as license agreements and other contractual provisions, to protect our intellectual property and other proprietary rights. Despite these measures, any of our intellectual property rights could be challenged, invalidated, circumvented, or misappropriated. In addition, we attempt to protect our intellectual property and proprietary information by requiring our employees and consultants to enter into confidentiality and assignment of inventions agreements, and by entering into confidentiality agreements with our third-party development, manufacturing, sales, and distribution partners, who may also acquire, develop and/or commercialize alternative or competing products or provide services to our competitors. For example, Roche had certain access to our trade secrets and other proprietary information pursuant to an agreement we had entered into with Roche, subject to the confidentiality provisions thereof (certain of which provisions survive the termination of the agreement); however, Roche is developing potentially competing sequencing products. There can be no assurance that our measures have provided or will provide adequate protection for our intellectual property and proprietary information. These agreements may be breached, and we may not have adequate remedies for any such breach. In addition, our trade secrets and other proprietary information may be disclosed to others, or others may gain access to or disclose our trade secrets and other proprietary information. Enforcing a claim that a third party illegally obtained and is using our trade secrets is expensive and time consuming, and the outcome is unpredictable. Additionally, others may independently develop proprietary information and techniques that are substantially equivalent to ours. The occurrence of these events may have a material adverse effect on our business, financial condition, or results of operations.

Our intellectual property may be subject to challenges in the United States or foreign jurisdictions that could adversely affect our intellectual property position.

Our pending, issued and granted U.S. and foreign patents and patent applications have been, are and may in the future be, subject to challenges by ONT Ltd., ONT Inc. and Metrichor, Ltd. ("Metrichor" and, together with ONT Ltd. and ONT Inc., "ONT") in addition to other parties asserting prior invention by others or invalidity on various grounds, through proceedings, such as interferences, reexaminations, or opposition proceedings. Addressing these challenges to our intellectual property has been, and any future challenges can be, costly and distract management's attention and resources. For example, we previously incurred significant legal expenses to litigate and settle a complaint seeking review of a patent interference decision of the U.S. Patent and Trademark Office. Additionally, ONT previously requested that the U.S. Patent and Trademark Office institute *inter partes* reviews of certain patents that we have asserted against ONT Inc. and ONT Ltd. in litigation proceedings for patent infringement. While none of the *inter partes* reviews requested by ONT were instituted by the U.S. Patent and Trademark Office, challenges of this nature before the Patent Trial and Appeal Board ("PTAB") in the future could result in determinations that our patents or pending patent applications are unpatentable to us, or are invalidated or unenforceable in whole or in part and could require us to expend significant time, funds, and other resources in litigating such challenges. Accordingly, adverse rulings in such proceedings could negatively impact the scope of our intellectual property protection for our products and technology and could materially and adversely affect our business. Similar mechanisms for challenging the validity and enforceability of a patent exist in foreign patent offices and courts and may result in the revocation, cancellation, or amendment of any foreign patents we hold now or in the future. The outcome following legal assertions of invalidity and unenforceability is unpredictable, and prior art could render our patents invalid. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on such products. Such a loss of patent protection would have a material adverse impact on our business.

Some of our technology is subject to “march-in” rights by the U.S. government.

Some of our patented technology was developed with U.S. federal government funding. When new technologies are developed with U.S. government funding, the government obtains certain rights in any resulting patents, including a nonexclusive license authorizing the government to use the invention for non-commercial purposes. These rights may permit the government to disclose our confidential information to third parties and to exercise “march-in” rights to use or allow third parties to use our patented technology. The government can exercise its march-in rights if it determines that such action is necessary to (i) achieve practical application of the U.S. government-funded technology, (ii) alleviate health or safety needs, (iii) meet requirements of federal regulations, or (iv) give preference to U.S. industry. In addition, U.S. government-funded inventions must be reported to the government and such government funding must be disclosed in any resulting patent applications. Furthermore, our rights in such inventions are subject to government license rights and foreign manufacturing restrictions. The U.S. government has generally denied requests to exercise its march-in rights, even to provide access to potentially life-saving medications; however, if the U.S. government were to exercise its march-in rights to our patent technologies funded by the U.S. government, particularly for the benefit of one of more of our competitors, that may have a material adverse effect on our business.

We are involved in legal proceedings to enforce our intellectual property rights.

Our intellectual property rights involve complex factual, scientific, and legal questions. We operate in an industry characterized by significant intellectual property litigation. Even though we may believe that we have a valid patent on a particular technology, other companies have from time to time taken, and may in the future take, actions that we believe violate our patent rights. For example, we were previously involved in legal proceedings with ONT and Harvard University in several United States and European jurisdictions. We have in the past received adverse rulings against us with respect to our complaint with the United States International Trade Commission for one of these proceedings. Legal actions to enforce our patent rights have been, and will continue to be, expensive, and may divert significant management time and resources. Adverse parties from previous legal actions have brought, and they and others may in the future bring, claims against us and/or our intellectual property. Litigation is a significant ongoing expense, recognized in sales, general and administrative expense, with an uncertain outcome, and has been, and may in the future be, a material expense for us. Our enforcement actions may not be successful, have given rise to legal claims against us and could result in some of our intellectual property rights being determined to be invalid or not enforceable. Furthermore, an adverse determination or judgement could lead to an award of damages against us, or the issuance of an injunction against us or our products that could prevent us from selling any products found to be infringing the intellectual property rights of another party.

We have been, are currently, and could in the future be, subject to legal proceedings with third parties who may claim that our products infringe or misappropriate their intellectual property rights.

Our products are based on complex, rapidly developing technologies. We may not be aware of issued or previously filed patent applications that belong to third parties that mature into issued patents that cover some aspect of our products or their use. In addition, because patent litigation is complex and the outcome inherently uncertain, our belief that our products do not infringe third-party patents of which we are aware or that such third-party patents are invalid and unenforceable may be determined to be incorrect. As a result, third parties have claimed, and may in the future claim, that we infringe their patent rights and have filed, and may in the future file lawsuits or engage in other proceedings against us to enforce their patent rights. For example, we are involved in legal proceedings for alleged patent infringement and related matters in the United States with Personal Genomics of Taiwan, Inc. ("PGI"), Take2 Technologies, Ltd., and the Chinese University of Hong Kong. In addition, ONT Ltd. and Harvard University have, in the past, filed claims against us in the High Court of England and Wales and the District Court of Mannheim, Germany for patent infringement, and PGI has filed claims against us in the U.S. District Court for the District of Delaware and in the Wuhan People's Court in China. We are aware of other issued patents and patent applications owned by third parties that could be construed to read on our products, and related maintenance and support services. Although we do not believe that our products or services infringe any valid issued patents, the third-party owners of these patents and applications may in the future claim that we infringe their patent rights and file lawsuits against us. In addition, as we enter new markets, our competitors and other third parties may claim that our products infringe their intellectual property rights as part of a business strategy to impede our successful entry into those markets. Furthermore, parties making claims against us may be able to obtain injunctive or other relief, which effectively could block our ability to further develop or commercialize products or services and could result in the award of substantial damages against us. Patent litigation between competitors in our industry is common. Additionally, we have certain obligations to many of our customers and suppliers to indemnify and defend them against claims by third parties that our products or their use infringe any intellectual property of these third parties. In defending ourselves against any of these claims, we have in the past incurred, and could in the future incur, to defend ourselves or our customers, substantial costs, and the attention of our management and technical personnel could be diverted. For example, we previously incurred significant legal expenses to litigate and settle a complaint alleging patent infringement. Even if we have an agreement that indemnifies us against such costs, the indemnifying party may be unable to uphold its contractual obligations. To avoid or settle legal claims, it may be necessary or desirable in the future to obtain licenses relating to one or more products or relating to current or future technologies, which could negatively affect our gross margins. We may not be able to obtain these licenses on commercially reasonable terms, or at all. We may be unable to modify our products so that they do not infringe the intellectual property rights of third parties. In some situations, the results of litigation or settlement of claims may require us to cease allegedly infringing activities which could prevent us from selling some or all of our products. The occurrence of these events may have a material adverse effect on our business, financial condition, or results of operations.

In addition, in the course of our business, we may from time to time have access to or be alleged to have access to confidential or proprietary information of others, which, though not patented, may be protected as trade secrets. Others could bring claims against us asserting that we improperly used their confidential or proprietary information, or that we misappropriated their technologies and incorporated those technologies into our products. A determination that we illegally used the confidential or proprietary information or misappropriated technologies of others in our products could result in us paying substantial damage awards or being prevented from further developing or selling some or all of our products, which could materially and adversely affect our business.

We have not yet registered some of our trademarks in all of our potential markets, and failure to secure those registrations could adversely affect our business.

Some of our trademark applications may not be allowed for registration, and our registered trademarks may not be maintained or enforced. In addition, in the U.S. Patent and Trademark Office and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings.

Our use of “open source” software could adversely affect our ability to sell our products and subject us to possible litigation.

A portion of the products or technologies developed and/or distributed by us incorporate “open source” software, and we may incorporate open source software into other products or technologies in the future. Some open source software licenses require that we disclose the source code for any modifications to such open source software that we make and distribute to one or more third parties, and that we license the source code for such modifications to third parties, including our competitors, at no cost. We monitor the use of open source software in our products to avoid uses in a manner that would require us to disclose or grant licenses under our source code that we wish to maintain as proprietary; however, there can be no assurance that such efforts have been or will be successful. In some circumstances, distribution of our software that includes or is linked with open source software could require that we disclose and license some or all of our proprietary source code in that software, which could include permitting the use of such software and source code at no cost to the user. Open source license terms are often ambiguous and there is little legal precedent governing the interpretation of these licenses. Successful claims made by the licensors of open source software that we have violated the terms of these licenses could result in unanticipated obligations, including being subject to significant damages, being enjoined from distributing products that incorporate open source software and being required to make available our proprietary source code pursuant to an open source license, which could substantially help our competitors develop products that are similar to or better than ours or otherwise materially and adversely affect our business.

Risks Related to Regulation

We are, and may become, subject to governmental regulations that may impose burdens on our operations, and the markets for our products may be narrowed.

We are subject, both directly and indirectly, to the adverse impact of government regulation of our operations and markets. For example, export of our instruments may be subject to strict regulatory control in a number of jurisdictions. Following Russia’s invasion of Ukraine in February 2022, the United States and other countries imposed certain economic sanctions and severe export control restrictions against Russia and Belarus as well as certain Russian nationals and individuals and entities with ties to Russia, Belarus, and this conflict. These sanctions and restrictions have continued to increase as the conflict has further escalated and now cover the export of our products to Russia, and the United States and other countries could impose even wider sanctions and export restrictions and take other actions in the future that could further limit our ability to provide products in certain locations. Additionally, new restrictions on the ability to send certain products and technology related to semiconductors, semiconductor manufacturing, and supercomputing to China without an export license discussed above impact our ability to provide products to customers or distributors in China. We have expanded and are continuing to expand the international jurisdictions into which we supply products, which increases the risks surrounding governmental regulations relating to our business. The need to or failure to satisfy export control criteria or to obtain necessary clearances could delay or prevent shipment of products, which could materially and adversely affect our revenue and profitability. Moreover, the life sciences industry, which is expected to continue to be one of the primary markets for our technology, has historically been heavily regulated. There are, for example, laws in several jurisdictions restricting research in genetic engineering, which may narrow our markets. Given the evolving nature of this industry, legislative bodies or regulatory authorities may adopt additional regulations that may adversely affect our market opportunities. Additionally, if ethical and other concerns surrounding the use of genetic information, diagnostics or therapies become widespread, there may be less demand for our products.

Our business is also directly affected by a wide variety of government regulations applicable to business enterprises generally and to companies operating in the life science industry in particular. Failure to comply with government regulations or obtain or maintain necessary permits and licenses could result in a variety of fines or other censures or an interruption in our business operations which may have a negative impact on our ability to generate revenue and the cost of operating our business. In addition, changes to laws and government regulations could cause a material adverse effect on our business as we will need to adapt our business to comply with such changes. For example, a governmental prohibition on the use of human *in vitro* diagnostics or other regulations that negatively impact the research and development activities of our customers would adversely impact our commercialization of products on which we have expended significant research and development resources, which would in turn have a material adverse impact on our business and prospects.

Our products could become subject to government regulation as medical devices by the U.S. Food and Drug Administration or other domestic and international regulatory agencies even if we do not elect to seek regulatory clearance or approval to market our products for diagnostic purposes, which could increase our costs and impede or delay our commercialization efforts, thereby materially and adversely affecting our business and results of operations.

Our products are currently labeled and promoted as research use only ("RUO") products, and are not currently designed, or intended to be used, for clinical diagnostic tests or as medical devices. However, in the future, certain of our products or related applications, such as those that may be developed for clinical uses, could be subject to regulation by the U.S. Food and Drug Administration ("FDA"), or the FDA's regulatory jurisdiction could be expanded to include our products. Also, even if our products are labeled, promoted, and intended as RUO, the FDA or comparable agencies of other countries could disagree with our conclusion that our products are intended for research use only or deem our sales, marketing and promotional efforts as being inconsistent with the FDA's guidance on RUO products. For example, our customers may independently elect to use our RUO labeled products in their own laboratory developed tests ("LDTs") for clinical diagnostic use, which could subject our products to government regulation, and the regulatory clearance or approval and maintenance process for such products may be uncertain, expensive, and time-consuming. Regulatory requirements related to marketing, selling, and distribution of RUO products could change or be uncertain, even if clinical uses of our RUO products by our customers were done without our consent. If the FDA or other regulatory authorities assert that any of our RUO products are subject to regulatory clearance or approval, our business, financial condition, or results of operations could be adversely affected. In the event that we fail to obtain and maintain necessary regulatory clearances or approvals for products that we develop for clinical uses, or if clearances or approvals for future products and indications are delayed or not issued, our commercial operations may be materially harmed. Furthermore, even if we are granted regulatory clearances or approvals, they may include significant limitations on the indicated uses for the product, which may limit the market for the product. We do not have experience in obtaining FDA approvals and no assurance can be given that we will be able to obtain or to maintain such approvals. Furthermore, any approvals that we may obtain can be revoked if safety or efficacy problems develop.

The FDA has historically exercised enforcement discretion in not enforcing the medical device regulations against laboratories developing and offering LDTs. However, in 2014, the FDA issued two draft guidance documents that set forth the FDA's proposed risk-based framework for regulating LDTs, which are designed, manufactured, and used within a single laboratory. The draft guidance documents provide the anticipated details through which the FDA would propose to establish an LDT oversight framework, including pre-market review for higher-risk LDTs, such as those that have the same intended use as FDA-approved or cleared companion diagnostic tests currently on the market. In 2017, the FDA announced that it would not issue final guidance on the oversight of LDTs, and manufacturers of products used for LDTs, but would seek further public discussion on an appropriate oversight approach, and give Congress an opportunity to develop a legislative solution. The FDA has issued warning letters to certain genomics labs for illegally marketing genetic tests that claim to predict patients' responses to specific medications, noting that the FDA has not created a legal "carve-out" for LDTs and retains discretion to take action when appropriate, such as when certain genomic tests raise significant public health concerns.

As manufacturers develop more complex diagnostic tests and diagnostic software, the FDA may increase its regulation of LDTs. Any future legislative or administrative rule making or oversight of LDTs, if and when finalized, may impact the sales of our products and how customers use our products, and may require us to change our business model in order to maintain compliance with these laws. We cannot predict how these various efforts will be resolved, how Congress or the FDA will regulate LDTs in the future, or how that regulatory system will impact our business. Changes to the current regulatory framework, including the imposition of additional or new regulations, including regulation of our products, could arise at any time during the development or marketing of our products, which may negatively affect our ability to obtain or maintain FDA or comparable regulatory approval of our products, if required. Further, sales of devices for diagnostic purposes may subject us to additional healthcare regulation and enforcement by the applicable government agencies. Such laws include, without limitation, state and federal anti-kickback or anti-referral laws, healthcare fraud and abuse laws, false claims laws, privacy and security laws, Physician Payments Sunshine Act and related transparency and manufacturer reporting laws, and other laws and regulations applicable to medical device manufacturers.

Additionally, in 2013, the FDA issued Final Guidance “Distribution of In Vitro Diagnostic Products Labeled for Research Use Only.” The guidance emphasizes that the FDA will review the totality of the circumstances when it comes to evaluating whether equipment and testing components are properly labeled as RUO. The final guidance states that merely including a labeling statement that the product is for research purposes only will not necessarily render the device exempt from the FDA’s clearance, approval, and other regulatory requirements if the circumstances surrounding the distribution, marketing and promotional practices indicate that the manufacturer knows its products are, or intends for its products to be, used for clinical diagnostic purposes. These circumstances may include written or verbal sales and marketing claims or links to articles regarding a product’s performance in clinical applications and a manufacturer’s provision of technical support for clinical applications.

In August 2020, the Department of Health and Human Services (“HHS”) announced rescission of guidance and other informal issuances of FDA regarding pre-market review of LDT absent notice-and-comment rulemaking, stating that, absent notice-and-comment rulemaking LDTs are not required to obtain FDA pre-market authorization. In November 2021, HHS under the Biden administration issued a statement that withdrew the August 2020 policy announcement stating that HHS does not have a policy on LDTs that is separate from FDA’s longstanding approach.

Legislative and administrative proposals to amend the FDA’s oversight of LDTs have been introduced in recent years, including the Verifying Accurate Leading-edge IVCT Development Act of 2021 (the “VALID Act”), which aims to create a new category of medical products separate from medical devices called “in vitro clinical tests,” or IVCTs, and bring all such products within the scope of the FDA’s oversight. To date, Congress has not passed the VALID Act, but may revisit the VALID Act or similar policy riders and enact other FDA programmatic reforms in the future. FDA recently announced in the United Agenda of its intent to issue a proposed rule to make explicit that LDTs are devices under the Federal Food, Drug, and Cosmetic Act. The Notice of Proposed Rulemaking for LDTs is anticipated to be published in the Federal Register later in 2023. It is unclear how future legislation by federal and state governments and FDA regulation will impact the industry, including our business and that of our customers.

If the FDA determines our products or related applications should be subject to additional regulation as in vitro diagnostic devices based upon customers’ use of our products for clinical diagnostic or therapeutic decision-making purposes, our ability to market and sell our products could be impeded and our business, prospects, results of operations and financial condition may be adversely affected. In addition, the FDA could consider our products to be misbranded or adulterated under the Federal Food, Drug, and Cosmetic Act and subject to recall and/or other enforcement action.

To the extent we elect to label and promote any of our products as medical devices, we would be required to obtain prior approval or clearance by the FDA or comparable foreign regulatory authority, which could take significant time and expense and could fail to result in a marketing authorization for the intended uses we believe are commercially attractive. Obtaining marketing authorization in one jurisdiction does not mean that we will be successful in obtaining marketing authorization in other jurisdictions where we conduct business.

If we elect to label and market our products for use as, or in the performance of, clinical diagnostics in the United States, thereby subjecting them to FDA regulation as medical devices, we would be required to obtain pre-market 510(k) clearance or pre-market approval from the FDA, unless an exception applies. It is possible, in the event we elect to submit 510(k) applications for certain of our products, that the FDA would take the position that a more burdensome pre-market application, such as a PMA or a *de novo* application is required for some of our products. If such applications were required, greater time and investment would be required to obtain FDA approval. Even if the FDA agreed that a 510(k) was appropriate, FDA clearance can be expensive and time consuming. It generally takes a significant amount of time to prepare a 510(k), including conducting appropriate testing on our products, and several months to years for the FDA to review a submission. Notwithstanding the effort and expense, FDA clearance or approval could be denied for some or all of our products for which we choose to market as a medical device or a clinical diagnostic device. Even if we were to seek and obtain regulatory approval or clearance, it may not be for the intended uses we request or that we believe are important or commercially attractive. There can be no assurance that future products for which we may seek pre-market clearance or approval will be approved or cleared by FDA or a comparable foreign regulatory authority on a timely basis, if at all, nor can there be assurance that labeling claims will be consistent with our anticipated claims or adequate to support continued adoption of such products. Compliance with FDA or comparable foreign regulatory authority regulations will require substantial costs, and subject us to heightened scrutiny by regulators and substantial penalties for failure to comply with such requirements or the inability to market our products. The lengthy and unpredictable pre-market clearance or approval process, as well as the unpredictability of the results of any required clinical studies, may result in our failing to obtain regulatory clearance or approval to market such products, which would significantly harm our business, results of operations, reputation, and prospects.

If we sought and received regulatory clearance or approval for certain of our products, we would be subject to ongoing FDA obligations and continued regulatory oversight and review, including the general controls listed above and the FDA's QSRs for our development and manufacturing operations. In addition, we would be required to obtain a new 510(k) clearance before we could introduce subsequent material modifications or improvements to such products. We could also be subject to additional FDA post-marketing obligations for such products, any or all of which would increase our costs and divert resources away from other projects. If we sought and received regulatory clearance or approval and are not able to maintain regulatory compliance with applicable laws, we could be prohibited from marketing our products for use as, or in the performance of, clinical diagnostics and/or could be subject to enforcement actions, including warning letters and adverse publicity, fines, injunctions, and civil penalties; recall or seizure of products; operating restrictions; and criminal prosecution.

Further, if we decide to seek regulatory clearance or approval for certain of our products in countries outside of the United States or if a foreign regulatory authority determines that our products are regulated as medical devices, we would be subject to extensive medical device laws and regulations outside of the United States. Sales of such products outside the United States will likely be subject to foreign regulatory requirements, which can vary greatly from country to country. As a result, the time required to obtain clearances or approvals outside the United States may differ from that required to obtain FDA clearance or approval and we may not be able to obtain foreign regulatory approvals on a timely basis or at all. In Europe, we would need to comply with the Medical Device Regulation 2017/745 and In Vitro Diagnostic Regulation 2017/746, which became effective May 26, 2017, with application dates of May 26, 2021 (postponed from 2020) and May 26, 2022, respectively. This will increase the difficulty of regulatory approvals in Europe in the future. In addition, the FDA regulates exports of medical devices. The number and scope of these requirements are increasing. Unlike many of the other companies offering nucleic acid sequencing equipment or consumables, this is an area where we do not have expertise. We, or our other third-party sales and distribution partners, may not be able to obtain regulatory approvals in such countries or may incur significant costs in obtaining or maintaining our foreign regulatory approvals. In addition, the export by us of certain of our products, which have not yet been cleared for domestic commercial distribution, may be subject to FDA or other export restrictions. Failure to comply with these regulatory requirements or obtain and maintain required approvals, clearances and certifications could impair our ability to commercialize our products for diagnostic use outside of the United States. Any action brought against us for violations of these laws or regulations, even if successfully defended, could cause us to incur significant legal expenses and divert our management's attention from the operation of our business.

Enhanced trade tariffs, import restrictions, export restrictions, Chinese regulations, or other trade barriers may materially harm our business.

We are continuing to expand our international operations as part of our growth strategy and have experienced an increasing concentration of sales in certain regions outside the United States, especially the Asia-Pacific region, as discussed above. There is currently significant uncertainty about the future relationship between the United States and various other countries, most significantly China, with respect to trade policies, treaties, government regulations and tariffs. Starting in September 2018, the U.S. Trade Representative (the "USTR") enacted various tariffs of 7.5%, 10%, 15%, and 25% on the import of Chinese products, including non-U.S. components and materials that may be used in our products. Additionally, China also has imposed tariffs on imports into China from the United States. These tariffs have and could continue to raise our costs. Furthermore, tariffs, trade restrictions, or trade barriers that have been, and may in the future be, placed on products such as ours by foreign governments, especially China, have raised, and could further raise, amounts paid for some or all of our products, which may result in the loss of customers and our business, and our financial condition and results of operations may be harmed. Further tariffs may be imposed that could cover imports of components and materials used in our products, or our business may be adversely impacted by retaliatory trade measures taken by China or other countries, including restricted access to components or materials used in our products or increased amounts that must be paid for our products, which could materially harm our business, financial condition, and results of operations.

Additionally, the U.S. government recently announced new controls restricting the ability to send certain products and technology related to semiconductors, semiconductor manufacturing, and supercomputing to China without an export license. These new controls also apply to certain hardware containing these specified integrated circuits. In many cases, these licenses are subject to a policy of denial and will not be issued. These controls may impact our ability to export certain products to customers or distributors in China and restrict our ability to use certain integrated circuits in our products. The U.S. government also recently added additional entities in China to restricted party lists impacting the ability of U.S. companies to provide items to these entities. Moreover, in November 2018, the U.S. Commerce Department's Bureau of Industry and Security ("BIS") released an advance notice of proposed rulemaking to control the export of emerging technologies. This notice included "[b]iotechnology, including nanobiology; synthetic biology; genomic and genetic engineering; or neurotech" as possible areas of increased export controls. The Biden Administration has continued to provide updated lists of emerging technologies subject to national security consents, and it continues to include biotechnologies including "[g]enome and protein engineering including design tools" and "[b]iomanufacturing and bioprocessing technologies." Therefore, it is possible that our ability to export our products to customers or distributors in China may be further restricted in the future.

It is possible that the Chinese government will retaliate in response to existing or future U.S. export controls or trade restrictions in ways that could impact our business. It also is possible that additional restrictions will be put in place that could impact our ability to provide our products to customers or distributors in China or source components from China. The continued threats of tariffs, trade restrictions and trade barriers could have a generally disruptive impact on the global economy and, therefore, negatively impact our sales. Given the relatively fluid regulatory environment in China and the United States and uncertainty how the U.S. or foreign governments will act with respect to export controls, tariffs, international trade agreements and policies, there could be additional tax or other regulatory changes in the future. Any such changes could directly and adversely impact our financial results and results of operations.

Our international business could expose us to business, regulatory, political, operational, financial, and economic risks associated with doing business outside of the United States.

Engaging in international business inherently involves a number of difficulties and risks, including:

- required compliance with existing and changing foreign regulatory requirements and laws that are or may be applicable to our business in the future, such as the European Union's General Data Protection Regulation ("GDPR") and other data privacy requirements, labor and employment regulations, anti-competition regulations, the U.K. Bribery Act of 2010 and other anti-corruption laws, regulations relating to the use of certain hazardous substances or chemicals in commercial products, and require the collection, reuse, and recycling of waste from products we manufacture;
- required compliance with U.S. laws such as the Foreign Corrupt Practices Act, and other U.S. federal laws and trade and economic sanctions and other regulations established by the Office of Foreign Asset Control;
- export requirements and import or trade restrictions;

- laws and business practices favoring local companies;
- restrictions on both inbound and outbound cross-border investment;
- foreign currency exchange, longer payment cycles and difficulties in enforcing agreements and collecting receivables through certain foreign legal systems;
- changes in social, economic, and political conditions or in laws, regulations and policies governing foreign trade, manufacturing, research and development, and investment both domestically as well as in the other countries and jurisdictions in which we operate and into which we may sell our products including as a result of the separation of the United Kingdom from the European Union ("Brexit") and ongoing geopolitical tensions related to the political uncertainty and military actions associated with the war in Ukraine, resulting sanctions imposed by the U.S. and other countries, and retaliatory actions taken by Russia in response to such sanctions;
- potentially adverse tax consequences, tariffs, customs charges, bureaucratic requirements, and other trade barriers;
- difficulties and costs of staffing and managing foreign operations; and
- difficulties protecting, maintaining, enforcing, or procuring intellectual property rights and defending against intellectual property claims under the law and judicial systems of other countries.

If one or more of these risks occurs, it could require us to dedicate significant resources to remedy such occurrence, and if we are unsuccessful in finding a solution, our financial results will suffer.

Our operations involve the use of hazardous materials, and we must comply with environmental, health and safety laws, which can be expensive and may adversely affect our business, operating results and financial condition.

Our research and development and manufacturing activities involve the use of hazardous materials, including chemicals and biological materials, and some of our products include hazardous materials. Accordingly, we are subject to federal, state, local and foreign laws, regulations, and permits relating to environmental, health and safety matters, including, among others, those governing the use, storage, handling, exposure to and disposal of hazardous materials and wastes, the health and safety of our employees, and the shipment, labeling, collection, recycling, treatment, and disposal of products containing hazardous materials. Liability under environmental laws and regulations can be joint and several and without regard to fault or negligence. For example, under certain circumstances and under certain environmental laws, we could be held liable for costs relating to contamination at our or our predecessors' past or present facilities and at third-party waste disposal sites. We could also be held liable for damages arising out of human exposure to hazardous materials. There can be no assurance that violations of environmental, health and safety laws will not occur as a result of human error, accident, equipment failure or other causes. The failure to comply with past, present or future laws could result in the imposition of substantial fines and penalties, remediation costs, property damage and personal injury claims, investigations, the suspension of production or product sales, loss of permits or a cessation of operations. Any of these events could harm our business, operating results, and financial condition. We also expect that our operations will be affected by new environmental, health and safety laws and regulations on an ongoing basis, or more stringent enforcement of existing laws and regulations. New laws or changes to existing laws may result in additional costs and may increase penalties associated with violations or require us to change the content of our products or how we manufacture them, which could have a material adverse effect on our business, operating results, and financial condition.

Ethical, legal, privacy, data protection and social concerns or governmental restrictions surrounding the use of genetic information could reduce demand for our technology.

Our products may be used to provide genetic information about humans, agricultural crops and other living organisms. The information obtained from our products could be used in a variety of applications which may have underlying ethical, legal, privacy, data protection and social concerns, including the genetic engineering or modification of agricultural products or testing for genetic predisposition for certain medical conditions. Governmental authorities could, for safety, social or other purposes, call for limits on or regulation of the use of genetic testing, and may consider or adopt such regulations or other restrictions. Such concerns or governmental restrictions could limit the use of our products or be costly and burdensome to comply with, and actual or perceived violations of any such restrictions may lead to the imposition of substantial fines and penalties, remediation costs, claims and litigation, regulatory investigations and proceedings, and other liability, any of which could have a material adverse effect on our business, financial condition, and results of operations.

Regulations related to conflict minerals has caused us to incur, and will continue to cause us to incur, additional expenses and could limit the supply and increase the costs of certain materials used in the manufacture of our products.

We are subject to requirements under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 that require us to conduct diligence and report on whether or not our products contain conflict minerals. The implementation of these requirements could adversely affect the sourcing, availability and pricing of the materials used in the manufacture of components used in our products. Furthermore, the complex nature of our products requires components and materials that may be available only from a limited number of sources and, in some cases, from only a single source. We have incurred, and will continue to incur, additional costs to comply with the disclosure requirements, including costs related to conducting diligence procedures to determine the sources of conflict minerals that may be used or necessary to the production of our products and, if applicable, potential changes to components, processes, or sources of supply as a consequence of such verification activities. We may face reputational harm if we determine that certain of our products contain minerals that are not determined to be conflict free or if we are unable to alter our processes or sources of supply to avoid using such materials. In such circumstances, the reputational harm could materially and adversely affect our business, financial condition, or results of operations.

Risks Related to Owning Our Common Stock

The price of our common stock has been, is, and may continue to be, highly volatile, and you may be unable to sell your shares at or above the price you paid to acquire them.

The market price of our common stock is highly volatile, and we expect it to continue to be volatile for the foreseeable future in response to many risk factors listed in this section, and others beyond our control, including:

- actual or anticipated fluctuations in our financial condition and operating results;
- announcements of new products, technological innovations or strategic partnerships by us or our competitors;
- announcements by us, our customers, partners, or suppliers relating directly or indirectly to our products, services or technologies;
- overall conditions in our industry and market;
- addition or loss of significant customers;
- changes in laws or regulations applicable to our products;
- actual or anticipated changes in our growth rate relative to our competitors;
- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures, capital commitments or achievement of significant milestones;
- additions or departures of key personnel;
- competition from existing products or new products that may emerge;
- issuance of new or updated research or reports by securities analysts;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- disputes or other developments related to proprietary rights, including patents, litigation matters or our ability to obtain intellectual property protection for our technologies;
- announcement or expectation of additional financing efforts;
- sales of our common stock by us or our stockholders;
- stock price and volume fluctuations attributable to inconsistent trading volume levels of our shares;
- reports, guidance and ratings issued by securities or industry analysts;
- operating results below the expectations of securities analysts or investors; and
- general economic and market conditions, which could be impacted by various events including COVID-19 or interest rate fluctuations, increases in fuel prices, foreign currency fluctuations, international tariffs, acts of terrorism, hostilities or the perception that hostilities may be imminent, military conflict and acts of war, including further political uncertainty and military actions associated with the war in Ukraine and the related response, including sanctions or other restrictive actions, by the United States and/or other countries.

If any of the forgoing occurs, it would cause our stock price or trading volume to decline. Stock markets in general and the market for companies in our industry in particular have experienced price and volume fluctuations, which have been exacerbated by the COVID-19 pandemic, and current macroeconomic trends and geopolitical events, and have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political and market conditions such as recessions, interest rate changes or international currency fluctuations, may negatively impact the market price of our common stock. You may not realize any return on your investment in us and may lose some or all of your investment. In the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation. We have been a party to this type of litigation in the past and may be the target of this type of litigation again in the future. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business.

Sales of substantial amounts of our common stock in the public markets, or the perception that such sales might occur, could reduce the market price that our common stock might otherwise attain and may dilute your voting power and your ownership interest in us.

Sales of a substantial number of shares of our common stock in the public market, or the perception that such sales could occur, could adversely affect the market price of our common stock and may make it more difficult for existing stockholders to sell their common stock at a time and price that they deem appropriate and may dilute their voting power and ownership interest in us.

In addition, if our existing stockholders sell, or indicate an intent to sell, a large number of shares of our common stock in the public market, it could cause our stock price to fall. We may also issue shares of common stock or securities convertible into our common stock in connection with a financing, acquisition, our equity incentive plans, or otherwise. Any such issuances would result in dilution to our existing stockholders and the market price of our common stock may be adversely affected.

In September 2021, in connection with the closing of the Omniome Merger, we completed a private placement of an aggregate of 11,214,953 shares of our common stock, at a price of \$26.75 per share, for aggregate gross proceeds of approximately \$300 million (the "Private Placement") and registered the Private Placement shares for resale on a registration statement on Form S-3. The Private Placement Investors may sell any or all of their shares pursuant to the registration statement from time to time.

On January 27, 2023, we issued and sold an aggregate of 20,125,000 shares of our common stock at a purchase price of \$10.00 per share pursuant to an automatic shelf registration statement filed on Form S-3 (File No. 333-249999) with the Securities and Exchange Commission, resulting in aggregate gross proceeds of approximately \$201.3 million. The investors may sell any or all of their shares from time to time.

Concentration of ownership by our principal stockholders may result in control by such stockholders of the composition of our board of directors.

Our existing principal stockholders, executive officers, directors, and their affiliates beneficially own a significant number of our outstanding shares of common stock. In addition, such parties may acquire additional control by purchasing stock that we issue in connection with our future fundraising efforts. These parties may now and in the future be able to exercise a significant level of control over all matters requiring stockholder approval, including the election of directors. This control could have the effect of delaying or preventing a change of control of our company or changes in management and will make the approval of certain transactions difficult or impossible without the support of these stockholders.

Anti-takeover provisions in our charter documents and under Delaware law could make an acquisition of us, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management and limit the market price of our common stock.

Provisions in our amended and restated certificate of incorporation and amended and restated bylaws may have the effect of delaying or preventing a change of control or changes in our management. Our amended and restated certificate of incorporation and amended and restated bylaws include provisions that:

- authorize our board of directors to issue, without further action by the stockholders, up to 50,000,000 shares of undesignated preferred stock and up to approximately 1,000,000,000 shares of authorized but unissued shares of common stock;

- require that any action to be taken by our stockholders be effected at a duly called annual or special meeting and not by written consent;
- specify that special meetings of our stockholders can be called only by our board of directors, the Chair of the Board, the Chief Executive Officer or the President;
- establish advance notice procedures for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- establish that our board of directors is divided into three classes, Class I, Class II and Class III, with each class serving staggered terms;
- provide that our directors may be removed only for cause; and
- provide that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum.

These provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors, which is responsible for appointing the members of our management. In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us.

Our amended and restated bylaws designate a state or federal court located within the State of Delaware as the exclusive forum for certain stockholder litigation matters, and also provide that the federal district courts will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act of 1933, as amended, each of which could limit our stockholders' ability to choose the judicial forum for disputes with us or our directors, officers, stockholders, or employees.

Our amended and restated bylaws provide that unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or, if the Court of Chancery does not have jurisdiction, another State court in Delaware or the federal district court for the District of Delaware) will, to the fullest extent permitted by law, be the sole and exclusive forum for: (i) any derivative action or proceeding brought on our behalf; (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our current or former directors, stockholders, officers, or other employees to us or our stockholders; (iii) any action arising pursuant to any provision of the Delaware General Corporation Law; (iv) any action to interpret, apply, enforce or determine the validity of our amended and restated certificate of incorporation or our amended and restated bylaws; or (v) any action asserting a claim governed by the internal affairs doctrine, except as to each of (i) through (v) above, for any claim as to which such court determines that there is an indispensable party not subject to the jurisdiction of such court.

Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all such Securities Act actions. Accordingly, both state and federal courts have jurisdiction to entertain such claims. To prevent having to litigate claims in multiple jurisdictions and the threat of inconsistent or contrary rulings by different courts, among other considerations, our amended and restated bylaws also provide that, unless we consent in writing to the selection of an alternative forum, the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act including, without limitation and for the avoidance of doubt, any auditor, underwriter, expert, control person or other defendant.

Any person or entity purchasing, holding or otherwise acquiring any interest in any of our securities shall be deemed to have notice of and consented to the foregoing bylaw provisions. Although we believe these exclusive forum provisions benefit us by providing increased consistency in the application of Delaware law and federal securities laws in the types of lawsuits to which each applies, the exclusive forum provisions may limit a stockholder's ability to bring a claim in a judicial forum of its choosing for disputes with us or any of our directors, stockholders, officers or other employees, which may discourage lawsuits with respect to such claims against us and our current and former directors, stockholders, officers or other employees. In addition, a stockholder that is unable to bring a claim in the judicial forum of its choosing may be required to incur additional costs in the pursuit of actions which are subject to the exclusive forum provisions described above. Our stockholders will not be deemed to have waived our compliance with the federal securities laws and the rules and regulations thereunder as a result of our exclusive forum provisions. Further, in the event a court finds either exclusive forum provision contained in our bylaws to be unenforceable or inapplicable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our results of operations.

Our large number of authorized but unissued shares of common stock may potentially dilute existing stockholders' stockholdings.

We have a significant number of authorized but unissued shares of common stock. Our board of directors may issue shares of common stock from this authorized but unissued pool from time to time without stockholder approval, resulting in the dilution of our existing stockholders.

We do not intend to pay dividends for the foreseeable future.

We have never declared or paid any dividends on our common stock and do not intend to pay any dividends in the foreseeable future. We anticipate that we will retain all of our future earnings for use in the operation of our business and for general corporate purposes. Any determination to pay dividends in the future will be at the discretion of our board of directors. Accordingly, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments.

Risks Related to Our Notes

We may not have the ability to raise the funds necessary to settle conversions of the Notes in cash or to repurchase the Notes upon a fundamental change, and our future debt may contain limitations on our ability to pay cash upon conversion or repurchase of the Notes.

In February 2021, we issued \$900.0 million in aggregate principal amount of 1.50% Convertible Senior Notes due 2028, which we refer to as the 2028 Notes. The 2028 Notes will mature on February 15, 2028, subject to earlier conversion, redemption or repurchase, including upon a fundamental change. In June 2023, pursuant to the Exchange Transaction, we exchanged \$441.0 million in aggregate principal amount of our 2028 Notes for \$441.0 million aggregate principal amount of our 2023 Notes.

The 2030 Notes will mature on December 15, 2030, subject to earlier conversion, redemption or repurchase, including upon a fundamental change. The 2030 Notes and 2028 Notes are collectively referred to as the Notes. Following the Exchange Transaction, approximately \$459.0 million in aggregate principal amount of the 2028 Notes remained outstanding.

Holders of the Notes will have the right to require us to repurchase all or a portion of their Notes upon the occurrence of a fundamental change before the maturity date at a repurchase price equal to 100% of the principal amount of the Notes to be repurchased, plus unpaid interest to, but excluding, the maturity date. In addition, upon conversion of the Notes, unless we elect to deliver solely shares of our common stock to settle such conversion (other than paying cash in lieu of delivering any fractional share), we will be required to settle a portion or all of our conversion obligation in cash in respect of the Notes being converted. Moreover, we will be required to repay the Notes in cash at their maturity unless earlier converted, redeemed, or repurchased. However, we may not have enough available cash or be able to obtain financing at the time we are required to make repurchases of Notes surrendered therefor or pay cash with respect to Notes being converted or at their maturity.

In addition, our ability to repurchase Notes or to pay cash upon conversions of Notes or at their maturity may be limited by law, regulatory authority or agreements governing our future indebtedness. Our failure to repurchase Notes at a time when the repurchase is required by the indenture or to pay cash upon conversions of Notes or at their maturity as required by the indenture would constitute a default under the indenture. A default under the indenture or the fundamental change itself could also lead to a default under agreements governing our future indebtedness. Moreover, the occurrence of a fundamental change under the indenture could constitute an event of default under any such agreement. If the payment of the related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness or to pay cash amounts due upon conversion, upon required repurchase or at maturity of the Notes.

If the Notes are converted, it may adversely affect our financial condition and operating results.

Holders of the Notes are entitled to convert their Notes at any time at their option. If one or more holders elect to convert their Notes, unless we elect to satisfy our conversion obligation by delivering solely shares of our common stock (other than paying cash in lieu of delivering any fractional share), we would be required to settle a portion or all of our conversion obligation in cash, which could adversely affect our liquidity. In addition, issuances of shares of common stock upon conversion of our Notes could depress the market price of our common stock and impair our ability to raise capital through the sale of additional equity securities. The existence of the Notes may encourage short selling by market participants because the conversion of the Notes could depress the price of our common stock.

General Risk Factors

Unfavorable global economic or political conditions could adversely affect our business, financial condition or results of operations.

General conditions in the global economy and in the global financial markets could adversely affect our results of operations, including the potential effects from the ongoing COVID-19 pandemic as discussed above, and the overall demand for nucleic acid sequencing products may be particularly vulnerable to unfavorable economic conditions. A global financial crisis, inflation or a global or regional political disruption, as well as acts of terrorism, hostilities, military conflict and acts of war, including any further political uncertainty and military actions associated with the war in Ukraine and the related response, could cause extreme volatility in the capital and credit markets. A severe or prolonged economic downturn or political disruption could result in a variety of risks to our business, including weakened demand for our products and our ability to raise additional capital when needed on acceptable terms, if at all. A weak or declining economy or political disruption could also strain our manufacturers or suppliers, possibly resulting in supply disruption, or cause our customers to delay making payments for our product and services. An impairment in value of our tangible or intangible assets could also be recorded as a result of weaker economic conditions. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the political or economic climate and financial market conditions could adversely impact our business.

Delivery of our products could be delayed or disrupted by factors beyond our control, and we could lose customers as a result.

We rely on third-party carriers for the timely delivery of our products. As a result, we are subject to carrier disruptions and increased costs that are beyond our control. Any failure to deliver products to our customers in a safe and timely manner may damage our reputation and brand and could cause us to lose customers. If our relationship with any of these third-party carriers is terminated or impaired or if any of these carriers are unable to deliver our products, the delivery of our products by our customers may be delayed, which could harm our business and financial results. The failure to deliver our products in a safe and timely manner may harm our relationship with our customers, increase our costs and otherwise disrupt our operations.

Doing business internationally creates operational and financial risks for our business.

We currently conduct operations in various countries and jurisdictions, and continue to expand to new international jurisdictions as part of our growth strategy and have experienced an increasing concentration of sales in certain regions outside the U.S. We sell directly and through distribution partners throughout Europe, the Asia-Pacific region, Mexico, Brazil, and South Africa and have a significant portion of our sales and customer support personnel in Europe and the Asia-Pacific region. As a result, we or our distribution partners may be subject to additional regulations and increased diversion of management time and efforts. Conducting and launching operations on an international scale requires close coordination of activities across multiple jurisdictions and time zones and consumes significant management resources. If we fail to coordinate and manage these activities effectively, our business, financial condition or results of operations could be materially and adversely affected and failure to comply with laws and regulations applicable to business operations in foreign jurisdictions may also subject us to significant liabilities and other penalties. International operations entail a variety of other risks, including, without limitation:

- limits to travel as a result of the COVID-19 pandemic or other epidemics;
- challenges in staffing and managing foreign operations;
- potentially longer sales cycles and more time required to engage and educate customers on the benefits of our platform outside of the United States;
- the potential need for localized software and documentation;
- reduced protection for intellectual property rights in some countries and practical difficulties of enforcing intellectual property and contract rights abroad;
- defending against intellectual property claims in other countries;
- restrictions on both inbound and outbound cross-border investment, including enhanced oversight by the Committee on Foreign Investment in the United States ("CFIUS") and substantial restrictions on investment from China;
- U.S. and foreign government trade restrictions, including those which may impose restrictions on the importation, exportation, re-exportation, sale, shipment or other transfer of programming, technology, components, and/or services to foreign persons;
- changes in diplomatic and trade relationships, including new tariffs, trade protection measures, import or export licensing requirements, trade embargoes, sanctions, and other trade barriers;
- tariffs imposed by the U.S. on goods from other countries and tariffs imposed by other countries on U.S. goods, including the tariffs by the U.S. government on various imports from China, Canada, Mexico, and the European Union ("E.U.") and by the governments of these jurisdictions on certain U.S. goods, and any other possible tariffs that may be imposed on products such as ours, the scope and duration of which, if implemented, remains uncertain;
- deterioration of political relations between the U.S. and Russia, China, Japan, Korea, Canada, the United Kingdom ("U.K."), and the E.U., which could have a material adverse effect on our sales and operations in these countries;
- changes in social, political, and economic conditions or in laws, regulations and policies governing foreign trade, manufacturing, development, and investment both domestically as well as in the other countries and jurisdictions into which we sell our products, including as a result of the withdrawal of the U.K. from the E.U.;
- difficulties in obtaining export licenses or in overcoming other trade barriers and restrictions resulting in delivery delays;
- fluctuations in currency exchange rates and the related effect on our results of operations;
- increased financial accounting and reporting burdens and complexities;
- disruptions to global trade due to disease outbreaks or conflicts;
- potential increases on tariffs or restrictions on trade generally; and
- significant taxes or other burdens of complying with a variety of foreign laws and regulations, including laws and regulations relating to privacy and data protection such as the E.U. General Data Protection Regulation which took effect in the E.U. in 2018.

In conducting our international operations, we are subject to U.S. laws relating to our international activities, such as the Foreign Corrupt Practices Act of 1977, as well as foreign laws relating to our activities in other countries, such as the United Kingdom Bribery Act of 2010. Additionally, the inclusion of one of our foreign customers on any U.S. Government sanctioned persons list, including but not limited to the U.S. Department of Commerce's List of Denied Persons and the U.S. Department of Treasury's List of Specially Designated Nationals and Blocked Persons List, could be material to our earnings. Failure to comply with these laws may subject us to claims or financial and/or other penalties in the United States and/or foreign countries that could materially and adversely impact our operations or financial condition. These risks have become increasingly prevalent as we have expanded our sales into countries that are generally recognized as having a higher risk of corruption.

We face risks related to the current global economic environment, which could delay or prevent our customers from purchasing our products, which could in turn harm our business, financial condition, and results of operations. The state of the global economy continues to be uncertain. The current global economic conditions and uncertain credit markets and concerns regarding the availability of credit pose a risk that could impact customer demand for our products, as well as our ability to manage normal commercial relationships with our customers, suppliers, and creditors, including financial institutions. If the current global economic environment deteriorates, our business could be negatively affected.

Moreover, changes in the value of the relevant currencies may affect the cost of certain items required in our operations. Changes in currency exchange rates may also affect the relative prices at which we are able to sell products in the same market. Our revenue from international customers may be negatively impacted as increases in the U.S. dollar relative to our international customers' local currencies could make our products more expensive, impacting our ability to compete or as a result of financial or other instability in such locations which could result in decreased sales of our products. Our costs of materials from international suppliers may also increase as the value of the U.S. dollar decreases relative to their local currency. Foreign policies and actions regarding currency valuation could result in actions by the United States and other countries to offset the effects of such fluctuations. Such actions may materially and adversely impact our financial condition and results of operations.

Violations of complex foreign and U.S. laws and regulations could result in fines and penalties, criminal sanctions against us, our officers, or our employees, prohibitions on the conduct of our business and on our ability to offer our products and services in one or more countries, and could also materially affect our brand, our international growth efforts, our ability to attract and retain employees, our business, and our operating results. Even if we implement policies or procedures designed to ensure compliance with these laws and regulations, there can be no assurance that our distribution partners, our employees, contractors, or agents will not violate our policies and subject us to potential claims or penalties.

If we fail to maintain proper and effective internal controls, our ability to produce accurate financial statements on a timely basis could be impaired, which would adversely affect our business and our stock price.

Ensuring that we have adequate internal financial and accounting controls and procedures in place to produce accurate financial statements on a timely basis is a costly and time-consuming effort that needs to be evaluated frequently. We may in the future discover areas of our internal financial and accounting controls and procedures that need improvement. Operating as a public company requires sufficient resources within the accounting and finance functions in order to produce timely financial information, ensure the level of segregation of duties, and maintain adequate internal control over financial reporting customary for a U.S. public company.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with U.S. GAAP. Our management does not expect that our internal control over financial reporting will prevent or detect all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, within our company will have been detected. Pursuant to Section 404 of the Sarbanes-Oxley Act, we perform periodic evaluations of our internal control over financial reporting. While we have in the past performed this evaluation and concluded that our internal control over financial reporting was operating effectively, there can be no assurance that in the future material weaknesses or significant deficiencies will not exist or otherwise be discovered. In addition, if we are unable to produce accurate financial statements on a timely basis, investors could lose confidence in the reliability of our financial

statements, which could cause the market price of our common stock to decline and make it more difficult for us to finance our operations and growth.

Our business could be negatively impacted by changes in the United States political environment.

There is significant ongoing uncertainty with respect to potential legislation, regulation and government policy at the federal level, as well as the state and local levels. Any such changes could significantly impact our business as well as the markets in which we compete. Specific legislative and regulatory proposals discussed during election campaigns and more recently that might materially impact us include, but are not limited to, changes to spending priorities and potential reductions in research funding. Uncertainty about U.S. government funding has posed, and may continue to pose, a risk as customers may choose to postpone or reduce spending in response to actual or anticipated restraints on funding. To the extent changes in the political environment have a negative impact on us or on our markets, our business, results of operation and financial condition could be materially and adversely impacted in the future.

Disruption of critical information technology systems or material breaches in the security of our systems could harm our business, customer relations and financial condition.

Information technology ("IT") helps us to operate efficiently, interface with customers, maintain financial accuracy and efficiently and accurately produce our financial statements. IT systems are used extensively in virtually all aspects of our business, including sales forecast, order fulfillment and billing, customer service, logistics, and management of data from running samples on our products. Our success depends, in part, on the continued and uninterrupted performance of our IT systems. Our IT systems may be vulnerable to damage from a variety of sources, including telecommunications or network failures, power loss, natural disasters, human acts, computer viruses, ransomware, computer denial-of-service attacks, unauthorized access to customer or employee data or company trade secrets, and other attempts to harm our systems. Furthermore, there may be a heightened risk of potential cybersecurity incidents and security breaches to which we could be vulnerable by state-sponsored or affiliated actors or others in connection with the political uncertainty and military actions associated with the war in Ukraine. Certain of our systems are not redundant, and our disaster recovery planning is not sufficient for every eventuality. Despite any precautions we may take, such problems could result in, among other consequences, disruption of our operations, which could harm our reputation and financial results.

If we do not allocate and effectively manage the resources necessary to build and sustain the proper IT infrastructure, we could be subject to transaction errors, processing inefficiencies, loss of customers, business disruptions or loss of or damage to intellectual property. If our data management systems do not effectively collect, store, process and report relevant data for the operation of our business, whether due to equipment malfunction or constraints, software deficiencies or human error, our ability to effectively plan, forecast and execute our business plan and comply with applicable laws and regulations will be impaired, perhaps materially. Any such impairment could materially and adversely affect our reputation, financial condition, results of operations, cash flows and the timeliness with which we report our internal and external operating results.

Security breaches and other disruptions could compromise our information and expose us to liability, which would cause our business and reputation to suffer.

In the ordinary course of our business, we collect and store sensitive data, including intellectual property, our proprietary business information and that of our customers, suppliers and business partners, and personal information of our customers and employees, in our data centers and on our networks. The secure processing, maintenance and transmission of this information is critical to our operations. Despite our security measures, our IT infrastructure may be vulnerable to attacks by hackers, computer viruses, malicious codes, ransomware, unauthorized access attempts, and cyber- or phishing-attacks, or breached or otherwise disrupted due to employee error, malfeasance, faulty password management or other disruptions. Third parties may attempt to fraudulently induce employees or other persons into disclosing usernames, passwords or other sensitive information, which may in turn be used to access our IT systems, commit identity theft or carry out other unauthorized or illegal activities. Any such breach or incident could compromise our systems and networks and the information stored or otherwise processed there could be accessed, publicly disclosed, lost, stolen or otherwise processed in an unauthorized manner. We engage third-party vendors and service providers to store and otherwise process some of our data, including sensitive and personal information. Our vendors and service providers may also be the targets of the risks described above, including cyberattacks, malicious software, ransomware, phishing schemes, and fraud. Our ability to monitor our vendors and service providers' data security is limited, and, in any event, third parties may be able to circumvent those security measures, resulting in the unauthorized access to, misuse, disclosure, loss or destruction of our data, including sensitive and personal information, and disruption of our or third-party service providers' systems. We and our third-party service providers may face difficulties in identifying, or promptly responding to, potential security breaches and other instances of unauthorized access to, or disclosure, other processing, or loss or unavailability of, information. Any hacking or other attack on our or our third-party service providers' or vendors' systems, and any unauthorized access to, or disclosure, other processing, or loss or unavailability of, information suffered by us or our third-party service providers or vendors, or the perception that any of these have occurred, could result in legal claims or proceedings, loss of intellectual property, liability under laws that protect the privacy of personal information, negative publicity, disruption of our operations and damage to our reputation, and data integrity issues, which could divert our management's attention from the operation of our business and materially and adversely affect our business, revenues and competitive position. Moreover, we may need to increase our efforts to train our personnel to detect and defend against cyber- or phishing-attacks, which are becoming more sophisticated and frequent, and we may need to implement additional protective measures to reduce the risk of potential security breaches and security incidents, which could cause us to incur significant additional expenses. Retaliatory acts by Russia in response to Western sanctions or otherwise in connection with the war in Ukraine could include cyber attacks that could disrupt the economy generally or that may either directly or indirectly impact our operations specifically.

In addition, our insurance may be insufficient to cover our losses resulting from cyber-attacks, breaches, or other interruptions, and any incidents may result in loss of, or increased costs of, such insurance. The successful assertion of one or more large claims against us that exceed available insurance coverage, the occurrence of changes in our insurance policies, including premium increases or the imposition of large deductible or co-insurance requirements, or denials of coverage, could have a material adverse effect on our business, including our financial condition, results of operations and reputation.

We are currently subject to, and may in the future become subject to additional, U.S. federal and state laws and regulations imposing obligations on how we collect, store and process personal information. Our actual or perceived failure to comply with such obligations could harm our business. Ensuring compliance with such laws could also impair our efforts to maintain and expand our future customer base, and thereby decrease our revenue.

In the ordinary course of our business, we currently, and in the future will, collect, store, transfer, use or process sensitive data, including personal information of employees, and intellectual property and proprietary business information owned or controlled by ourselves and other parties. The secure processing, storage, maintenance, and transmission of this critical information are vital to our operations and business strategy. We are, and may increasingly become, subject to various laws and regulations, as well as contractual obligations, relating to data privacy and security in the jurisdictions in which we operate. The regulatory environment related to data privacy and security is increasingly rigorous, with new and constantly changing requirements applicable to our business, and enforcement practices are likely to remain uncertain for the foreseeable future. These laws and regulations may be interpreted and applied differently over time and from jurisdiction to jurisdiction, and it is possible that they will be interpreted and applied in ways that may have a material adverse effect on our business, financial condition, results of operations and prospects.

In the United States, various federal and state regulators, including governmental agencies like the Consumer Financial Protection Bureau and the Federal Trade Commission, have adopted, or are considering adopting, laws and regulations concerning personal information and data security. Certain state laws may be more stringent or broader in scope, or offer greater individual rights, with respect to personal information than federal, international or other state laws, and such laws may differ from each other, all of which may complicate compliance efforts. For example, the California Consumer Privacy Act ("CCPA"), which increases privacy rights for California residents and imposes obligations on companies that process their personal information, came into effect on January 1, 2020. Among other things, the CCPA requires covered companies to provide new disclosures to California consumers and provide such consumers new data protection and privacy rights, including the ability to opt-out of certain sales of personal information. The CCPA provides for civil penalties for violations, as well as a private right of action for certain data breaches that result in the loss of personal information. This private right of action may increase the likelihood of, and risks associated with, data breach litigation. In November 2020, California also passed the California Privacy Rights Act, or ("CPRA"), which significantly expanded the CCPA as of January 1, 2023, including by introducing additional obligations such as data minimization and storage limitations and granting additional rights to consumers, among others. The enactment of the CCPA has prompted similar legislative developments in other states, and numerous other states have proposed, and in certain cases enacted, legislation relating to privacy and data security, many of which are similar to the CCPA and CPRA. Similar laws are being considered by other state legislatures. In addition, laws in all 50 U.S. states require businesses to provide notice to consumers whose personal information has been disclosed as a result of a data breach. State laws are changing rapidly and there is discussion in the U.S. Congress of a new comprehensive federal data privacy law. These and future laws and regulations may increase our compliance costs and potential liability.

Furthermore, regulations promulgated pursuant to the Health Insurance Portability and Accountability Act of 1996 ("HIPAA"), establish privacy and security standards that limit the use and disclosure of individually identifiable health information (known as "protected health information") and require the implementation of administrative, physical and technological safeguards to protect the privacy of protected health information and ensure the confidentiality, integrity and availability of electronic protected health information. Determining whether protected health information has been handled in compliance with applicable privacy standards and our contractual obligations can require complex factual and statistical analyses and may be subject to changing interpretation. Although we take measures to protect sensitive data from unauthorized access, use or disclosure, our information technology and infrastructure may be vulnerable to attacks by hackers or viruses or disrupted, breached or otherwise compromised due to employee error, malfeasance or other malicious or inadvertent disruptions. Any such breach or disruption could compromise our networks and the information stored there could be accessed, manipulated, publicly disclosed, lost, stolen, made unavailable, or otherwise processed without authorization. Any such disruption, access, breach, unavailability, theft, loss or other unauthorized processing of information, or the perception that any of these has occurred could result in legal claims or proceedings, and liability under federal or state laws that protect the privacy of personal information, such as the HIPAA, the Health Information Technology for Economic and Clinical Health Act, and regulatory penalties. Notice of breaches must be made to affected individuals, the Secretary of the Department of Health and Human Services, and for extensive breaches, notice may need to be made to the media or State Attorneys General. Such a notice could harm our reputation and our ability to compete.

While we have in place formal policies and procedures related to the storage, collection, and processing of information, and have conducted data privacy audits, we continue to evaluate our compliance needs, including the need to conduct additional internal and external data privacy audits or adopt additional policies and procedures, to ensure our compliance with all applicable data protection laws and regulations. Additionally, we do not currently have policies and procedures in place for assessing our third-party vendors' compliance with applicable data protection laws and regulations. All of these evolving compliance and operational requirements impose significant costs, such as costs related to organizational changes, implementing additional protection technologies, training employees and engaging consultants, which are likely to increase over time. In addition, such requirements may require us to modify our data processing practices and policies, distract management or divert resources from other initiatives and projects, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects. Any failure or perceived failure by us or our third-party vendors, collaborators, contractors and consultants to comply with any applicable federal, state or similar foreign laws and regulations relating to data privacy and security, could result in damage to our reputation, as well as proceedings or litigation by governmental agencies or other third parties, including class action privacy litigation in certain jurisdictions, which would subject us to significant fines, sanctions, awards, penalties or judgments, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

Increased scrutiny of our environmental, social or governance responsibilities may result in additional costs and risks, and may adversely impact our reputation, employee retention, and willingness of customers and suppliers to do business with us.

Investor advocacy groups, institutional investors, investment funds, proxy advisory services, stockholders, and customers are increasingly focused on environmental, social, and governance (“ESG”) practices of companies. Additionally, public interest and legislative pressure related to public companies’ ESG practices continues to grow. If our ESG practices fail to meet regulatory requirements or investor or other industry stakeholders’ evolving expectations and standards for responsible corporate citizenship in areas including environmental stewardship, support for local communities, Board of Director and employee diversity, human capital management, employee health and safety practices, product quality, supply chain management, corporate governance and transparency, and employing ESG strategies in our operations, our brand, reputation and employee retention may be negatively impacted and customers and suppliers may be unwilling to do business with us. In addition, as we work to align our ESG practices with industry standards, we will likely continue to expand our disclosures in these areas and doing so may result in additional costs and require additional resources to monitor, report, and comply with our various ESG practices. If we fail to adopt ESG standards or practices as quickly as stakeholders desire, report on our ESG efforts or practices accurately, or satisfy the expectations of stakeholders, our reputation, business, financial performance, and growth may be adversely impacted.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

Other than as previously reported on our Current Reports on Form 8-K filed with the SEC on June 26, 2023 and June 30, 2023, there have been no unregistered sales of the Company’s equity securities during the three months ended June 30, 2023.

Item 3. Defaults Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

Securities Trading Plans of Directors and Executive Officers

During our last fiscal quarter, the following officers, as defined in Rule 16a-1(f), adopted a “Rule 10b5-1 trading arrangement” as defined in Regulation S-K Item 408, as follows:

On May 18, 2023, Christian Henry, our President and Chief Executive Officer, adopted a Rule 10b5-1 trading arrangement providing for the sale from time to time of an aggregate of up to 139,858 shares of our common stock. The trading arrangement is intended to satisfy the affirmative defense in Rule 10b5-1(c). The duration of the trading arrangement is until August 20, 2024, or earlier if all transactions under the trading arrangement are completed.

On May 19, 2023, Susan Kim, our Chief Financial Officer, adopted a Rule 10b5-1 trading arrangement providing for the sale from time to time of an aggregate of up to 90,155 shares of our common stock. The trading arrangement is intended to satisfy the affirmative defense in Rule 10b5-1(c). The duration of the trading arrangement is until September 30, 2024, or earlier if all transactions under the trading arrangement are completed.

No other officers or directors, as defined in Rule 16a-1(f), adopted and/or terminated a “Rule 10b5-1 trading arrangement” or a “non-Rule 10b5-1 trading arrangement,” as defined in Regulation S-K Item 408, during the last fiscal quarter.

Item 6. Exhibits

Exhibit No.	Description	Incorporated by reference herein		
		Form	Exhibit No.	Filing Date
3.1	Amended and Restated Certificate of Incorporation of Pacific Biosciences of California, Inc.	10-K	3.1	March 23, 2011
3.2	Third Amended and Restated Bylaws of Pacific Biosciences of California, Inc.	8-K	3.2	November 7, 2022
4.1	Indenture, dated February 16, 2021, between Pacific Biosciences of California, Inc., and U.S. Bank National Association, as Trustee			Filed herewith
4.2	Indenture, dated as of June 30, 2023, by and between Pacific Biosciences of California, Inc. and U.S. Bank Trust Company, National Association, as Trustee	8-K	4.1	June 30, 2023
4.3	Form of 1.375% Convertible Senior Note due 2030 (included in Exhibit 4.2)	8-K	4.2	June 30, 2023
10.1	Letter Agreement, dated June 23, 2023, between the Company and Chimera Investment LLC	8-K	10.1	June 26, 2023
31.1	Certification of Chief Executive Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002			Filed herewith
31.2	Certification of Chief Financial Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002			Filed herewith
32.1*	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002			Furnished herewith
32.2*	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002			Furnished herewith
101.INS	XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document)			Filed herewith
101.SCH	Inline XBRL Taxonomy Extension Schema Document			Filed herewith
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document			Filed herewith
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document			Filed herewith
101.LAB	Inline XBRL Taxonomy Extension Labels Linkbase Document			Filed herewith
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document			Filed herewith
104	Cover Page Interactive File (formatted as inline XBRL and contained in Exhibit 101)			Filed herewith

* The certifications attached as Exhibit 32.1 and 32.2 that accompany this Quarterly Report on Form 10-Q are deemed furnished and not filed with the Securities and Exchange Commission and are not to be incorporated by reference into any filing of Pacific Biosciences of California, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Quarterly Report on Form 10-Q, irrespective of any general incorporation language contained in such filing.

Signatures

Pursuant to the requirements of the Securities Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

Pacific Biosciences of California, Inc.

Date: August 4, 2023

By: _____
/s/ Christian O. Henry
Christian O. Henry
President and Chief Executive Officer
(Principal Executive Officer)

Date: August 4, 2023

By: _____
/s/ Susan G. Kim
Susan G. Kim
Chief Financial Officer
(Principal Financial Officer)

Date: August 4, 2023

By: _____
/s/ Michele Farmer
Michele Farmer
Vice President and Chief Accounting Officer
(Principal Accounting Officer)

PACIFIC BIOSCIENCES OF CALIFORNIA, INC.

AND

U.S. BANK NATIONAL ASSOCIATION,

as Trustee

INDENTURE

Dated as of February 16, 2021

1.50% Convertible Senior Notes due 2028

ARTICLE 1
DEFINITIONS

Section 1.01. <i>Definitions</i>	1
Section 1.02. <i>References to Interest</i>	13

ARTICLE 2
ISSUE, DESCRIPTION, EXECUTION, REGISTRATION AND EXCHANGE OF NOTES

Section 2.01. <i>Designation and Amount</i>	13
Section 2.02. <i>Form of Notes</i>	13
Section 2.03. <i>Date and Denomination of Notes; Payments of Interest and Defaulted Amounts</i>	14
Section 2.04. <i>Execution, Authentication and Delivery of Notes</i>	16
Section 2.05. <i>Exchange and Registration of Transfer of Notes; Restrictions on Transfer; Depository</i>	16
Section 2.06. <i>Mutilated, Destroyed, Lost or Stolen Notes</i>	22
Section 2.07. <i>Temporary Notes</i>	23
Section 2.08. <i>Cancellation of Notes Paid, Converted, Etc</i>	24
Section 2.09. <i>CUSIP Numbers</i>	24
Section 2.10. <i>Additional Notes; Repurchases</i>	24

ARTICLE 3
SATISFACTION AND DISCHARGE

Section 3.01. <i>Satisfaction and Discharge</i>	25
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ARTICLE 4
PARTICULAR COVENANTS OF THE COMPANY

Section 4.01. <i>Payment of Principal and Interest</i>	25
Section 4.02. <i>Maintenance of Office or Agency</i>	26
Section 4.03. <i>Appointments to Fill Vacancies in Trustee's Office</i>	26
Section 4.04. <i>Provisions as to Paying Agent</i>	26
Section 4.05. <i>Existence</i>	28
Section 4.06. <i>Rule 144A Information Requirement and Annual Reports</i>	28
Section 4.07. <i>Stay, Extension and Usury Laws</i>	28
Section 4.08. <i>Compliance Certificate; Statements as to Defaults</i>	29
Section 4.09. <i>Further Instruments and Acts</i>	29

i

ARTICLE 5
LISTS OF HOLDERS AND REPORTS BY THE COMPANY AND THE TRUSTEE

Section 5.01. <i>Lists of Holders</i>	29
Section 5.02. <i>Preservation and Disclosure of Lists</i>	29

ARTICLE 6
DEFAULTS AND REMEDIES

Section 6.01. <i>Events of Default</i>	30
Section 6.02. <i>Acceleration; Rescission and Annulment</i>	31
Section 6.03. <i>Additional Interest</i>	32

Section 6.04.	<i>Payments of Notes on Default; Suit Therefor</i>	32
Section 6.05.	<i>Application of Monies Collected by Trustee</i>	34
Section 6.06.	<i>Proceedings by Holders</i>	35
Section 6.07.	<i>Proceedings by Trustee</i>	36
Section 6.08.	<i>Remedies Cumulative and Continuing</i>	36
Section 6.09.	<i>Direction of Proceedings and Waiver of Defaults by Majority of Holders</i>	36
Section 6.10.	<i>Notice of Defaults</i>	37
Section 6.11.	<i>Undertaking to Pay Costs</i>	37

ARTICLE 7
CONCERNING THE TRUSTEE

Section 7.01.	<i>Duties and Responsibilities of Trustee</i>	38
Section 7.02.	<i>Reliance on Documents, Opinions, Etc</i>	39
Section 7.03.	<i>No Responsibility for Recitals, Etc</i>	41
Section 7.04.	<i>Trustee, Paying Agents, Conversion Agents, Bid Solicitation Agent or Note Registrar May Own Notes</i>	41
Section 7.05.	<i>Monies and Shares of Common Stock to Be Held in Trust</i>	41
Section 7.06.	<i>Compensation and Expenses of Trustee</i>	42
Section 7.07.	<i>Officer's Certificate as Evidence</i>	43
Section 7.08.	<i>Eligibility of Trustee</i>	43
Section 7.09.	<i>Resignation or Removal of Trustee</i>	43
Section 7.10.	<i>Acceptance by Successor Trustee</i>	44
Section 7.11.	<i>Succession by Merger, Etc</i>	45
Section 7.12.	<i>Trustee's Application for Instructions from the Company</i>	45

ARTICLE 8
CONCERNING THE HOLDERS

Section 8.01.	<i>Action by Holders</i>	45
Section 8.02.	<i>Proof of Execution by Holders</i>	46
Section 8.03.	<i>Who Are Deemed Absolute Owners</i>	46
Section 8.04.	<i>Company-Owned Notes Disregarded</i>	46
Section 8.05.	<i>Revocation of Consents; Future Holders Bound</i>	47

ARTICLE 9
HOLDERS' MEETINGS

Section 9.01.	<i>Purpose of Meetings</i>	47
Section 9.02.	<i>Call of Meetings by Trustee</i>	48
Section 9.03.	<i>Call of Meetings by Company or Holders</i>	48
Section 9.04.	<i>Qualifications for Voting</i>	48
Section 9.05.	<i>Regulations</i>	48
Section 9.06.	<i>Voting</i>	49
Section 9.07.	<i>No Delay of Rights by Meeting</i>	49

ARTICLE 10
SUPPLEMENTAL INDENTURES

Section 10.01.	<i>Supplemental Indentures Without Consent of Holders</i>	50
Section 10.02.	<i>Supplemental Indentures with Consent of Holders</i>	51
Section 10.03.	<i>Effect of Supplemental Indentures</i>	52
Section 10.04.	<i>Notation on Notes</i>	52
Section 10.05.	<i>Evidence of Compliance of Supplemental Indenture to Be Furnished Trustee</i> ...	52

ARTICLE 11
CONSOLIDATION, MERGER, SALE, CONVEYANCE AND LEASE

Section 11.01. <i>Company May Consolidate, Etc. on Certain Terms</i>	53
Section 11.02. <i>Successor Corporation to Be Substituted</i>	53

ARTICLE 12
IMMUNITY OF INCORPORATORS, STOCKHOLDERS, OFFICERS AND DIRECTORS

Section 12.01. <i>Indenture and Notes Solely Corporate Obligations</i>	54
--	----

ARTICLE 13
INTENTIONALLY OMITTED

ARTICLE 14
CONVERSION OF NOTES

Section 14.01. <i>Conversion Privilege</i>	54
Section 14.02. <i>Conversion Procedure; Settlement Upon Conversion</i>	55
Section 14.03. <i>Adjustment of Conversion Rate</i>	60
Section 14.04. <i>Adjustments of Prices</i>	69
Section 14.05. <i>Shares to Be Fully Paid</i>	69
Section 14.06. <i>Effect of Recapitalizations, Reclassifications and Changes of the Common Stock</i>	69
Section 14.07. <i>Certain Covenants</i>	71
Section 14.08. <i>Responsibility of Trustee</i>	72

Section 14.09. <i>Notice to Holders Prior to Certain Actions</i>	72
Section 14.10. <i>Stockholder Rights Plans</i>	73
Section 14.11. <i>Exchange In Lieu Of Conversion</i>	73

ARTICLE 15
REPURCHASE OF NOTES AT OPTION OF HOLDERS

Section 15.01. <i>Intentionally Omitted</i>	74
Section 15.02. <i>Repurchase at Option of Holders Upon a Fundamental Change</i>	74
Section 15.03. <i>Withdrawal of Fundamental Change Repurchase Notice</i>	77
Section 15.04. <i>Deposit of Fundamental Change Repurchase Price</i>	77
Section 15.05. <i>Covenant to Comply with Applicable Laws Upon Repurchase of Notes</i>	78

ARTICLE 16
OPTIONAL REDEMPTION

Section 16.01. <i>Optional Redemption</i>	78
Section 16.02. <i>Notice of Optional Redemption; Selection of Notes</i>	79
Section 16.03. <i>Payment of Notes Called for Redemption</i>	80
Section 16.04. <i>Restrictions on Redemption</i>	81

ARTICLE 17
MISCELLANEOUS PROVISIONS

Section 17.01. <i>Provisions Binding on Company's Successors</i>	81
Section 17.02. <i>Official Acts by Successor Corporation</i>	81
Section 17.03. <i>Addresses for Notices, Etc</i>	81
Section 17.04. <i>Governing Law; Jurisdiction</i>	82
Section 17.05. <i>Evidence of Compliance with Conditions Precedent; Certificates and Opinions of Counsel to Trustee</i>	82
Section 17.06. <i>Legal Holidays</i>	83
Section 17.07. <i>No Security Interest Created</i>	83
Section 17.08. <i>Benefits of Indenture</i>	83
Section 17.09. <i>Table of Contents, Headings, Etc</i>	83
Section 17.10. <i>Authenticating Agent</i>	84
Section 17.11. <i>Execution in Counterparts</i>	85
Section 17.12. <i>Severability</i>	85
Section 17.13. <i>Waiver of Jury Trial</i>	85
Section 17.14. <i>Force Majeure</i>	85
Section 17.15. <i>Calculations</i>	85
Section 17.16. <i>U.S.A. Patriot Act</i>	86

INDENTURE, dated as of February 16, 2021, between PACIFIC BIOSCIENCES OF CALIFORNIA, INC., a Delaware corporation, as issuer (the “**Company**”, as more fully set forth in Section 1.01) and U.S. BANK NATIONAL ASSOCIATION, a national banking association, as trustee (the “**Trustee**”, as more fully set forth in Section 1.01).

WITNESSETH:

WHEREAS, for its lawful corporate purposes, the Company has duly authorized the issuance of its 1.50% Convertible Senior Notes due 2028 (the “**Notes**”), initially in an aggregate principal amount not to exceed \$900,000,000, and in order to provide the terms and conditions

principal amount not to exceed \$2,000,000, and in order to provide the terms and conditions upon which the Notes are to be authenticated, issued and delivered, the Company has duly authorized the execution and delivery of this Indenture; and

WHEREAS, the Form of Note, the certificate of authentication to be borne by each Note, the Form of Notice of Conversion, the Form of Fundamental Change Repurchase Notice and the Form of Assignment and Transfer to be borne by the Notes are to be substantially in the forms hereinafter provided; and

WHEREAS, all acts and things necessary to make the Notes, when executed by the Company and authenticated and delivered by the Trustee or a duly authorized authenticating agent, as in this Indenture provided, the valid, binding and legal obligations of the Company, and this Indenture a valid agreement according to its terms, have been done and performed, and the execution of this Indenture and the issuance hereunder of the Notes have in all respects been duly authorized.

NOW, THEREFORE, THIS INDENTURE WITNESSETH:

That in order to declare the terms and conditions upon which the Notes are, and are to be, authenticated, issued and delivered, and in consideration of the premises and of the purchase and acceptance of the Notes by the Holders thereof, the Company covenants and agrees with the Trustee for the equal and proportionate benefit of the respective Holders from time to time of the Notes (except as otherwise provided below), as follows:

ARTICLE 1 DEFINITIONS

Section 1.01. *Definitions.* The terms defined in this Section 1.01 (except as herein otherwise expressly provided or unless the context otherwise requires) for all purposes of this Indenture and of any indenture supplemental hereto shall have the respective meanings specified in this Section 1.01. The words “herein,” “hereof,” “hereunder,” and words of similar import refer to this Indenture as a whole and not to any particular Article, Section or other subdivision. The terms defined in this Article include the plural as well as the singular.

“**Additional Interest**” means all amounts, if any, payable pursuant to Section 6.03.

“**Affiliate**” of any specified Person means any other Person directly or indirectly controlling or controlled by or under direct or indirect common control with such specified Person. For the purposes of this definition, “control,” when used with respect to any specified Person means the power to direct or cause the direction of the management and policies of such Person, directly or indirectly, whether through the ownership of voting securities, by contract or otherwise; and the terms “controlling” and “controlled” have meanings correlative to the foregoing. Notwithstanding anything to the contrary herein, the determination of whether one Person is an “Affiliate” of another Person for purposes of this Indenture shall be made based on the facts at the time such determination is made or required to be made, as the case may be, hereunder.

“**Board of Directors**” means the board of directors of the Company or a committee of such board duly authorized to act for it hereunder.

“**Board Resolution**” means a copy of a resolution certified by the Secretary or an Assistant Secretary of the Company to have been duly adopted by the Board of Directors, and to be in full force and effect on the date of such certification, and delivered to the Trustee.

“**Business Day**” means, with respect to any Note, any day other than a Saturday, a Sunday or a day on which the Federal Reserve Bank of New York is authorized or required by

law or executive order to close or be closed.

“**Capital Stock**” means, for any entity, any and all shares, interests, rights to purchase, warrants, options, participations or other equivalents of or interests in (however designated) stock issued by that entity, but shall not include any debt securities convertible into or exchangeable for any securities otherwise constituting Capital Stock pursuant to this definition.

“**Cash Settlement**” shall have the meaning specified in Section 14.02(a).

“**Clause A Distribution**” shall have the meaning specified in Section 14.03(c).

“**Clause B Distribution**” shall have the meaning specified in Section 14.03(c).

“**Clause C Distribution**” shall have the meaning specified in Section 14.03(c).

“**close of business**” means 5:00 p.m. (New York City time).

“**Combination Settlement**” shall have the meaning specified in Section 14.02(a).

“**Commission**” means the U.S. Securities and Exchange Commission.

“**Common Equity**” of any Person means Capital Stock of such Person that is generally entitled (a) to vote in the election of directors of such Person or (b) if such Person is not a corporation, to vote or otherwise participate in the selection of the governing body, partners, managers or others that will control the management or policies of such Person.

“**Common Stock**” means the common stock of the Company, par value \$0.001 per share, at the date of this Indenture, subject to Section 14.06.

“**Company**” shall have the meaning specified in the first paragraph of this Indenture, and subject to the provisions of Article 11, shall include its successors and assigns.

“**Company Order**” means a written order of the Company, signed by any of its Officers, and delivered to the Trustee.

“**Conversion Agent**” shall have the meaning specified in Section 4.02.

“**Conversion Consideration**” shall have the meaning specified in Section 14.11(a).

“**Conversion Date**” shall have the meaning specified in Section 14.02(c).

“**Conversion Obligation**” shall have the meaning specified in Section 14.01.

“**Conversion Price**” means as of any time, \$1,000, *divided by* the Conversion Rate as of such time.

“**Conversion Rate**” shall have the meaning specified in Section 14.01.

“**Corporate Trust Office**” means the designated office of the Trustee at which at any time this Indenture shall be administered, which office at the date hereof is located at 1 California Street, Suite 1000, San Francisco, CA 94111, Attention: D. Jason (Pacific Biosciences of California, Inc. 1.50% Convertible Senior Notes due 2028), or such other address as the Trustee may designate from time to time by notice to the Holders and the Company, or the designated corporate trust office of any successor trustee (or such other address as such successor trustee may designate from time to time by notice to the Holders and the Company).

“**Custodian**” means the Trustee, as custodian for The Depository Trust Company, with respect to the Global Notes, or any successor entity thereto.

“**Daily Conversion Value**” means, for each of the 30 consecutive Trading Days during the relevant Observation Period, 1/30th of the product of (a) the Conversion Rate on such Trading Day and (b) the Daily VWAP on such Trading Day.

“**Daily Measurement Value**” means the Specified Dollar Amount (if any), *divided by* 30.

“**Daily Settlement Amount**,” for each of the 30 consecutive Trading Days during the relevant Observation Period, shall consist of:

(a) cash in an amount equal to the lesser of (i) the Daily Measurement Value and (ii) the Daily Conversion Value on such Trading Day; and

(b) if the Daily Conversion Value on such Trading Day exceeds the Daily Measurement Value, a number of shares of Common Stock equal to (i) the difference between the Daily Conversion Value and the Daily Measurement Value, *divided by* (ii) the Daily VWAP for such Trading Day.

“**Daily VWAP**” means the per share volume-weighted average price as displayed under the heading “Bloomberg VWAP” on Bloomberg page “PACB <equity> AQR” (or its equivalent successor if such page is not available) in respect of the period from the scheduled open of

trading until the scheduled close of trading of the primary trading session on such Trading Day (or if such volume-weighted average price is unavailable, the market value of one share of the Common Stock on such Trading Day reasonably determined, using a volume-weighted average method, by a nationally recognized independent investment banking firm retained for this purpose by the Company). The “**Daily VWAP**” shall be determined without regard to after-hours trading or any other trading outside of the regular trading session trading hours.

“**Default**” means any event that is, or after notice or passage of time, or both, would be, an Event of Default.

“**Defaulted Amounts**” means any amounts on any Note (including, without limitation, the Redemption Price, the Fundamental Change Repurchase Price, principal and interest) that are payable but are not punctually paid or duly provided for.

“**delivered**” with respect to any notice to be delivered, given or mailed to a Holder pursuant to this Indenture, shall mean notice (x) given to the Depository (or its designee) pursuant to the standing instructions from the Depository or its designee, including by electronic mail in accordance with accepted practices or procedures at the Depository (in the case of a Global Note) or (y) mailed to such Holder by first class mail, postage prepaid, at its address as it appears on the Note Register, in each case in accordance with Section 17.03. Notice so “delivered” shall be deemed to include any notice to be “mailed” or “given,” as applicable, under this Indenture.

“**Depository**” means, with respect to each Global Note, the Person specified in Section 2.05(c) as the Depository with respect to such Notes, until a successor shall have been appointed and become such pursuant to the applicable provisions of this Indenture, and thereafter, “**Depository**” shall mean or include such successor.

“**Designated Institution**” shall have the meaning specified in Section 14.11(a).

“**Distributed Property**” shall have the meaning specified in Section 14.03(c).

“**Effective Date**” means the first date on which shares of the Common Stock trade on the applicable exchange or in the applicable market, regular way, reflecting the relevant share split or share combination, as applicable (*provided* that, for the avoidance of doubt, any alternative trading convention on the applicable exchange or market in respect of shares of the Common Stock under a separate ticker symbol or CUSIP number will not be considered “regular way” for purposes of this definition).

“**Event of Default**” shall have the meaning specified in Section 6.01.

“**Ex-Dividend Date**” means the first date on which shares of the Common Stock trade on the applicable exchange or in the applicable market, regular way, without the right to receive the issuance, dividend or distribution in question, from the Company or, if applicable, from the seller

of Common Stock on such exchange or market (in the form of due bills or otherwise) as determined by such exchange or market. For the avoidance of doubt, any alternative trading convention on the applicable exchange or market in respect of shares of Common Stock under a separate ticker symbol or CUSIP number will not be considered “regular way” for this purpose.

“**Exchange Act**” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

“**Exchange Election**” shall have the meaning specified in Section 14.11(a).

“**Form of Assignment and Transfer**” shall mean the “Form of Assignment and Transfer” attached as Attachment 3 to the Form of Note attached hereto as Exhibit A.

“Form of Fundamental Change Repurchase Notice” shall mean the “Form of Fundamental Change Repurchase Notice” attached as Attachment 2 to the Form of Note attached hereto as Exhibit A.

“Form of Note” shall mean the “Form of Note” attached hereto as Exhibit A.

“Form of Notice of Conversion” shall mean the “Form of Notice of Conversion” attached as Attachment 1 to the Form of Note attached hereto as Exhibit A.

“Fundamental Change” shall be deemed to have occurred at the time after the Notes are originally issued if any of the following occurs prior to the Maturity Date:

(a) a “person” or “group” within the meaning of Section 13(d) of the Exchange Act, other than the Company, its Wholly-Owned Subsidiaries and the employee benefit plans of the Company and its Wholly-Owned Subsidiaries, files a Schedule TO (or any successor schedule, form or report) or any schedule, form or report under the Exchange Act disclosing that such person or group has become the direct or indirect “beneficial owner,” as defined in Rule 13d-3 under the Exchange Act, of Common Stock representing more than 50% of the voting power of the Common Stock; *provided* that no person or group shall be deemed to be the beneficial owner of any securities tendered pursuant to a tender or exchange offer made by or on behalf of such “person” or “group” until such tendered securities are accepted for purchase or exchange under such offer;

(b) the consummation of (A) any recapitalization, reclassification or change of the Common Stock (other than changes resulting from a subdivision, a combination or a change in par value) as a result of which the Common Stock would be converted into, or exchanged for, stock, other securities, other property or assets; (B) any share exchange, consolidation or merger of the Company pursuant to which all of the Common Stock will be converted into cash, securities or other property or assets; or (C) any sale, lease or other transfer in one transaction or a series of transactions of all or substantially all of the consolidated assets of the Company and its Subsidiaries, taken as a whole, to any Person other than one or more of the Company’s Wholly-Owned Subsidiaries; *provided*, however, that a transaction described in clause (A) or (B) in which the holders of all

5

classes of the Company’s Common Equity immediately prior to such transaction own, directly or indirectly, more than 50% of all classes of Common Equity of the continuing or surviving corporation or transferee or the parent thereof immediately after such transaction in substantially the same proportions (relative to each other) as such ownership immediately prior to such transaction shall not be a Fundamental Change pursuant to this clause (b);

(c) the stockholders of the Company approve any plan or proposal for the liquidation or dissolution of the Company; or

(d) the Common Stock (or other Common Equity underlying the Notes) ceases to be listed or quoted on any of The New York Stock Exchange, The Nasdaq Global Select Market or The Nasdaq Global Market (or any of their respective successors);

provided, however, that a transaction or transactions described in clauses (a) or (b) above shall not constitute a Fundamental Change if at least 90% of the consideration received or to be received by the common stockholders of the Company, excluding cash payments for fractional shares and cash payments made in respect of dissenters’ appraisal rights, in connection with such transaction or transactions consists of shares of common stock or other Common Equity that are

listed or quoted on any of The New York Stock Exchange, The Nasdaq Global Select Market or The Nasdaq Global Market (or any of their respective successors) or will be so listed or quoted when issued or exchanged in connection with such transaction or transactions and as a result of such transaction or transactions such consideration becomes Reference Property for the Notes, excluding cash payments for fractional shares and cash payments made in respect of dissenters' appraisal rights (subject to the provisions of Section 14.06). If any Merger Event in which the Common Stock is replaced by the common stock of another entity occurs, following the effective date of such Merger Event, references to the Company in this definition shall instead be references to such other entity.

For purposes of this definition of "Fundamental Change," any transaction or series of transactions that constitutes a Fundamental Change pursuant to both clause (a) and clause (b) of this definition (without giving effect to the proviso in clause (b)) shall be deemed a Fundamental Change solely under clause (b) of this definition (subject to the proviso in clause (b)).

"Fundamental Change Company Notice" shall have the meaning specified in Section 15.02(c).

"Fundamental Change Repurchase Date" shall have the meaning specified in Section 15.02(a).

"Fundamental Change Repurchase Notice" shall have the meaning specified in Section 15.02(b)(i).

"Fundamental Change Repurchase Price" shall have the meaning specified in Section 15.02(a).

“**Global Note**” shall have the meaning specified in Section 2.05(b).

“**Holder,**” as applied to any Note, or other similar terms (but excluding the term “beneficial holder”), shall mean any Person in whose name at the time a particular Note is registered on the Note Register.

“**Indenture**” means this instrument as originally executed or, if amended or supplemented as herein provided, as so amended or supplemented.

“**Interest Payment Date**” means each February 15 and August 15 of each year, beginning on August 15, 2021.

“**Investment Agreement**” means the Investment Agreement, dated as of February 9, 2021, by and between the Company and SB Northstar LP.

“**Last Date of Original Issuance**” means (a) with respect to any Notes issued pursuant to the Investment Agreement and any Notes issued in exchange therefor or in substitution thereof, the initial issuance date of the Notes; and (b) with respect to any additional Notes issued as described under Section 2.10 and any Notes issued in exchange therefor or in substitution thereof, either (i) the date such Notes are originally issued; or (ii) such other date as is specified in an Officer’s Certificate delivered to the Trustee before the original issuance of such Notes.

“**Last Reported Sale Price**” of the Common Stock (or other security for which a closing sale price must be determined) on any date means the closing sale price per share (or if no closing sale price is reported, the average of the bid and ask prices or, if more than one in either case, the average of the average bid and the average ask prices) on that date as reported in composite transactions for the principal U.S. national or regional securities exchange on which the Common Stock (or such other security) is traded. If the Common Stock (or such other security) is not listed for trading on a U.S. national or regional securities exchange on the relevant date, the “**Last Reported Sale Price**” shall be the last quoted bid price for the Common Stock (or such other security) in the over-the-counter market on the relevant date as reported by OTC Markets Group Inc. or a similar organization. If the Common Stock (or such other security) is not so quoted, the “**Last Reported Sale Price**” shall be the average of the mid-point of the last bid and ask prices for the Common Stock (or such other security) on the relevant date from each of at least three nationally recognized independent investment banking firms selected by the Company for this purpose. The “**Last Reported Sale Price**” shall be determined without regard to after-hours trading or any other trading outside of regular trading session hours.

“**Market Disruption Event**” means, for the purposes of determining amounts due upon conversion (a) a failure by the primary U.S. national or regional securities exchange or market on which the Common Stock is listed or admitted for trading to open for trading during its regular trading session or (b) the occurrence or existence prior to 1:00 p.m., New York City time, on any Scheduled Trading Day for the Common Stock for more than one half-hour period in the aggregate during regular trading hours of any suspension or limitation imposed on trading (by reason of movements in price exceeding limits permitted by the relevant stock exchange or otherwise) in the Common Stock or in any options contracts or futures contracts relating to the Common Stock.

“**Maturity Date**” means February 15, 2028.

“**Merger Event**” shall have the meaning specified in Section 14.06(a).

“**Note**” or “**Notes**” shall have the meaning specified in the first paragraph of the recitals of this Indenture.

“**Note Register**” shall have the meaning specified in Section 2.05(a).

“**Note Registrar**” shall have the meaning specified in Section 2.05(a).

“**Notice of Conversion**” shall have the meaning specified in Section 14.02(b).

“**Observation Period**” with respect to any Note surrendered for conversion means: (i) subject to clause (ii), if the relevant Conversion Date occurs prior to November 15, 2027, the 30 consecutive Trading Day period beginning on, and including, the second Trading Day immediately succeeding such Conversion Date; (ii) if the relevant Conversion Date occurs on or after the date of the Company’s issuance of a Redemption Notice with respect to the Notes pursuant to Section 16.02 and prior to the relevant Redemption Date (as such Redemption Date may be extended), the 30 consecutive Trading Days beginning on, and including, the 31st Scheduled Trading Day immediately preceding such Redemption Date; and (iii) subject to clause (ii), if the relevant Conversion Date occurs on or after November 15, 2027, the 30 consecutive Trading Days beginning on, and including, the 31st Scheduled Trading Day immediately preceding the Maturity Date.

“**Officer**” means, with respect to the Company, the Chief Executive Officer, the Chief Financial Officer, the Chief Accounting Officer, General Counsel, the Treasurer, the Secretary, or any President or Vice President (whether or not designated by a number or numbers or word or words added before or after the title “President” or “Vice President”).

“**Officer’s Certificate**,” when used with respect to the Company, means a certificate that is delivered to the Trustee and that is signed by an Officer of the Company. Each such certificate shall include the statements provided for in Section 17.05 if and to the extent required by the provisions of such Section. The Officer giving an Officer’s Certificate pursuant to Section 4.08 shall be the principal executive, financial or accounting officer of the Company.

“**open of business**” means 9:00 a.m. (New York City time).

“**Opinion of Counsel**” means an opinion in writing signed by legal counsel, who may be an employee of or counsel to the Company, or other counsel who is reasonably acceptable to the Trustee, that is delivered to the Trustee, which opinion may contain customary exceptions and qualifications as to the matters set forth therein. Each such opinion shall include the statements provided for in Section 17.05 if and to the extent required by the provisions of such Section 17.05.

“**Optional Redemption**” shall have the meaning specified in Section 16.01.

“**outstanding**,” when used with reference to Notes, shall, subject to the provisions of Section 8.04, mean, as of any particular time, all Notes authenticated and delivered by the Trustee under this Indenture, except:

(a) Notes theretofore canceled by the Trustee or accepted by the Trustee for cancellation;

(b) Notes, or portions thereof, that have become due and payable and in respect of which monies in the necessary amount shall have been deposited in trust with the Trustee or with any Paying Agent (other than the Company) or shall have been set aside and segregated in trust by the Company (if the Company shall act as its own Paying Agent).

(c) Notes that have been paid pursuant to Section 2.06 or Notes in lieu of which, or in substitution for which, other Notes shall have been authenticated and delivered pursuant to the terms of Section 2.06 unless proof satisfactory to the Trustee is presented that any such Notes are held by protected purchasers in due course;

(d) Notes converted pursuant to Article 14 and required to be cancelled pursuant to Section 2.08; and

(e) Notes redeemed pursuant to Article 16.

“**Paying Agent**” shall have the meaning specified in Section 4.02.

“**Person**” means an individual, a corporation, a limited liability company, an association, a partnership, a joint venture, a joint stock company, a trust, an unincorporated organization or a government or an agency or a political subdivision thereof.

“**Physical Notes**” means permanent certificated Notes in registered form issued in denominations of \$1,000 principal amount and integral multiples thereof.

“**Physical Settlement**” shall have the meaning specified in Section 14.02(a).

“**Predecessor Note**” of any particular Note means every previous Note evidencing all or a portion of the same debt as that evidenced by such particular Note; and, for the purposes of this definition, any Note authenticated and delivered under Section 2.06 in lieu of or in exchange for a mutilated, lost, destroyed or stolen Note shall be deemed to evidence the same debt as the mutilated, lost, destroyed or stolen Note that it replaces.

“**Record Date**” means, with respect to any dividend, distribution or other transaction or event in which the holders of Common Stock (or other applicable security) have the right to receive any cash, securities or other property or in which the Common Stock (or such other security) is exchanged for or converted into any combination of cash, securities or other property, the date fixed for determination of holders of the Common Stock (or such other security) entitled to receive such cash, securities or other property (whether such date is fixed by the Board of Directors, by statute, by contract or otherwise).

“**Redemption Date**” shall have the meaning specified in Section 16.02(a).

“**Redemption Notice**” shall have the meaning specified in Section 16.02(a).

“**Redemption Notice Date**” means the date on which a Redemption Notice is delivered pursuant to Section 16.02.

“**Redemption Period**” means the period from, and including, the relevant Redemption Notice Date until the close of business on the second Scheduled Trading Day immediately preceding the related Redemption Date (or, if the Company defaults in the payment of the Redemption Price, until the close of business on the Trading Day immediately preceding the date on which the Redemption Price has been paid or duly provided for).

“**Redemption Price**” means, for any Notes to be redeemed pursuant to Section 16.01, 100% of the principal amount of such Notes, *plus* accrued and unpaid interest, if any, to, but excluding, the Redemption Date (unless the Redemption Date falls after a Regular Record Date but on or prior to the immediately succeeding Interest Payment Date, in which case interest accrued to the Interest Payment Date will be paid by the Company to Holders of record of such Notes as of the close of Business on such Regular Record Date, and the Redemption Price will be equal to 100% of the principal amount of such Notes).

“Reference Property” shall have the meaning specified in Section 14.06(a).

“Regular Record Date,” with respect to any Interest Payment Date, shall mean the February 1 or August 1 (whether or not such day is a Business Day) immediately preceding the applicable February 15 and August 15 Interest Payment Date, respectively.

“Resale Restriction Termination Date” shall have the meaning specified in Section 2.05(c).

“Responsible Officer” means, when used with respect to the Trustee, any officer within the corporate trust department of the Trustee, including any vice president, assistant vice president, assistant secretary, assistant treasurer, trust officer or any other officer of the Trustee who customarily performs functions similar to those performed by the Persons who at the time shall be such officers, respectively, or to whom any corporate trust matter relating to this Indenture is referred because of such person’s knowledge of and familiarity with the particular subject and who, in each case, shall have direct responsibility for the administration of this Indenture.

“Restricted Global Note” means a Global Note that is required to bear the legend set forth in Section 2.05(d).

“Restricted Securities” shall have the meaning specified in Section 2.05(c).

“Rule 144” means Rule 144 as promulgated under the Securities Act.

“Rule 144A” means Rule 144A as promulgated under the Securities Act.

“**Scheduled Trading Day**” means a day that is scheduled to be a Trading Day on the principal U.S. national or regional securities exchange or market on which the Common Stock is listed or admitted for trading. If the Common Stock is not so listed or admitted for trading, “**Scheduled Trading Day**” means a Business Day.

“**Securities Act**” means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

“**Settlement Amount**” has the meaning specified in Section 14.02(a)(iv).

“**Settlement Method**” means, with respect to any conversion of Notes, Physical Settlement, Cash Settlement or Combination Settlement, as elected (or deemed to have been elected) by the Company.

“**Settlement Method Election Deadline**” has the meaning specified in Section 14.02(a)(iii).

“**Settlement Notice**” has the meaning specified in Section 14.02(a)(iii).

“**Significant Subsidiary**” means a Subsidiary of the Company that is a “significant subsidiary” as defined in Article 1, Rule 1-02(w) of Regulation S-X under the Exchange Act promulgated by the Commission; *provided* that, in the case of a Subsidiary of the Company that meets the criteria of clause (3) of the definition thereof but not clause (1) or (2) thereof, in each case as such rule is in effect on the initial issuance date of the Notes, such Subsidiary shall not be deemed to be a Significant Subsidiary unless such Subsidiary’s income from continuing operations before income taxes, exclusive of amounts attributable to any non-controlling interests for the last completed fiscal year prior to the date of such determination exceeds \$15,000,000 (with such amount calculated pursuant to Rule 1-02(w) as in effect on the initial issuance date of the Notes). For the avoidance of doubt, for purposes of this definition, to the extent any such Subsidiary would not be deemed to be a “significant subsidiary” under the relevant definition set forth in Rule 1-02(w) of Regulation S-X (or any successor rule) as in effect on the relevant date of determination, such Subsidiary shall not be deemed to be a “Significant Subsidiary” hereunder irrespective of whether such Subsidiary would otherwise be deemed to be a “Significant Subsidiary” after giving effect to the proviso in the immediately preceding sentence.

“**Specified Dollar Amount**” means the maximum cash amount per \$1,000 principal amount of Notes to be received upon conversion as specified in the Settlement Notice related to any converted Notes (or deemed specified pursuant to Section 14.02(a)).

“**Spin-Off**” shall have the meaning specified in Section 14.03(c).

“**Sponsor Global Notes**” means the Global Notes issued and authenticated on the Last Date of Original Issuance with an initial balance of \$900,000,000 and identified by the CUSIP and ISIN numbers set forth in Section 2.09.

“**Sponsor Notes**” means any Sponsor Global Notes or any temporary Notes or Physical Notes issued in exchange for beneficial interests in a Sponsor Global Note.

“**Subsidiary**” means, with respect to any Person, any corporation, association, partnership or other business entity of which more than 50% of the total voting power of shares of Capital Stock or other interests (including partnership interests) entitled (without regard to the occurrence of any contingency) to vote in the election of directors, managers, general partners or trustees thereof is at the time owned or controlled, directly or indirectly, by (i) such Person; (ii) such Person and one or more Subsidiaries of such Person; or (iii) one or more Subsidiaries of such Person.

“**Successor Company**” shall have the meaning specified in Section 11.01(a).

“**Trading Day**” means, except for purposes determining amounts due upon conversion as set forth below, a day on which (i) trading in the Common Stock (or other security for which a closing sale price must be determined) generally occurs on The Nasdaq Global Select Market or, if the Common Stock (or such other security) is not then listed on The Nasdaq Global Select Market, on the principal other U.S. national or regional securities exchange on which the Common Stock (or such other security) is then listed or, if the Common Stock (or such other security) is not then listed on a U.S. national or regional securities exchange, on the principal other market on which the Common Stock (or such other security) is then traded and (ii) a Last Reported Sale Price for the Common Stock (or closing sale price for such other security) is available on such securities exchange or market; *provided* that if the Common Stock (or such other security) is not so listed or traded, “**Trading Day**” means a Business Day; and *provided, further*, that for purposes of determining amounts due upon conversion only, “**Trading Day**” means a day on which (x) there is no Market Disruption Event and (y) trading in the Common Stock generally occurs on The Nasdaq Global Select Market or, if the Common Stock is not then listed on The Nasdaq Global Select Market, on the principal other U.S. national or regional securities exchange on which the Common Stock is then listed or, if the Common Stock is not then listed on a U.S. national or regional securities exchange, on the principal other market on which the Common Stock is then listed or admitted for trading, except that if the Common Stock is not so listed or admitted for trading, “**Trading Day**” means a Business Day.

“**transfer**” shall have the meaning specified in Section 2.05(c).

“**Trigger Event**” shall have the meaning specified in Section 14.03(c).

“**Trust Indenture Act**” means the Trust Indenture Act of 1939, as amended.

“**Trustee**” means the Person named as the “**Trustee**” in the first paragraph of this Indenture until a successor trustee shall have become such pursuant to the applicable provisions of this Indenture, and thereafter “**Trustee**” shall mean or include each Person who is then a Trustee hereunder.

“**unit of Reference Property**” shall have the meaning specified in Section 14.06(a).

“**Unrestricted Global Note**” means a Global Note that is not required to bear the legend set forth in Section 2.05(d).

“**Valuation Period**” shall have the meaning specified in Section 14.03(c).

“**Wholly-Owned Subsidiary**” means, with respect to any Person, any direct or indirect Subsidiary of such Person, except that, solely for purposes of this definition, the reference to “more than 50%” in the definition of “Subsidiary” shall be deemed replaced by a reference to “100%,” the calculation of which shall exclude nominal amounts of the voting power of shares of Capital Stock or other interests in the relevant Subsidiary not held by such Person to the extent required to satisfy local minority interest requirements outside of the United States.

Section 1.02. *References to Interest.* Unless the context otherwise requires, any reference to interest on, or in respect of, any Note in this Indenture shall be deemed to include Additional Interest if, in such context, Additional Interest is, was or would be payable pursuant to Section 6.03. Unless the context otherwise requires, any express mention of Additional Interest in any provision hereof shall not be construed as excluding Additional Interest in those provisions hereof where such express mention is not made.

ARTICLE 2

ISSUE, DESCRIPTION, EXECUTION, REGISTRATION AND EXCHANGE OF NOTES

Section 2.01. *Designation and Amount.* The Notes shall be designated as the “1.50% Convertible Senior Notes due 2028.” The aggregate principal amount of Notes that may be authenticated and delivered under this Indenture is initially limited to \$900,000,000, except for Notes authenticated and delivered upon registration or transfer of, or in exchange for, or in lieu of other Notes to the extent expressly permitted hereunder.

Section 2.02. *Form of Notes.* The Notes and the Trustee’s certificate of authentication to be borne by such Notes shall be substantially in the respective forms set forth in Exhibit A, the terms and provisions of which shall constitute, and are hereby expressly incorporated in and made a part of this Indenture. To the extent applicable, the Company and the Trustee, by their execution and delivery of this Indenture, expressly agree to such terms and provisions and to be bound thereby. In the case of any conflict between this Indenture and a Note, the provisions of this Indenture shall control and govern to the extent of such conflict.

Any Global Note may be endorsed with or have incorporated in the text thereof such legends or recitals or changes not inconsistent with the provisions of this Indenture as may be required by the Custodian or the Depositary, or as may be required to comply with any applicable law or any regulation thereunder or with the rules and regulations of any securities exchange or automated quotation system upon which the Notes may be listed or traded or designated for issuance or to conform with any usage with respect thereto, or to indicate any special limitations or restrictions to which any particular Notes are subject.

Any of the Notes may have such letters, numbers or other marks of identification and such notations, legends or endorsements as the Officer executing the same may approve

(execution thereof to be conclusive evidence of such approval) and as are not inconsistent with the provisions of this Indenture, or as may be required to comply with any law or with any rule or regulation made pursuant thereto or with any rule or regulation of any securities exchange or automated quotation system on which the Notes may be listed or designated for issuance, or to conform to usage or to indicate any special limitations or restrictions to which any particular Notes are subject.

Each Global Note shall represent such principal amount of the outstanding Notes as shall be specified therein and shall provide that it shall represent the aggregate principal amount of outstanding Notes from time to time endorsed thereon and that the aggregate principal amount of outstanding Notes represented thereby may from time to time be increased or reduced to reflect redemptions, repurchases, cancellations, conversions, transfers or exchanges permitted hereby. Any endorsement of a Global Note to reflect the amount of any increase or decrease in the amount of outstanding Notes represented thereby shall be made by the Trustee or the Custodian, at the direction of the Trustee, in such manner and upon instructions given by the Holder of such Notes in accordance with this Indenture. Payment of principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, and accrued and unpaid interest on, a Global Note shall be made to the Holder of such Note on the date of payment, unless a record date or other means of determining Holders eligible to receive payment is provided for herein.

Section 2.03. *Date and Denomination of Notes; Payments of Interest and Defaulted Amounts.* (a) The Notes shall be issuable in registered form without coupons in minimum denominations of \$1,000 principal amount and integral multiples thereof. Each Note shall be dated the date of its authentication and shall bear interest from the date specified on the face of such Note. Accrued interest on the Notes shall be computed on the basis of a 360-day year composed of twelve 30-day months and, for partial months, on the basis of the number of days actually elapsed in a 30-day month.

(b) The Person in whose name any Note (or its Predecessor Note) is registered on the Note Register at the close of business on any Regular Record Date with respect to any Interest Payment Date shall be entitled to receive the interest payable on such Interest Payment Date. The Company shall pay (or cause the Paying Agent to pay) the principal amount of any Note (x) in the case of any Physical Note, at the office or agency of the Company designated by the Company for such purposes in the United States of America, which shall initially be the Corporate Trust Office and (y) in the case of any Global Note, by wire transfer of immediately available funds to the account of the Depository or its nominee. The Company shall pay (or cause the Paying Agent to pay) interest (i) on any Physical Notes (A) to Holders holding Physical Notes having an aggregate principal amount of \$5,000,000 or less, by check mailed to the Holders of these Notes at their address as it appears in the Note Register and (B) to Holders holding Physical Notes having an aggregate principal amount of more than \$5,000,000, either by check mailed to each such Holder or, upon application by such a Holder to the Note Registrar (containing the requisite information for the Trustee or Paying Agent to make such wire transfer) not later than the relevant Regular Record Date, by wire transfer in immediately available funds to that Holder's account within the United States of America if such Holder has provided the Company, the Trustee or the Paying Agent (if other than the Trustee) with the requisite

information necessary to make such wire transfer, which application shall remain in effect until the Holder notifies, in writing, the Note Registrar to the contrary or (ii) on any Global Note by wire transfer of immediately available funds to the account of the Depositary or its nominee.

(c) Any Defaulted Amounts shall forthwith cease to be payable to the Holder on the relevant payment date but shall accrue interest per annum at the rate borne by the Notes from, and including, such relevant payment date, and such Defaulted Amounts together with such interest thereon shall be paid by the Company, at its election in each case, as provided in clause (i) or (ii) below:

(i) The Company may elect to make payment of any Defaulted Amounts to the Persons in whose names the Notes (or their respective Predecessor Notes) are registered at the close of business on a special record date for the payment of such Defaulted Amounts, which shall be fixed in the following manner. The Company shall notify the Trustee in writing of the amount of the Defaulted Amounts proposed to be paid on each Note and the date of the proposed payment (which shall be not less than 25 days after the receipt by the Trustee of such notice, unless the Trustee shall consent to an earlier date), and at the same time the Company shall deposit with the Trustee an amount of money equal to the aggregate amount to be paid in respect of such Defaulted Amounts or shall make arrangements satisfactory to the Trustee for such deposit on or prior to the date of the proposed payment, such money when deposited to be held in trust for the benefit of the Persons entitled to such Defaulted Amounts as in this clause provided. Thereupon the Company shall fix a special record date for the payment of such Defaulted Amounts which shall be not more than 15 days and not less than 10 days prior to the date of the proposed payment, and not less than 10 days after the receipt by the Trustee of the notice of the proposed payment (unless the Trustee shall consent to an earlier date). The Company shall promptly notify the Trustee in writing of such special record date and the Trustee, in the name and at the expense of the Company, shall cause notice of the proposed payment of such Defaulted Amounts and the special record date therefor to be delivered to each Holder at its address as it appears in the Note Register, or by electronic means to the Depositary in the case of Global Notes, not less than 10 days prior to such special record date. Notice of the proposed payment of such Defaulted Amounts and the special record date therefor having been so delivered, such Defaulted Amounts shall be paid to the Persons in whose names the Notes (or their respective Predecessor Notes) are registered at the close of business on such special record date and shall no longer be payable pursuant to the following clause (ii) of this Section 2.03(c). The Trustee shall have no responsibility whatsoever for the calculation of the Defaulted Amounts.

(ii) The Company may make payment of any Defaulted Amounts in any other lawful manner not inconsistent with the requirements of any securities exchange or automated quotation system on which the Notes may be listed or designated for issuance, and upon such notice as may be required by such exchange or automated quotation system, if, after written notice given by the Company to the Trustee of the proposed payment pursuant to this clause, such manner of payment shall be deemed practicable by the Trustee.

Secretary or any of its Executive or Senior Vice Presidents.

At any time and from time to time after the execution and delivery of this Indenture, the Company may deliver Notes executed by the Company to the Trustee for authentication, together with a Company Order for the authentication and delivery of such Notes, and the Trustee in accordance with such Company Order shall authenticate and deliver such Notes, without any further action by the Company hereunder; provided that, as set forth in Section 17.05, the Trustee shall be entitled to receive an Officer's Certificate and an Opinion of Counsel of the Company with respect to the issuance, authentication and delivery of such Notes.

Only such Notes as shall bear thereon a certificate of authentication substantially in the form set forth on the Form of Note attached as Exhibit A hereto, executed manually by an authorized signatory of the Trustee (or an authenticating agent appointed by the Trustee as provided by Section 17.10), shall be entitled to the benefits of this Indenture or be valid or obligatory for any purpose. Such certificate by the Trustee (or such an authenticating agent) upon any Note executed by the Company shall be conclusive evidence that the Note so authenticated has been duly authenticated and delivered hereunder and that the Holder is entitled to the benefits of this Indenture.

In case any Officer of the Company who shall have signed any of the Notes shall cease to be such Officer before the Notes so signed shall have been authenticated and delivered by the Trustee, or disposed of by the Company, such Notes nevertheless may be authenticated and delivered or disposed of as though the Person who signed such Notes had not ceased to be such Officer of the Company; and any Note may be signed on behalf of the Company by such persons as, at the actual date of the execution of such Note, shall be the Officers of the Company, although at the date of the execution of this Indenture any such Person was not such an Officer.

Section 2.05. *Exchange and Registration of Transfer of Notes; Restrictions on Transfer; Depository.* (a) The Company shall cause to be kept at the Corporate Trust Office a register (the register maintained in such office or in any other office or agency of the Company designated pursuant to Section 4.02, the "**Note Register**") in which, subject to such reasonable regulations as it may prescribe, the Company shall provide for the registration of Notes and of transfers of Notes. Such register shall be in written form or in any form capable of being converted into written form within a reasonable period of time. The Trustee is hereby initially appointed the "**Note Registrar**" for the purpose of registering Notes and transfers of Notes as herein provided. The Company may appoint one or more co-Note Registrars in accordance with Section 4.02.

Upon surrender for registration of transfer of any Note to the Note Registrar or any co-Note Registrar, and satisfaction of the requirements for such transfer set forth in this Section 2.05, the Company shall execute, and the Trustee shall authenticate and deliver, in the name of the designated transferee or transferees, one or more new Notes of any authorized denominations and of a like aggregate principal amount and bearing such restrictive legends as may be required by this Indenture.

Notes may be exchanged for other Notes of any authorized denominations and of a like aggregate principal amount, upon surrender of the Notes to be exchanged at any such office or agency maintained by the Company pursuant to Section 4.02. Whenever any Notes are so surrendered for exchange, the Company shall execute, and the Trustee shall authenticate and deliver, the Notes that the Holder making the exchange is entitled to receive, bearing registration numbers not contemporaneously outstanding.

All Notes presented or surrendered for registration of transfer or for exchange, repurchase or conversion shall (if so required by the Company, the Trustee, the Note Registrar or any co-Note Registrar) be duly endorsed, or be accompanied by a written instrument or instruments of transfer in form satisfactory to the Company and duly executed, by the Holder thereof or its attorney-in-fact duly authorized in writing.

No service charge shall be imposed by the Company, the Trustee, the Note Registrar, any co-Note Registrar or the Paying Agent for any exchange or registration of transfer of Notes, but the Company may require a Holder to pay a sum sufficient to cover any documentary, stamp or similar issue or transfer tax required in connection therewith as a result of the name of the Holder of new Notes issued upon such exchange or registration of transfer being different from the name of the Holder of the old Notes surrendered for exchange or registration of transfer.

None of the Company, the Trustee, the Note Registrar or any co-Note Registrar shall be required to exchange or register a transfer of (i) any Notes surrendered for conversion or, if a portion of any Note is surrendered for conversion, such portion thereof surrendered for conversion, (ii) any Notes, or a portion of any Note, surrendered for repurchase (and not withdrawn) in accordance with Article 15 or (iii) any Notes selected for redemption in accordance with Article 16, except the unredeemed portion of any Note being redeemed in part.

All Notes issued upon any registration of transfer or exchange of Notes in accordance with this Indenture shall be the valid obligations of the Company, evidencing the same debt, and entitled to the same benefits under this Indenture as the Notes surrendered upon such registration of transfer or exchange.

Notwithstanding the foregoing or anything to the contrary provided herein, a holder of a beneficial interest in a Note that is not a Sponsor Note may not exchange or transfer such beneficial interest for a beneficial interest in a Sponsor Note, but a holder of a beneficial interest in a Sponsor Note may, at any time, exchange or transfer such beneficial interest for a beneficial interest in a Note that is not a Sponsor Note.

(b) So long as the Notes are eligible for book-entry settlement with the Depository, unless otherwise required by law, subject to the fourth paragraph from the end of Section 2.05(c) all Notes shall be represented by one or more Notes in global form (each, a “**Global Note**”) registered in the name of the Depository or the nominee of the Depository. Each Global Note shall bear the legend required on a Global Note set forth in Exhibit A hereto. The transfer and exchange of beneficial interests in a Global Note that does not involve the issuance of a Physical Note shall be effected through the Depository (but not the Trustee or the Custodian) in accordance with this Indenture (including the restrictions on transfer set forth herein) and the procedures of the Depository therefor.

17

(c) Every Note that bears or is required under this Section 2.05(c) to bear the legend set forth in this Section 2.05(c) (together with any Common Stock issued upon conversion of the Notes that is required to bear the legend set forth in Section 2.05(d), collectively, the “**Restricted Securities**”) shall be subject to the restrictions on transfer set forth in this Section 2.05(c) (including those contained in the legend set forth below), unless such restrictions on transfer shall be eliminated or otherwise waived by written consent of the Company, and the Holder of each such Restricted Security, by such Holder’s acceptance thereof, agrees to be bound by all such restrictions on transfer. As used in this Section 2.05(c) and Section 2.05(d), the term “**transfer**” encompasses any sale, pledge, transfer or other disposition whatsoever of any Restricted Security.

Until the date (the “**Resale Restriction Termination Date**”) that is the later of (1) the date that is one year after the Last Date of Original Issuance of the Notes, or such shorter period of time as permitted by Rule 144 or any successor provision thereto, and (2) such later date, if any, as may be required by applicable law, any certificate evidencing such Note (and all securities issued in exchange therefor or substitution thereof, other than Common Stock, if any, issued upon conversion thereof, which shall bear the legend set forth in Section 2.05(d), if applicable) shall bear a legend in substantially the following form (unless such Notes have been transferred pursuant to a registration statement that has become or been declared effective under the Securities Act and that continues to be effective at the time of such transfer, or sold pursuant

the Securities Act and that continues to be effective at the time of such transfer, or sale pursuant to the exemption from registration provided by Rule 144 or any similar provision then in force under the Securities Act, or unless otherwise agreed by the Company in writing, with notice thereof to the Trustee):

THIS SECURITY AND THE COMMON STOCK, IF ANY, ISSUABLE UPON CONVERSION OF THIS SECURITY HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE “**SECURITIES ACT**”), AND MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED EXCEPT IN ACCORDANCE WITH THE FOLLOWING SENTENCE. BY ITS ACQUISITION HEREOF OR OF A BENEFICIAL INTEREST HEREIN, THE ACQUIRER:

(1) REPRESENTS THAT IT AND ANY ACCOUNT FOR WHICH IT IS ACTING IS A “QUALIFIED INSTITUTIONAL BUYER” (WITHIN THE MEANING OF RULE 144A UNDER THE SECURITIES ACT) AND THAT IT EXERCISES SOLE INVESTMENT DISCRETION WITH RESPECT TO EACH SUCH ACCOUNT, AND

(2) AGREES FOR THE BENEFIT OF PACIFIC BIOSCIENCES OF CALIFORNIA, INC. (THE “**COMPANY**”) THAT IT WILL NOT OFFER, SELL, PLEDGE OR OTHERWISE TRANSFER THIS SECURITY OR ANY BENEFICIAL INTEREST HEREIN PRIOR TO THE DATE THAT IS THE LATER OF (X) ONE YEAR AFTER THE LAST DATE OF ORIGINAL ISSUANCE HEREOF OR SUCH SHORTER PERIOD OF TIME AS PERMITTED BY RULE 144 UNDER THE SECURITIES ACT OR ANY SUCCESSOR PROVISION THERETO AND (Y) SUCH LATER DATE, IF ANY, AS MAY BE REQUIRED BY APPLICABLE LAW, EXCEPT:

(A) TO THE COMPANY OR ANY SUBSIDIARY THEREOF, OR

(B) PURSUANT TO A REGISTRATION STATEMENT WHICH HAS BECOME EFFECTIVE UNDER THE SECURITIES ACT, OR

(C) TO A QUALIFIED INSTITUTIONAL BUYER IN COMPLIANCE WITH RULE 144A UNDER THE SECURITIES ACT, OR

(D) PURSUANT TO AN EXEMPTION FROM REGISTRATION PROVIDED BY RULE 144 UNDER THE SECURITIES ACT OR ANY OTHER AVAILABLE EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT.

PRIOR TO THE REGISTRATION OF ANY TRANSFER IN ACCORDANCE WITH CLAUSE (2)(D) ABOVE, THE COMPANY AND THE TRUSTEE RESERVE THE RIGHT TO REQUIRE THE DELIVERY OF SUCH LEGAL OPINIONS, CERTIFICATIONS OR OTHER EVIDENCE AS MAY REASONABLY BE REQUIRED IN ORDER FOR THE COMPANY TO DETERMINE THAT THE PROPOSED TRANSFER IS BEING MADE IN COMPLIANCE WITH THE SECURITIES ACT AND APPLICABLE STATE SECURITIES LAWS. NO REPRESENTATION IS MADE AS TO THE AVAILABILITY OF ANY EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT.

No transfer of any Note prior to the Resale Restriction Termination Date will be registered by the Note Registrar unless the applicable box on the Form of Assignment and Transfer has been checked.

Any Note (or security issued in exchange or substitution therefor) (i) as to which such restrictions on transfer shall have expired in accordance with their terms, (ii) that has been transferred pursuant to a registration statement that has become effective or been declared effective under the Securities Act and that continues to be effective at the time of such transfer or (iii) that has been sold pursuant to the exemption from registration provided by Rule 144 or any similar provision then in force under the Securities Act, may, upon surrender of such Note for exchange to the Note Registrar in accordance with the provisions of this Section 2.05, be exchanged for a new Note or Notes, of like tenor and aggregate principal amount, which shall not bear the restrictive legend required by this Section 2.05(c) and shall not be assigned a restricted CUSIP number. The Company shall be entitled to instruct the Custodian in writing to so surrender any Global Note as to which any of the conditions set forth in clause (i) through (iii) of the immediately preceding sentence have been satisfied, and, upon such instruction, the Custodian shall so surrender such Global Note for exchange; and any new Global Note so exchanged therefor shall not bear the restrictive legend specified in this Section 2.05(c) and shall not be assigned a restricted CUSIP number. The Company shall promptly notify the Trustee upon the occurrence of the Resale Restriction Termination Date and promptly after a registration statement, if any, with respect to the Notes or any Common Stock issued upon conversion of the Notes has been declared effective under the Securities Act. Any exchange pursuant to the foregoing paragraph shall be in accordance with the applicable procedures of the Depositary.

Notwithstanding any other provisions of this Indenture (other than the provisions set forth in this Section 2.05(c)), a Global Note may not be transferred as a whole or in part except (i) by the Depositary to a nominee of the Depositary or by a nominee of the Depositary to the

Depositary or another nominee of the Depositary or by the Depositary or any such nominee to a successor Depositary or a nominee of such successor Depositary and (ii) for transfers of portions of a Global Note in certificated form made upon request of a member of, or a participant in, the

Depository (for itself or on behalf of a beneficial owner) by written notice given to the Trustee by or on behalf of the Depository in accordance with applicable procedures of the Depository and in compliance with this Section 2.05(c).

The Depository shall be a clearing agency registered under the Exchange Act. The Company initially appoints The Depository Trust Company to act as Depository with respect to each Global Note. Initially, each Global Note shall be issued to the Depository, registered in the name of Cede & Co., as the nominee of the Depository, and deposited with the Trustee as custodian for Cede & Co.

If (i) the Depository notifies the Company at any time that the Depository is unwilling or unable to continue as depository for the Global Notes and a successor depository is not appointed within 90 days, (ii) the Depository ceases to be registered as a clearing agency under the Exchange Act and a successor depository is not appointed within 90 days or (iii) an Event of Default with respect to the Notes has occurred and is continuing and, subject to the Depository's applicable procedures, a beneficial owner of any Note requests that its beneficial interest therein be issued as a Physical Note, the Company shall execute, and the Trustee, upon receipt of an Officer's Certificate, an Opinion of Counsel and a Company Order for the authentication and delivery of Notes, shall authenticate and deliver (x) in the case of clause (iii), a Physical Note to such beneficial owner in a principal amount equal to the principal amount of such Note corresponding to such beneficial owner's beneficial interest and (y) in the case of clause (i) or (ii), Physical Notes to each beneficial owner of the related Global Notes (or a portion thereof) in an aggregate principal amount equal to the aggregate principal amount of such Global Notes in exchange for such Global Notes, and upon delivery of the Global Notes to the Trustee such Global Notes shall be canceled.

Physical Notes issued in exchange for all or a part of the Global Note pursuant to this Section 2.05(c) shall be registered in such names and in such authorized denominations as the Depository, pursuant to instructions from its direct or indirect participants or otherwise, or, in the case of clause (iii) of the immediately preceding paragraph, the relevant beneficial owner shall instruct the Trustee. Upon execution and authentication, the Trustee shall deliver such Physical Notes to the Persons in whose names such Physical Notes are so registered.

At such time as all interests in a Global Note have been converted, canceled, redeemed, repurchased upon a Fundamental Change or transferred, such Global Note shall be, upon receipt thereof, canceled by the Trustee in accordance with standing procedures and existing instructions between the Depository and the Custodian. At any time prior to such cancellation, if any interest in a Global Note is exchanged for Physical Notes, converted, canceled, redeemed, repurchased upon a Fundamental Change or transferred to a transferee who receives Physical Notes therefor or any Physical Note is exchanged or transferred for part of such Global Note, the principal amount of such Global Note shall, in accordance with the standing procedures and instructions existing between the Depository and the Custodian, be appropriately reduced or increased, as the case may be, and an endorsement shall be made on such Global Note, by the Trustee or the Custodian, at the direction of the Trustee, to reflect such reduction or increase.

None of the Company, the Trustee (including in its capacity as Paying Agent) or any agent of the Company or the Trustee shall have any responsibility or liability for any act or omission of the Depository or for the payment of amounts to owners of beneficial interest in a Global Note, for any aspect of the records relating to or payments made on account of beneficial ownership interests of a Global Note or maintaining, supervising or reviewing any records relating to such beneficial ownership interests.

Neither the Company nor the Trustee shall have any responsibility or liability for any act or omission of the Depository. All notices and communications to be given to the Holders and all payments to be made to Holders in respect of the Notes shall be given or made only to, or upon the order of, the registered Holder(s) (which shall be the Depository or its nominee in the case of a Global Note).

The rights of beneficial owners in any Global Note shall be exercised only through the Depository subject to the Applicable Procedures of the Depository. The Trustee may rely and shall be fully protected in relying upon information furnished by the Depository with respect to its members, participants and any beneficial owners.

(d) Until the Resale Restriction Termination Date, any stock certificate representing Common Stock issued upon conversion of such Note shall bear a legend in substantially the following form (unless such Common Stock has been transferred pursuant to a registration statement that has become or been declared effective under the Securities Act and that continues to be effective at the time of such transfer, or pursuant to the exemption from registration provided by Rule 144 or any similar provision then in force under the Securities Act, or such Common Stock has been issued upon conversion of a Note that has been transferred pursuant to a registration statement that has become or been declared effective under the Securities Act and that continues to be effective at the time of such transfer, or pursuant to the exemption from registration provided by Rule 144 or any similar provision then in force under the Securities Act, or unless otherwise agreed by the Company with written notice thereof to the Trustee and any transfer agent for the Common Stock):

THIS SECURITY HAS NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE “**SECURITIES ACT**”), AND MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED EXCEPT IN ACCORDANCE WITH THE FOLLOWING SENTENCE. BY ITS ACQUISITION HEREOF OR OF A BENEFICIAL INTEREST HEREIN, THE ACQUIRER:

AGREES FOR THE BENEFIT OF PACIFIC BIOSCIENCES OF CALIFORNIA, INC. (THE “**COMPANY**”) THAT IT WILL NOT OFFER, SELL, PLEDGE OR OTHERWISE TRANSFER THIS SECURITY OR ANY BENEFICIAL INTEREST HEREIN PRIOR TO THE DATE THAT IS THE LATER OF (X) ONE YEAR AFTER THE LAST DATE OF ORIGINAL ISSUE OF THE SERIES OF NOTES UPON THE CONVERSION OF WHICH THIS SECURITY WAS ISSUED OR SUCH SHORTER PERIOD OF TIME AS PERMITTED BY RULE 144 UNDER THE SECURITIES ACT OR ANY SUCCESSOR PROVISION THERETO AND (Y) SUCH LATER DATE, IF ANY, AS MAY BE REQUIRED BY APPLICABLE LAW, EXCEPT:

21

- (A) TO THE COMPANY OR ANY SUBSIDIARY THEREOF, OR
- (B) PURSUANT TO A REGISTRATION STATEMENT WHICH HAS BECOME EFFECTIVE UNDER THE SECURITIES ACT, OR
- (C) PURSUANT TO AN EXEMPTION FROM REGISTRATION PROVIDED BY RULE 144 UNDER THE SECURITIES ACT OR ANY OTHER AVAILABLE EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT.

PRIOR TO THE REGISTRATION OF ANY TRANSFER IN ACCORDANCE WITH CLAUSE (1)(C) ABOVE, THE COMPANY AND THE TRANSFER AGENT FOR THE COMPANY’S COMMON STOCK RESERVE THE RIGHT TO REQUIRE THE DELIVERY OF SUCH LEGAL OPINIONS, CERTIFICATIONS OR OTHER EVIDENCE AS MAY REASONABLY BE REQUIRED IN ORDER FOR THE COMPANY TO DETERMINE THAT THE PROPOSED TRANSFER IS BEING MADE IN COMPLIANCE WITH THE SECURITIES ACT AND APPLICABLE STATE SECURITIES LAWS. NO REPRESENTATION IS MADE AS TO THE AVAILABILITY OF ANY EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT.

Any such Common Stock (i) as to which such restrictions on transfer shall have expired in accordance with their terms, (ii) that has been transferred pursuant to a registration statement that has become or been declared effective under the Securities Act and that continues to be effective at the time of such transfer or (iii) that has been sold pursuant to the exemption from registration provided by Rule 144 or any similar provision then in force under the Securities Act, may, upon surrender of the certificates representing such shares of Common Stock for exchange in accordance with the procedures of the transfer agent for the Common Stock, be exchanged for a new certificate or certificates for a like aggregate number of shares of Common Stock, which shall not bear the restrictive legend required by this Section 2.05(d).

(e) The Trustee shall have no obligation or duty to monitor, determine or inquire as to compliance with any restrictions on transfer imposed under this Indenture or under applicable law with respect to any transfer of any interest in any Note (including any transfers between or among Depositary participants or beneficial owners of interests in any Global Note) other than to require delivery of such certificates and other documentation or evidence as are expressly required by, and to do so if and when expressly required by the terms of, this Indenture, and to examine the same to determine substantial compliance as to form with the express requirements hereof.

(f) Neither the Trustee nor any agent shall have any responsibility or liability for any actions taken or not taken by the Depositary, and may assume performance absent written notice to the contrary.

Section 2.06. *Mutilated, Destroyed, Lost or Stolen Notes.* In case any Note shall become mutilated or be destroyed, lost or stolen, the Company in its discretion may execute, and upon receipt of a Company Order, the Trustee or an authenticating agent appointed by the Trustee shall authenticate and deliver, a new Note, bearing a registration number not contemporaneously

outstanding, in exchange and substitution for the mutilated Note, or in lieu of and in substitution for the Note so destroyed, lost or stolen. In every case the applicant for a substituted Note shall furnish to the Company, to the Trustee and, if applicable, to such authenticating agent such security or indemnity as may be required by them to save each of them harmless from any loss, liability, cost or expense caused by or connected with such substitution, and, in every case of destruction, loss or theft, the applicant shall also furnish to the Company, to the Trustee and, if applicable, to such authenticating agent evidence to their satisfaction of the destruction, loss or theft of such Note and of the ownership thereof.

The Trustee or such authenticating agent may authenticate any such substituted Note and deliver the same upon the receipt of such security or indemnity as the Trustee, the Company and, if applicable, such authenticating agent may require. No service charge shall be imposed by the Company, the Trustee, the Note Registrar, any co-Note Registrar or the Paying Agent upon the issuance of any substitute Note, but the Company may require a Holder to pay a sum sufficient to cover any documentary, stamp or similar issue or transfer tax required in connection therewith as a result of the name of the Holder of the new substitute Note being different from the name of the Holder of the old Note that became mutilated or was destroyed, lost or stolen. In case any Note that has matured or is about to mature or has been surrendered for required repurchase or is about to be converted in accordance with Article 14 shall become mutilated or be destroyed, lost or stolen, the Company may, in its sole discretion, instead of issuing a substitute Note, pay or authorize the payment of or convert or authorize the conversion of the same (without surrender thereof except in the case of a mutilated Note), as the case may be, if the applicant for such payment or conversion shall furnish to the Company, to the Trustee and, if applicable, to such authenticating agent such security or indemnity as may be required by them to save each of them harmless for any loss, liability, cost or expense caused by or connected with such substitution, and, in every case of destruction, loss or theft, evidence satisfactory to the Company, the Trustee and, if applicable, any Paying Agent or Conversion Agent of the destruction, loss or theft of such Note and of the ownership thereof.

Every substitute Note issued pursuant to the provisions of this Section 2.06 by virtue of the fact that any Note is destroyed, lost or stolen shall constitute an additional contractual obligation of the Company, whether or not the destroyed, lost or stolen Note shall be found at any time, and shall be entitled to all the benefits of (but shall be subject to all the limitations set forth in) this Indenture equally and proportionately with any and all other Notes duly issued hereunder. To the extent permitted by law, all Notes shall be held and owned upon the express condition that the foregoing provisions are exclusive with respect to the replacement, payment, conversion, redemption or repurchase of mutilated, destroyed, lost or stolen Notes and shall preclude any and all other rights or remedies notwithstanding any law or statute existing or hereafter enacted to the contrary with respect to the replacement, payment, conversion, redemption or repurchase of negotiable instruments or other securities without their surrender.

Section 2.07. *Temporary Notes.* Pending the preparation of Physical Notes, the Company may execute and the Trustee or an authenticating agent appointed by the Trustee shall, upon receipt of a Company Order, authenticate and deliver temporary Notes (printed or lithographed). Temporary Notes shall be issuable in any authorized denomination, and substantially in the form of the Physical Notes but with such omissions, insertions and variations

as may be appropriate for temporary Notes, all as may be determined by the Company. Every such temporary Note shall be executed by the Company and authenticated by the Trustee or such authenticating agent upon the same conditions and in substantially the same manner, and with

the same effect, as the Physical Notes. Without unreasonable delay, the Company shall execute and deliver to the Trustee or such authenticating agent Physical Notes (other than any Global Note) and thereupon any or all temporary Notes (other than any Global Note) may be surrendered in exchange therefor, at each office or agency maintained by the Company pursuant to Section 4.02 and the Trustee or such authenticating agent shall authenticate and deliver in exchange for such temporary Notes an equal aggregate principal amount of Physical Notes. Such exchange shall be made by the Company at its own expense and without any charge therefor. Until so exchanged, the temporary Notes shall in all respects be entitled to the same benefits and subject to the same limitations under this Indenture as Physical Notes authenticated and delivered hereunder.

Section 2.08. *Cancellation of Notes Paid, Converted, Etc.* The Company shall cause all Notes surrendered for the purpose of payment at maturity, repurchase upon a Fundamental Change, redemption, registration of transfer or exchange or conversion (other than any Notes exchanged pursuant to Section 14.12), if surrendered to the Company or any of its agents, Subsidiaries or Affiliates, in each case, that the Company controls, to be surrendered to the Trustee for cancellation. All Notes delivered to the Trustee shall be canceled promptly by it, in accordance with its customary procedures. Except for Notes surrendered for registration of transfer or exchange, no Notes shall be authenticated in exchange therefor except as expressly permitted by any of the provisions of this Indenture. The Trustee shall dispose of canceled Notes in accordance with its customary procedures and, after such disposition, shall deliver a certificate of such cancellation to the Company upon the Company's written request.

Section 2.09. *CUSIP Numbers.* The Company in issuing the Notes may use "CUSIP" numbers (if then generally in use), and, if so, the Trustee shall use "CUSIP" numbers in all notices issued to Holders as a convenience to such Holders; *provided* that any such notice may state that no representation is made as to the correctness of such numbers either as printed on the Notes or on such notice and that reliance may be placed only on the other identification numbers printed on the Notes. The Company shall promptly notify the Trustee in writing of any change in the "CUSIP" numbers.

On the Last Date of Original Issuance, the Notes shall initially bear the CUSIP and ISIN numbers set forth in the following sentence. The CUSIP and ISIN numbers for the Sponsor Global Notes that are Restricted Global Notes shall be 69404D AA6 and US69404DAA63, respectively; the CUSIP and ISIN numbers for the Sponsor Global Notes that are Unrestricted Global Notes shall be 69404D AB4 and US69404DAB47, respectively; the CUSIP and ISIN numbers for Restricted Global Notes other than Sponsor Global Notes shall be 69404D AC2 and US69404DAC20, respectively; and the CUSIP and ISIN numbers for Unrestricted Global Notes other than Sponsor Global Notes shall be 69404D AD0 and US69404DAD03, respectively.

Section 2.10. *Additional Notes; Repurchases.* The Company may, without the consent of, or notice to, the Holders and notwithstanding Section 2.01, reopen this Indenture and issue additional Notes hereunder. The Company may, to the extent permitted by law, and, without the consent of Holders, directly or indirectly (regardless of whether such Notes are surrendered to

the Company), repurchase Notes in the open market or otherwise, whether by the Company or its Subsidiaries or through a privately negotiated transaction or public tender or exchange offer or through counterparties to private agreements, including by cash-settled swaps or other derivatives. The Company may, at its option and to the extent permitted by applicable law, reissue, resell or surrender to the Trustee for cancellation in accordance with Section 2.08 any Notes that the Company may repurchase, in the case of a reissuance or resale, so long as such Notes do not constitute restricted securities upon such reissuance or resale. Any Notes that the Company may (or is required under this Indenture to) repurchase will be considered "outstanding" for all purposes under this Indenture (other than, at any time when such Notes are held by the Company, any of its Subsidiaries or Affiliates or any Subsidiary of any of the Company's Affiliates, as set forth in Section 8.04) unless and until such time the Company

surrenders them to the Trustee for cancellation and, upon receipt of a written order from the Company, the Trustee will cancel all Notes so surrendered.

ARTICLE 3 SATISFACTION AND DISCHARGE

Section 3.01. *Satisfaction and Discharge.* (a) This Indenture and the Notes shall cease to be of further effect when (i) all Notes theretofore authenticated and delivered (other than (x) Notes which have been destroyed, lost or stolen and which have been replaced, paid or converted as provided in Section 2.06 and (y) Notes for whose payment money has heretofore been deposited in trust or segregated and held in trust by the Company and thereafter repaid to the Company or discharged from such trust, as provided in Section 4.04(d)) have been delivered to the Trustee for cancellation; or (ii) the Company has deposited with the Trustee or delivered to Holders, as applicable, after the Notes have become due and payable, whether on the Maturity Date, any Redemption Date, any Fundamental Change Repurchase Date, upon conversion or otherwise, cash or cash, shares of Common Stock or a combination thereof, as applicable, solely to satisfy the Company's Conversion Obligation, sufficient to pay all of the outstanding Notes and all other sums due and payable under this Indenture or the Notes by the Company; and (b) the Trustee upon request of the Company contained in an Officer's Certificate and at the expense of the Company, shall execute instruments reasonably requested by the Company acknowledging satisfaction and discharge of this Indenture and the Notes, when the Company has delivered to the Trustee an Officer's Certificate and an Opinion of Counsel, each stating that all conditions precedent herein provided for relating to the satisfaction and discharge of this Indenture and the Notes have been complied with. Notwithstanding the satisfaction and discharge of this Indenture, the obligations of the Company to the Trustee under Section 7.06 shall survive.

ARTICLE 4 PARTICULAR COVENANTS OF THE COMPANY

Section 4.01. *Payment of Principal and Interest.* The Company covenants and agrees that it will cause to be paid the principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, and accrued and unpaid interest on, each of the Notes at the places, at the respective times and in the manner provided herein and in the Notes.

25

Any applicable withholding taxes (including backup withholding) may be withheld from payments of interest and payments upon conversion, repurchase or maturity of the Notes (or, in some circumstances from any payments of Common Stock) or sales proceeds received by or other funds or assets of the Holder or beneficial owner.

Section 4.02. *Maintenance of Office or Agency.* The Company will maintain in the United States of America an office or agency where the Notes may be surrendered for registration of transfer or exchange or for presentation for payment or repurchase ("**Paying Agent**") or for conversion ("**Conversion Agent**") and where notices and demands to or upon the Company in respect of the Notes and this Indenture may be served. The Company will give prompt written notice to the Trustee of the location, and any change in the location, of such office or agency. If at any time the Company shall fail to maintain any such required office or agency or shall fail to furnish the Trustee with the address thereof, such presentations, surrenders, notices and demands may be made or served at the Corporate Trust Office in the United States of America as a place where Notes may be presented for payment or for registration of transfer.

The Company may also from time to time designate as co-Note Registrars one or more other offices or agencies where the Notes may be presented or surrendered for any or all such purposes and may from time to time rescind such designations; *provided* that no such designation

or rescission shall in any manner relieve the Company of its obligation to maintain an office or agency in the United States of America so designated by the Trustee as a place for such purposes. The Company will give prompt written notice to the Trustee of any such designation or rescission and of any change in the location of any such other office or agency. The terms “**Paying Agent**” and “**Conversion Agent**” include any such additional or other offices or agencies, as applicable.

The Company hereby initially designates the Trustee as the Paying Agent, Note Registrar, Custodian and Conversion Agent and the Corporate Trust Office as the office or agency in the United States of America where Notes may be surrendered for registration of transfer or exchange or for presentation for payment or repurchase or for conversion and where notices and demands to or upon the Company in respect of the Notes and this Indenture may be served; provided that the Corporate Trust Office shall not be a place for service of legal process on the Company.

Section 4.03. *Appointments to Fill Vacancies in Trustee’s Office.* The Company, whenever necessary to avoid or fill a vacancy in the office of Trustee, will appoint, in the manner provided in Section 7.09, a Trustee, so that there shall at all times be a Trustee hereunder.

Section 4.04. *Provisions as to Paying Agent.* (a) If the Company shall appoint a Paying Agent other than the Trustee, the Company will cause such Paying Agent to execute and deliver to the Trustee an instrument in which such agent shall agree with the Trustee, subject to the provisions of this Section 4.04:

- (i) that it will hold all sums held by it as such agent for the payment of the principal (including the Redemption Price and the Fundamental Change Repurchase

Price, if applicable) of, and accrued and unpaid interest on, the Notes in trust for the benefit of the Holders of the Notes;

(ii) that it will give the Trustee prompt written notice of any failure by the Company to make any payment of the principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, and accrued and unpaid interest on, the Notes when the same shall be due and payable; and

(iii) that at any time during the continuance of an Event of Default, upon request of the Trustee, it will forthwith pay to the Trustee all sums so held in trust.

The Company shall, on or before each due date of the principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, or accrued and unpaid interest on, the Notes, deposit with the Paying Agent a sum sufficient to pay such principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) or accrued and unpaid interest, and (unless such Paying Agent is the Trustee) the Company will promptly notify the Trustee in writing of any failure to take such action; *provided* that if such deposit is made on the due date, such deposit must be received by the Paying Agent by 11:00 a.m., New York City time, on such date.

(b) If the Company shall act as its own Paying Agent, it will, on or before each due date of the principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, and accrued and unpaid interest on, the Notes, set aside, segregate and hold in trust for the benefit of the Holders of the Notes a sum sufficient to pay such principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) and accrued and unpaid interest so becoming due and will promptly notify the Trustee in writing of any failure to take such action and of any failure by the Company to make any payment of the principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, or accrued and unpaid interest on, the Notes when the same shall become due and payable.

(c) Anything in this Section 4.04 to the contrary notwithstanding, the Company may, at any time, for the purpose of obtaining a satisfaction and discharge of this Indenture, or for any other reason, pay, cause to be paid or deliver to the Trustee all sums or amounts held in trust by the Company or any Paying Agent hereunder as required by this Section 4.04, such sums or amounts to be held by the Trustee upon the trusts herein contained and upon such payment or delivery by the Company or any Paying Agent to the Trustee, the Company or such Paying Agent shall be released from all further liability but only with respect to such sums or amounts. Upon the occurrence of any event specified in Section 6.01(h) or Section 6.01(i), the Trustee shall automatically become the Paying Agent.

(d) Subject to applicable escheatment laws, any money or property deposited with the Trustee, the Conversion Agent or any Paying Agent, or then held by the Company, in trust for the payment of the principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, accrued and unpaid interest on and the consideration due upon conversion of any Note and remaining unclaimed for two years after such principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable),

interest or consideration due upon conversion has become due and payable shall be paid to the Company on request of the Company contained in an Officer's Certificate, or (if then held by the Company) shall be discharged from such trust and the Trustee shall have no further liability with

respect to such funds or property; and the Holder of such Note shall thereafter, as an unsecured general creditor, look only to the Company for payment thereof, and all liability of the Trustee, the Conversion Agent or such Paying Agent with respect to such trust money, and all liability of the Company as trustee with respect to such trust money and shares of Common Stock, and all liability of the Company as trustee thereof, shall thereupon cease.

Section 4.05. *Existence.* Subject to Article 11, the Company shall do or cause to be done all things necessary to preserve and keep in full force and effect its corporate existence.

Section 4.06. *Rule 144A Information Requirement and Annual Reports.* (a) At any time the Company is not subject to Section 13 or 15(d) of the Exchange Act, the Company shall, so long as any of the Notes or any shares of Common Stock issuable upon conversion thereof shall, at such time, constitute “restricted securities” within the meaning of Rule 144(a)(3) under the Securities Act, promptly provide to the Trustee and will, upon written request, provide to any Holder, beneficial owner or prospective purchaser of such Notes or any shares of Common Stock issuable upon conversion of such Notes, the information required to be delivered pursuant to Rule 144A(d)(4) under the Securities Act to facilitate the resale of such Notes or shares of Common Stock pursuant to Rule 144A.

(b) The Company shall file with the Trustee, within 15 days after the same are required to be filed with the Commission (giving effect to any grace period provided by Rule 12b-25 (or any successor rule) under the Exchange Act), copies of any annual or quarterly reports (on Form 10-K or Form 10-Q or any respective successive form) that the Company is required to file with the Commission pursuant to Section 13 or 15(d) of the Exchange Act (excluding any such information, documents or reports, or portions thereof, subject to confidential treatment and any correspondence with the Commission). Any such document or report that the Company files with the Commission via the Commission’s EDGAR system (or any successor thereto) shall be deemed to be filed with the Trustee for purposes of this Section 4.06(b) at the time such documents are filed via the EDGAR system (or any successor thereto), it being understood that the Trustee shall not be responsible for determining whether such filings have been made.

(c) Delivery of the reports and documents described in subsection (b) above to the Trustee is for informational purposes only, and the Trustee’s receipt of such shall not constitute constructive notice of any information contained therein or determinable from information contained therein, including the Company’s compliance with any of its covenants hereunder (as to which the Trustee is entitled to rely exclusively on an Officer’s Certificate).

Section 4.07. *Stay, Extension and Usury Laws.* The Company covenants (to the extent that it may lawfully do so) that it shall not at any time insist upon, plead, or in any manner whatsoever claim or take the benefit or advantage of, any stay, extension or usury law or other law that would prohibit or forgive the Company from paying all or any portion of the principal of or interest on the Notes as contemplated herein, wherever enacted, now or at any time hereafter in force, or that may affect the covenants or the performance of this Indenture; and the Company (to the extent it may lawfully do so) hereby expressly waives all benefit or advantage of any such

law, and covenants that it will not, by resort to any such law, hinder, delay or impede the execution of any power herein granted to the Trustee, but will suffer and permit the execution of every such power as though no such law had been enacted.

Section 4.08. *Compliance Certificate; Statements as to Defaults.* The Company shall deliver to the Trustee within 120 days after the end of each fiscal year of the Company (beginning with the fiscal year ending on December 31, 2021) an Officer’s Certificate stating whether the signers thereof have knowledge of any Default under the Indenture that occurred during such fiscal year and, if so, specifying each such Default and the nature thereof.

In addition, the Company shall deliver to the Trustee, within 30 days after obtaining knowledge of the occurrence of any Event of Default or Default, an Officer’s Certificate setting

knowledge of the occurrence of any Event of Default or Default, an Officer's Certificate setting forth the details of such Event of Default or Default, its status and the action that the Company is taking or proposing to take in respect thereof; *provided* that the Company is not required to deliver such notice if such Event of Default or Default has been cured.

Section 4.09. *Further Instruments and Acts.* Upon request of the Trustee, the Company will execute and deliver such further instruments and do such further acts as may be reasonably necessary or proper to carry out more effectively the purposes of this Indenture.

ARTICLE 5

LISTS OF HOLDERS AND REPORTS BY THE COMPANY AND THE TRUSTEE

Section 5.01. *Lists of Holders.* The Company covenants and agrees that it will furnish or cause to be furnished to the Trustee, semi-annually, not more than 15 days after each February 1 and August 1 in each year beginning with August 1, 2021, and at such other times as the Trustee may request in writing, within 30 days after receipt by the Company of any such request (or such lesser time as the Trustee may reasonably request in order to enable it to timely provide any notice to be provided by it hereunder), a list in such form as the Trustee may reasonably require of the names and addresses of the Holders as of a date not more than 15 days (or such other date as the Trustee may reasonably request in order to so provide any such notices) prior to the time such information is furnished, except that no such list need be furnished so long as the Trustee is acting as Note Registrar.

Section 5.02. *Preservation and Disclosure of Lists.* The Trustee shall preserve, in as current a form as is reasonably practicable, all information as to the names and addresses of the Holders contained in the most recent list furnished to it as provided in Section 5.01 or maintained by the Trustee in its capacity as Note Registrar, if so acting. The Trustee may destroy any list furnished to it as provided in Section 5.01 upon receipt of a new list so furnished.

ARTICLE 6

DEFAULTS AND REMEDIES

Section 6.01. *Events of Default.* Each of the following events shall be an “**Event of Default**” with respect to the Notes:

- (a) default in any payment of interest on any Note when due and payable, and the default continues for a period of 30 days;
- (b) default in the payment of principal of any Note when due and payable on the Maturity Date, upon Optional Redemption, upon any required repurchase, upon declaration of acceleration or otherwise;
- (c) failure by the Company to comply with its obligation to convert the Notes in accordance with this Indenture upon exercise of a Holder's conversion right, and such failure continues for three (3) Business Days;
- (d) failure by the Company to issue a Fundamental Change Company Notice in accordance with Section 15.02(c) when due, and such failure continues for three (3) Business Days;

(e) failure by the Company to comply with its obligations under Article 11;

(f) failure by the Company for 60 days after written notice from the Trustee or the Holders of at least 25% in aggregate principal amount of the Notes then outstanding has been received by the Company to comply with any of its other agreements contained in the Notes or this Indenture;

(g) default by the Company or any Significant Subsidiary of the Company with respect to any mortgage, agreement or other instrument under which there may be outstanding, or by which there may be secured or evidenced, any indebtedness for money borrowed in excess of \$50,000,000 (or its foreign currency equivalent) in the aggregate of the Company and/or any such Significant Subsidiary, whether such indebtedness now exists or shall hereafter be created (i) resulting in such indebtedness becoming or being declared due and payable prior to its stated maturity date or (ii) constituting a failure to pay the principal of any such indebtedness when due and payable (after the expiration of all applicable grace periods) at its stated maturity, upon required repurchase, upon declaration of acceleration or otherwise, and, in the case of clauses (i) and (ii), such acceleration shall not, after the expiration of any applicable grace period, have been rescinded or annulled or such failure to pay or default shall not have been cured or waived, or such indebtedness is not paid or discharged, as the case may be, within 30 days after written notice to the Company from the Trustee or to the Company and the Trustee from Holders of at least 25% in aggregate principal amount of Notes then outstanding in accordance with this Indenture;

(h) the Company or any Significant Subsidiary shall commence a voluntary case or other proceeding seeking liquidation, reorganization or other relief with respect to the Company or any such Significant Subsidiary or its debts under any bankruptcy, insolvency or other similar

law now or hereafter in effect or seeking the appointment of a trustee, receiver, liquidator, custodian or other similar official of the Company or any such Significant Subsidiary or any substantial part of its property, or shall consent to any such relief or to the appointment of or taking possession by any such official in an involuntary case or other proceeding commenced against it, or shall make a general assignment for the benefit of creditors, or shall fail generally to pay its debts as they become due; or

(i) an involuntary case or other proceeding shall be commenced against the Company or any Significant Subsidiary seeking liquidation, reorganization or other relief with respect to the Company or such Significant Subsidiary or its debts under any bankruptcy, insolvency or other similar law now or hereafter in effect or seeking the appointment of a trustee, receiver, liquidator, custodian or other similar official of the Company or such Significant Subsidiary or any substantial part of its property, and such involuntary case or other proceeding shall remain undismissed and unstayed for a period of 60 consecutive days.

Section 6.02. *Acceleration; Rescission and Annulment.* If one or more Events of Default shall have occurred and be continuing (whatever the reason for such Event of Default and whether it shall be voluntary or involuntary or be effected by operation of law or pursuant to any judgment, decree or order of any court or any order, rule or regulation of any administrative or governmental body), then, and in each and every such case (other than an Event of Default specified in Section 6.01(h) or Section 6.01(i) with respect to the Company), unless the principal of all of the Notes shall have already become due and payable, either the Trustee or the Holders of at least 25% in aggregate principal amount of the Notes then outstanding determined in accordance with Section 8.04, by notice in writing to the Company (and to the Trustee if given by Holders), may declare 100% of the principal of, and accrued and unpaid interest on, all the Notes to be due and payable immediately, and upon any such declaration the same shall become and shall automatically be immediately due and payable, anything contained in this Indenture or in the Notes to the contrary notwithstanding. If an Event of Default specified in Section 6.01(h) or Section 6.01(i) with respect to the Company occurs and is continuing, 100% of the principal of, and accrued and unpaid interest, if any, on, all Notes shall become and shall automatically be immediately due and payable without any declaration or other act on the part of the Trustee or any Holder.

The immediately preceding paragraph, however, is subject to the conditions that if, at any time after the principal of the Notes shall have been so declared due and payable, and before any judgment or decree for the payment of the monies due shall have been obtained or entered as hereinafter provided, and if (1) rescission would not conflict with any judgment or decree of a court of competent jurisdiction and (2) any and all existing Events of Default under this Indenture, other than the nonpayment of the principal of and accrued and unpaid interest, if any, on Notes that shall have become due solely by such acceleration, shall have been cured or waived pursuant to Section 6.09, then and in every such case (except as provided in the immediately succeeding sentence) the Holders of a majority in aggregate principal amount of the Notes then outstanding, by written notice to the Company and to the Trustee, may waive all Defaults or Events of Default with respect to the Notes and rescind and annul such declaration and its consequences and such Default shall cease to exist, and any Event of Default arising therefrom shall be deemed to have been cured for every purpose of this Indenture; but no such

Default or Event of Default resulting from (i) the nonpayment of the principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, or accrued and unpaid interest on, any Notes, (ii) a failure to repurchase any Notes when required or (iii) a failure to pay or deliver, as the case may be, the consideration due upon conversion of the Notes.

Section 6.03. *Additional Interest.* Notwithstanding anything in this Indenture or in the Notes to the contrary, to the extent the Company elects, the sole remedy for an Event of Default relating to the Company's failure to comply with its obligations as set forth in Section 4.06(b) shall, for the first 360 calendar days after the occurrence of such an Event of Default, consist exclusively of the right to receive Additional Interest on the Notes at a rate equal to (i) 0.25% per annum of the principal amount of the Notes outstanding for each day during the first 180 calendar days of the 360-day period after the occurrence of such an Event of Default during which such Event of Default is continuing (or, if earlier, the date on which such Event of Default is cured or waived as provided for in this Indenture) and (ii) 0.50% per annum of the principal amount of the Notes outstanding for each day from, and including, the 181st calendar day to, and including, the 360th calendar day after the occurrence of such an Event of Default during which such Event of Default is continuing (or, if earlier, the date on which such Event of Default is cured or waived as provided for in this Indenture). If the Company so elects, such Additional Interest shall be payable in the same manner and on the same dates as the stated interest payable on the Notes. On the 361st day after such Event of Default (if the Event of Default relating to the Company's failure to comply with its obligations as set forth in Section 4.06(b) is not cured or waived prior to such 361st day), the Notes shall be subject to acceleration as provided in Section 6.02. The provisions of this paragraph will not affect the rights of Holders in the event of the occurrence of any Event of Default other than the Company's failure to comply with its obligations as set forth in Section 4.06(b). In the event the Company does not elect to pay Additional Interest following an Event of Default in accordance with this Section 6.03 or the Company elected to make such payment but does not pay the Additional Interest when due, the Notes shall be immediately subject to acceleration as provided in Section 6.02.

In order to elect to pay Additional Interest as the sole remedy during the first 360 days after the occurrence of any Event of Default described in the immediately preceding paragraph, the Company must notify all Holders of the Notes, the Trustee and the Paying Agent in an Officer's Certificate of such election prior to the beginning of such 360-day period. Upon the failure to timely give such notice, the Notes shall be immediately subject to acceleration as provided in Section 6.02.

Section 6.04. *Payments of Notes on Default; Suit Therefor.* If an Event of Default described in clause (a) or (b) of Section 6.01 shall have occurred and be continuing, the Company shall, upon demand of the Trustee, pay to the Trustee, for the benefit of the Holders of the Notes, the whole amount then due and payable on the Notes for principal and interest, if any, with interest on any overdue principal and interest, if any, at the rate borne by the Notes at such time, and, in addition thereto, such further amount as shall be sufficient to cover any amounts due to the Trustee under Section 7.06. If the Company shall fail to pay such amounts forthwith

upon such demand, the Trustee, in its own name and as trustee of an express trust, may institute a judicial proceeding for the collection of the sums so due and unpaid, may prosecute such proceeding to judgment or final decree and may enforce the same against the Company or any other obligor upon the Notes and collect the moneys adjudged or decreed to be payable in the manner provided by law out of the property of the Company or any other obligor upon the Notes, wherever situated.

In the event there shall be pending proceedings for the bankruptcy or for the reorganization of the Company or any other obligor on the Notes under Title 11 of the United States Code, or any other applicable law, or in case a receiver, assignee or trustee in bankruptcy or reorganization, liquidator, sequestrator or similar official shall have been appointed for or taken possession of the Company or such other obligor, the property of the Company or such

taken possession of the Company or such other obligor, the property of the Company or such other obligor, or in the event of any other judicial proceedings relative to the Company or such other obligor upon the Notes, or to the creditors or property of the Company or such other obligor, the Trustee, irrespective of whether the principal of the Notes shall then be due and payable as therein expressed or by declaration or otherwise and irrespective of whether the Trustee shall have made any demand pursuant to the provisions of this Section 6.04, shall be entitled and empowered, by intervention in such proceedings or otherwise, to file and prove a claim or claims for the whole amount of principal and accrued and unpaid interest, if any, in respect of the Notes, and, in case of any judicial proceedings, to file such proofs of claim and other papers or documents and to take such other actions as it may deem necessary or advisable in order to have the claims of the Trustee (including any claim for the reasonable compensation, expenses, disbursements and advances of the Trustee, its agents and counsel) and of the Holders allowed in such judicial proceedings relative to the Company or any other obligor on the Notes, its or their creditors, or its or their property, and to collect and receive any monies or other property payable or deliverable on any such claims, and to distribute the same after the deduction of any amounts due to the Trustee under Section 7.06; and any receiver, assignee or trustee in bankruptcy or reorganization, liquidator, custodian or similar official is hereby authorized by each of the Holders to make such payments to the Trustee, as administrative expenses, and, in the event that the Trustee shall consent to the making of such payments directly to the Holders, to pay to the Trustee any amount due it for reasonable compensation, expenses, advances and disbursements, including agents and counsel fees, and including any other amounts due to the Trustee under Section 7.06, incurred by it up to the date of such distribution. To the extent that such payment of reasonable compensation, expenses, advances and disbursements out of the estate in any such proceedings shall be denied for any reason, payment of the same shall be secured by a lien on, and shall be paid out of, any and all distributions, dividends, monies, securities and other property that the Holders of the Notes may be entitled to receive in such proceedings, whether in liquidation or under any plan of reorganization or arrangement or otherwise.

Nothing herein contained shall be deemed to authorize the Trustee to authorize or consent to or accept or adopt on behalf of any Holder any plan of reorganization, arrangement, adjustment or composition affecting such Holder or the rights of any Holder thereof, or to authorize the Trustee to vote in respect of the claim of any Holder in any such proceeding.

All rights of action and of asserting claims under this Indenture, or under any of the Notes, may be enforced by the Trustee without the possession of any of the Notes, or the production thereof at any trial or other proceeding relative thereto, and any such suit or proceeding instituted by the Trustee shall be brought in its own name as trustee of an express trust, and any recovery of judgment shall, after provision for the payment of the reasonable compensation, expenses, disbursements and advances of the Trustee, its agents and counsel, be for the ratable benefit of the Holders of the Notes.

In any proceedings brought by the Trustee (and in any proceedings involving the interpretation of any provision of this Indenture to which the Trustee shall be a party) the Trustee shall be held to represent all the Holders of the Notes, and it shall not be necessary to make any Holders of the Notes parties to any such proceedings.

In case the Trustee shall have proceeded to enforce any right under this Indenture and such proceedings shall have been discontinued or abandoned because of any waiver pursuant to Section 6.09 or any rescission and annulment pursuant to Section 6.02 or for any other reason or shall have been determined adversely to the Trustee, then and in every such case the Company, the Holders and the Trustee shall, subject to any determination in such proceeding, be restored respectively to their several positions and rights hereunder, and all rights, remedies and powers of the Company, the Holders and the Trustee shall continue as though no such proceeding had

been instituted.

Section 6.05. *Application of Monies Collected by Trustee.* Any monies or property collected by the Trustee pursuant to this Article 6 with respect to the Notes shall be applied in the following order, at the date or dates fixed by the Trustee for the distribution of such monies or property, upon presentation of the several Notes, and stamping thereon the payment, if only partially paid, and upon surrender thereof, if fully paid:

First, to the payment of all amounts due the Trustee in all of its capacities, including its agent and counsel, under Section 7.06;

Second, in case the principal of the outstanding Notes shall not have become due and be unpaid, to the payment of interest on, and any cash due upon conversion of, the Notes in default in the order of the date due of the payments of such interest and cash due upon conversion, as the case may be, with interest (to the extent that such interest has been collected by the Trustee) upon such overdue payments at the rate borne by the Notes at such time, such payments to be made ratably to the Persons entitled thereto;

Third, in case the principal of the outstanding Notes shall have become due, by declaration or otherwise, and be unpaid to the payment of the whole amount (including, if applicable, the payment of the Redemption Price, the Fundamental Change Repurchase Price and any cash due upon conversion) then owing and unpaid upon the Notes for principal and interest, if any, with interest on the overdue principal and, to the extent that such interest has been collected by the Trustee, upon overdue installments of interest at the rate borne by the Notes at such time, and in case such monies shall be insufficient to pay in full the whole amounts so due and unpaid upon the Notes, then to the payment of such principal (including, if applicable, the Redemption Price, the Fundamental Change Repurchase Price and any cash due upon

conversion) and interest without preference or priority of principal over interest, or of interest over principal or of any installment of interest over any other installment of interest, or of any Note over any other Note, ratably to the aggregate of such principal (including, if applicable, the Redemption Price, the Fundamental Change Repurchase Price and any cash due upon conversion) and accrued and unpaid interest; and

Fourth, to the payment of the remainder, if any, to the Company.

Section 6.06. *Proceedings by Holders.* Except to enforce the right to receive payment of principal (including, if applicable, the Redemption Price and the Fundamental Change Repurchase Price) or interest when due, or the right to receive payment or delivery of the consideration due upon conversion, no Holder of any Note shall have any right by virtue of or by availing of any provision of this Indenture or the Notes to institute any suit, action or proceeding in equity or at law upon or under or with respect to this Indenture, or for the appointment of a receiver, trustee, liquidator, custodian or other similar official, or for any other remedy hereunder, unless:

(a) such Holder previously shall have given to the Trustee written notice of an Event of Default and of the continuance thereof, as herein provided;

(b) Holders of at least 25% in aggregate principal amount of the Notes then outstanding shall have made written request upon the Trustee to institute such action, suit or proceeding in its own name as Trustee hereunder;

(c) such Holders shall have offered, and if requested, provided to the Trustee such security or indemnity reasonably satisfactory to it against any loss, liability or expense to be incurred therein or thereby;

(d) the Trustee for 60 days after its receipt of such notice, request and offer of such security or indemnity, shall have neglected or refused to institute any such action, suit or proceeding; and

(e) no direction that, in the opinion of the Trustee, is inconsistent with such written request shall have been given to the Trustee by the Holders of a majority of the aggregate principal amount of the Notes then outstanding within such 60-day period pursuant to Section 6.09,

it being understood and intended, and being expressly covenanted by the taker and Holder of every Note with every other taker and Holder and the Trustee that no one or more Holders shall have any right in any manner whatever by virtue of or by availing of any provision of this Indenture to affect, disturb or prejudice the rights of any other Holder (it being understood that the Trustee shall not have an affirmative duty to ascertain whether or not any such direction is unduly prejudicial to any other Holder), or to obtain or seek to obtain priority over or preference to any other such Holder, or to enforce any right under this Indenture, except in the manner herein provided and for the equal, ratable and common benefit of all Holders (except as otherwise provided herein). For the protection and enforcement of this Section 6.06, each and

Notwithstanding any other provision of this Indenture and any provision of any Note, the right of any Holder to receive payment or delivery, as the case may be, of (x) the principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, (y) accrued and unpaid interest, if any, on, and (z) the consideration due upon conversion of, such Note, on or after the respective due dates expressed or provided for in such Note or in this Indenture, or to institute suit for the enforcement of any such payment or delivery, as the case may be, on or after such respective dates against the Company shall not be impaired or affected without the consent of such Holder.

Section 6.07. *Proceedings by Trustee.* In case of an Event of Default, the Trustee may in its discretion proceed to protect and enforce the rights vested in it by this Indenture by such appropriate judicial proceedings as are necessary to protect and enforce any of such rights, either by suit in equity or by action at law or by proceeding in bankruptcy or otherwise, whether for the specific enforcement of any covenant or agreement contained in this Indenture or in aid of the exercise of any power granted in this Indenture, or to enforce any other legal or equitable right vested in the Trustee by this Indenture or by law.

Section 6.08. *Remedies Cumulative and Continuing.* Except as provided in the last paragraph of Section 2.06, all powers and remedies given by this Article 6 to the Trustee or to the Holders shall, to the extent permitted by law, be deemed cumulative and not exclusive of any thereof or of any other powers and remedies available to the Trustee or the Holders of the Notes, by judicial proceedings or otherwise, to enforce the performance or observance of the covenants and agreements contained in this Indenture, and no delay or omission of the Trustee or of any Holder of any of the Notes to exercise any right or power accruing upon any Default or Event of Default shall impair any such right or power, or shall be construed to be a waiver of any such Default or Event of Default or any acquiescence therein; and, subject to the provisions of Section 6.06, every power and remedy given by this Article 6 or by law to the Trustee or to the Holders may be exercised from time to time, and as often as shall be deemed expedient, by the Trustee or by the Holders.

Section 6.09. *Direction of Proceedings and Waiver of Defaults by Majority of Holders.* Subject to the Trustee's right to receive security or indemnity from the relevant Holders as described herein, the Holders of a majority of the aggregate principal amount of the Notes at the time outstanding determined in accordance with Section 8.04 shall have the right to direct the time, method and place of conducting any proceeding for any remedy available to the Trustee or exercising any trust or power conferred on the Trustee with respect to the Notes; *provided, however,* that (a) such direction shall not be in conflict with any rule of law or with this Indenture, and (b) the Trustee may take any other action deemed proper by the Trustee that is not inconsistent with such direction. The Trustee may refuse to follow any direction that it determines is unduly prejudicial to the rights of any other Holder or that would involve the Trustee in personal liability (it being understood that the Trustee shall not have an affirmative duty to ascertain whether or not any such direction is unduly prejudicial to any other Holder). The Holders of a majority in aggregate principal amount of the Notes at the time outstanding determined in accordance with Section 8.04 may on behalf of the Holders of all of the Notes

waive any past Default or Event of Default hereunder and its consequences except (i) any continuing defaults relating to the nonpayment of accrued and unpaid interest, if any, on, or the principal (including any Redemption Price and any Fundamental Change Repurchase Price) of, the Notes when due that has not been cured pursuant to the provisions of Section 6.01, (ii) a failure by the Company to pay or deliver, as the case may be, the consideration due upon conversion of the Notes or (iii) a default in respect of a covenant or provision hereof which under Article 10 cannot be modified or amended without the consent of each Holder of an outstanding Note affected. Upon any such waiver the Company, the Trustee and the Holders of the Notes shall be restored to their former positions and rights hereunder; but no such waiver shall extend to any subsequent or other Default or Event of Default or impair any right consequent thereon. Whenever any Default or Event of Default hereunder shall have been waived as permitted by this

Section 6.09, said Default or Event of Default shall for all purposes of the Notes and this Indenture be deemed to have been cured and to be not continuing; but no such waiver shall extend to any subsequent or other Default or Event of Default or impair any right consequent thereon.

Section 6.10. *Notice of Defaults.* The Trustee shall, within 90 days after obtaining knowledge of the occurrence and continuance of a Default of which a Responsible Officer has actual knowledge, deliver to all Holders notice of all such Defaults, unless such Defaults shall have been cured or waived before the giving of such notice; *provided* that, except in the case of a Default in the payment of the principal of (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable), or accrued and unpaid interest on, any of the Notes or a Default in the payment or delivery of the consideration due upon conversion, the Trustee shall be protected in withholding such notice if and so long as it in good faith determines that the withholding of such notice is in the interests of the Holders.

Section 6.11. *Undertaking to Pay Costs.* All parties to this Indenture agree, and each Holder of any Note by its acceptance thereof shall be deemed to have agreed, that any court may, in its discretion, require, in any suit for the enforcement of any right or remedy under this Indenture, or in any suit against the Trustee for any action taken or omitted by it as Trustee, the filing by any party litigant in such suit of an undertaking to pay the costs of such suit and that such court may in its discretion assess reasonable costs, including reasonable attorneys' fees and expenses, against any party litigant in such suit, having due regard to the merits and good faith of the claims or defenses made by such party litigant; *provided* that the provisions of this Section 6.11 (to the extent permitted by law) shall not apply to any suit instituted by the Trustee, to any suit instituted by any Holder, or group of Holders, holding in the aggregate more than 10% in principal amount of the Notes at the time outstanding determined in accordance with Section 8.04, or to any suit instituted by any Holder for the enforcement of the payment of the principal of or accrued and unpaid interest, if any, on any Note (including, but not limited to, the Redemption Price and the Fundamental Change Repurchase Price with respect to the Notes being repurchased as provided in this Indenture) on or after the due date expressed or provided for in such Note or to any suit for the enforcement of the right to convert any Note in accordance with the provisions of Article 14.

ARTICLE 7 CONCERNING THE TRUSTEE

Section 7.01. *Duties and Responsibilities of Trustee.* The Trustee, prior to the occurrence of an Event of Default of which a Responsible Officer of the Trustee has written notice or actual knowledge and after the curing or waiver of all Events of Default that may have occurred, undertakes to perform such duties and only such duties as are specifically set forth in this Indenture. In the event an Event of Default has occurred and is continuing of which a Responsible Officer of the Trustee has written notice or actual knowledge, the Trustee shall exercise such of the rights and powers vested in it by this Indenture, and use the same degree of care and skill in its exercise, as a prudent person would exercise or use under the circumstances in the conduct of such person's own affairs; *provided* that if an Event of Default occurs and is continuing, the Trustee will be under no obligation to exercise any of the rights or powers under this Indenture at the request or direction of any of the Holders unless such Holders have offered (and, if requested, provided) to the Trustee indemnity or security satisfactory to it against any loss, liability or expense that might be incurred by it in compliance with such request or direction.

No provision of this Indenture shall be construed to relieve the Trustee from liability for its own grossly negligent action, its own grossly negligent failure to act or its own willful

misconduct, except that:

(a) prior to the occurrence of an Event of Default and after the curing or waiving of all Events of Default that may have occurred:

(i) the duties and obligations of the Trustee shall be determined solely by the express provisions of this Indenture, and the Trustee shall not be liable except for the performance of such duties and obligations as are specifically set forth in this Indenture and no implied covenants or obligations shall be read into this Indenture against the Trustee; and

(ii) in the absence of bad faith or willful misconduct on the part of the Trustee, the Trustee may conclusively rely, as to the truth of the statements and the correctness of the opinions expressed therein, upon any certificates or opinions furnished to the Trustee and conforming to the requirements of this Indenture; but, in the case of any such certificates or opinions that by any provisions hereof are specifically required to be furnished to the Trustee, the Trustee shall be under a duty to examine the same to determine whether or not they conform to the requirements of this Indenture (but need not confirm or investigate the accuracy of any mathematical calculations or other facts stated therein);

(b) the Trustee shall not be liable for any error of judgment made in good faith by a Responsible Officer or Officers of the Trustee, unless it shall be proved that the Trustee was grossly negligent in ascertaining the pertinent facts;

(c) the Trustee shall not be liable with respect to any action taken or omitted to be taken by it in good faith in accordance with the direction of the Holders of not less than a

majority of the aggregate principal amount of the Notes at the time outstanding determined as provided in Section 8.04 relating to the time, method and place of conducting any proceeding for any remedy available to the Trustee, or exercising any trust or power conferred upon the Trustee, under this Indenture;

(d) whether or not therein provided, every provision of this Indenture relating to the conduct or affecting the liability of, or affording protection to, the Trustee shall be subject to the provisions of this Section;

(e) the Trustee shall not be liable in respect of any payment (as to the correctness of amount, entitlement to receive or any other matters relating to payment) or notice effected by the Company or any Paying Agent or any records maintained by any co-Note Registrar with respect to the Notes;

(f) if any party fails to deliver a notice relating to an event the fact of which, pursuant to this Indenture, requires notice to be sent to the Trustee, the Trustee may conclusively rely on its failure to receive such notice as reason to act as if no such event occurred, unless a Responsible Officer of the Trustee had actual knowledge of such event;

(g) in the absence of written investment direction from the Company, all cash received by the Trustee shall be placed in a non-interest bearing trust account, and in no event shall the Trustee be liable for the selection of investments or for investment losses incurred thereon or for losses incurred as a result of the liquidation of any such investment prior to its maturity date or the failure of the party directing such investments prior to its maturity date or the failure of the party directing such investment to provide timely written investment direction, and the Trustee shall have no obligation to invest or reinvest any amounts held hereunder in the absence of such written investment direction from the Company;

(h) in the event that the Trustee is also acting as Custodian, Note Registrar, Paying Agent, Conversion Agent or transfer agent hereunder, the rights and protections afforded to the Trustee pursuant to this Article 7 shall also be afforded to such Custodian, Note Registrar, Paying Agent, Conversion Agent or transfer agent; and

(i) under no circumstances shall the Trustee be liable in its individual capacity for the obligations evidenced by the Notes.

None of the provisions contained in this Indenture shall require the Trustee to expend or risk its own funds or otherwise incur personal financial liability in the performance of any of its duties or in the exercise of any of its rights or powers.

Section 7.02. *Reliance on Documents, Opinions, Etc.* Except as otherwise provided in Section 7.01:

(a) the Trustee may conclusively rely and shall be fully protected in acting upon any resolution, certificate, statement, instrument, opinion, report, notice, request, consent, order, bond, note, coupon or other paper or document (whether in its original or facsimile form)

(b) any request, direction, order or demand of the Company mentioned herein shall be sufficiently evidenced by an Officer's Certificate (unless other evidence in respect thereof be herein specifically prescribed); and any Board Resolution may be evidenced to the Trustee by a copy thereof certified by the Secretary or an Assistant Secretary of the Company;

(c) the Trustee may consult with counsel of its selection and require an Opinion of Counsel and any written or verbal advice of such counsel or Opinion of Counsel shall be full and complete authorization and protection in respect of any action taken or omitted by it hereunder in good faith and in accordance with such advice or Opinion of Counsel. Before the Trustee acts or refrains from acting, it may require an Officer's Certificate or an Opinion of Counsel or both. The Trustee shall not be liable for any action it takes or omits to take in good faith in reliance on such Officer's Certificate or Opinion of Counsel;

(d) the Trustee shall not be bound to make any investigation into the facts or matters stated in any resolution, certificate, statement, instrument, opinion, report, notice, request, direction, consent, order, bond, debenture or other paper or document, but the Trustee, in its discretion, may make such further inquiry or investigation into such facts or matters as it may see fit, and, if the Trustee shall determine to make such further inquiry or investigation, it shall be entitled to examine the books, records and premises of the Company, personally or by agent or attorney at the expense of the Company and shall incur no liability of any kind by reason of such inquiry or investigation;

(e) the Trustee may execute any of the trusts or powers hereunder or perform any duties hereunder either directly or by or through agents, custodians, nominees or attorneys and the Trustee shall not be responsible for any misconduct or negligence on the part of any agent, custodian, nominee or attorney appointed by it with due care hereunder;

(f) the permissive rights of the Trustee enumerated herein shall not be construed as duties;

(g) the Trustee shall not be required to give any bond or surety in respect of the performance of its powers and duties hereunder;

(h) the Trustee may request that the Company deliver a certificate setting forth the names of individuals and/or titles of officers authorized at such time to take specified actions pursuant to this Indenture;

(i) the Trustee shall not be deemed to have notice of any Default or Event of Default (except in the case of a Default or Event of Default in payment of scheduled principal of, premium, if any, or interest on, any Note) unless a Responsible Officer of the Trustee has actual knowledge thereof or unless written notice of any event which is in fact such a Default or Event of Default (and stating the occurrence of a Default or Event of Default) is received by the Trustee at the Corporate Trust Office of the Trustee, and such notice references the Notes and this Indenture;

40

(j) the Trustee shall not be responsible or liable for any action it takes or omits to take in good faith which it reasonably believes to be authorized or within its rights or powers;

(k) the Trustee shall not be responsible or liable for any action taken or omitted by it in good faith at the direction of the holders of not less than a majority in principal amount of the Notes as to the time, method and place of conducting any proceedings for any remedy available to the Trustee or the exercising of any power conferred by this Indenture;

(l) neither the Trustee nor any of its directors, officers, employees, agents or affiliates shall be responsible for nor have any duty to monitor the performance or any action of the Company, or any of their respective directors, members, officers, agents, affiliates or employee, nor shall it have any liability in connection with the malfeasance or nonfeasance by such party

not shall it have any liability in connection with the inaccuracy or omission by such party. The Trustee shall not be responsible for any inaccuracy in the information obtained from the Company or for any inaccuracy or omission in the records which may result from such information or any failure by the Trustee to perform its duties as set forth herein as a result of any inaccuracy or incompleteness;

(m) in no event shall the Trustee be liable for any consequential, punitive, special or indirect loss or damage of any kind whatsoever (including but not limited to lost profits), even if the Trustee has been advised of the likelihood of such loss or damage and regardless of the form of action. The Trustee shall not be charged with knowledge of any Default or Event of Default with respect to the Notes, unless either (1) a Responsible Officer shall have actual knowledge of such Default or Event of Default or (2) written notice of such Default or Event of Default shall have been given to the Trustee by the Company or by any Holder of the Notes at the Corporate Trust Office and such notice references the Notes and/or this Indenture; and

(n) neither the Trustee nor any Agent shall have any responsibility or liability for any actions taken or not taken by the Depository.

Section 7.03. *No Responsibility for Recitals, Etc.* The recitals contained herein and in the Notes (except in the Trustee's certificate of authentication) shall be taken as the statements of the Company, and the Trustee assumes no responsibility for the correctness of the same. The Trustee makes no representations as to the validity, sufficiency or enforceability of this Indenture or of the Notes. The Trustee shall not be accountable for the use or application by the Company of any Notes or the proceeds of any Notes authenticated and delivered by the Trustee in conformity with the provisions of this Indenture or any money paid to the Company or upon the Company's direction under any provision of the Indenture.

Section 7.04. *Trustee, Paying Agents, Conversion Agents or Note Registrar May Own Notes.* The Trustee, any Paying Agent, any Conversion Agent or Note Registrar, in its individual or any other capacity, may become the owner or pledgee of Notes with the same rights it would have if it were not the Trustee, Paying Agent, Conversion Agent or Note Registrar.

Section 7.05. *Monies and Shares of Common Stock to Be Held in Trust.* All monies and any shares of Common Stock received by the Trustee shall, until used or applied as herein provided, be held in trust for the purposes for which they were received. Money and shares of Common Stock held by the Trustee in trust hereunder need not be segregated from other funds or

property except to the extent required by law. The Trustee shall be under no liability for interest on any money or shares of Common Stock received by it hereunder except as may be agreed from time to time by the Company and the Trustee.

Section 7.06. *Compensation and Expenses of Trustee.* The Company covenants and agrees to pay to the Trustee, in any capacity under this Indenture, from time to time, and the Trustee shall receive such compensation for all services rendered by it hereunder in any capacity (which shall not be limited by any provision of law in regard to the compensation of a trustee of an express trust) as mutually agreed to in writing between the Trustee and the Company, and the Company will pay or reimburse the Trustee upon its request for all reasonable expenses, disbursements and advances reasonably incurred or made by the Trustee in accordance with any of the provisions of this Indenture in any capacity thereunder (including the reasonable compensation and the expenses and disbursements of its agents and counsel and of all Persons not regularly in its employ) except any such expense, disbursement or advance as shall have been caused by its gross negligence or willful misconduct as determined by a final, non-appealable decision of a court of competent jurisdiction. The Company also covenants to indemnify the Trustee in any capacity under this Indenture and any other document or transaction entered into in connection herewith and its officers, directors, attorneys, employees and agents and any authenticating agent for, and to hold them harmless against, any loss, claim (whether asserted by the Company, a Holder or any Person), damage, liability or expense (including attorneys' fees)

the Company, a holder of any Note(s), damage, liability or expense (including attorney's fees), incurred without gross negligence or willful misconduct on the part of the Trustee, its officers, directors, attorneys, agents or employees, or such agent or authenticating agent, as the case may be, as determined by a final, non-appealable decision of a court of competent jurisdiction, and arising out of or in connection with the acceptance or administration of this Indenture or in any other capacity hereunder, including the costs and expenses of defending themselves against any claim of liability in the premises or the enforcement of this Section 7.06. The obligations of the Company under this Section 7.06 to compensate or indemnify the Trustee and to pay or reimburse the Trustee for expenses, disbursements and advances shall be secured by a senior lien to which the Notes are hereby made subordinate on all money or property held or collected by the Trustee, except, subject to the effect of Section 6.05, funds held in trust herewith for the benefit of the Holders of particular Notes, and, for the avoidance of doubt, such lien shall not be extended in a manner that would conflict with the Company's obligations to its other creditors. The Trustee's right to receive payment of any amounts due under this Section 7.06 shall not be subordinate to any other liability or indebtedness of the Company. The obligation of the Company under this Section 7.06 shall survive the satisfaction and discharge of this Indenture and the earlier resignation or removal of the Trustee. The Company need not pay for any settlement made without its consent, which consent shall not be unreasonably withheld. The indemnification provided in this Section 7.06 shall extend to the officers, directors, agents and employees of the Trustee.

Without prejudice to any other rights available to the Trustee under applicable law, when the Trustee and its agents and any authenticating agent incur expenses or render services after an Event of Default specified in Section 6.01(h) or Section 6.01(i) occurs, the expenses and the compensation for the services are intended to constitute expenses of administration under any bankruptcy, insolvency or similar laws.

Section 7.07. *Officer's Certificate and Opinion of Counsel as Evidence.* Except as otherwise provided in Section 7.01, whenever in the administration of the provisions of this Indenture the Trustee shall deem it necessary or desirable that a matter be proved or established prior to taking or omitting any action hereunder, such matter (unless other evidence in respect thereof be herein specifically prescribed) may, in the absence of gross negligence or willful misconduct on the part of the Trustee, be deemed to be conclusively proved and established by an Officer's Certificate and Opinion of Counsel delivered to the Trustee, and such Officer's Certificate and Opinion of Counsel, in the absence of gross negligence or willful misconduct on the part of the Trustee, shall be full warrant to the Trustee for any action taken or omitted by it under the provisions of this Indenture upon the faith thereof.

Section 7.08. *Eligibility of Trustee.* There shall at all times be a Trustee hereunder which shall be a Person that is eligible pursuant to the Trust Indenture Act (as if, for this purpose, the Trust Indenture Act were applicable hereto) to act as such and has a combined capital and surplus of at least \$50,000,000. If such Person publishes reports of condition at least annually, pursuant to law or to the requirements of any supervising or examining authority, then for the purposes of this Section, the combined capital and surplus of such Person shall be deemed to be its combined capital and surplus as set forth in its most recent report of condition so published. If at any time the Trustee shall cease to be eligible in accordance with the provisions of this Section, it shall resign immediately in the manner and with the effect hereinafter specified in this Article.

Section 7.09. *Resignation or Removal of Trustee.* (a) The Trustee may at any time resign by giving written notice of such resignation to the Company and by delivering notice thereof to the Holders. Upon receiving such notice of resignation, the Company shall promptly appoint a successor trustee by written instrument, in duplicate, executed by order of the Board of Directors, one copy of which instrument shall be delivered to the resigning Trustee and one copy to the successor trustee. If no successor trustee shall have been so appointed and have accepted appointment within 45 days after the giving of such notice of resignation to the Holders, the resigning Trustee may, upon ten Business Days' notice to the Company and the Holders and at the expense of the Company, petition any court of competent jurisdiction for the appointment of a successor trustee, or any Holder who has been a bona fide holder of a Note or Notes for at least six months (or since the date of this Indenture) may, subject to the provisions of Section 6.11, on behalf of himself or herself and all others similarly situated, petition any such court for the appointment of a successor trustee. Such court may thereupon, after such notice, if any, as it may deem proper and prescribe, appoint a successor trustee.

(b) In case at any time any of the following shall occur:

(i) the Trustee shall cease to be eligible in accordance with the provisions of Section 7.08 and shall fail to resign after written request therefor by the Company or by any such Holder, or

(ii) the Trustee shall become incapable of acting, or shall be adjudged a bankrupt or insolvent, or a receiver of the Trustee or of its property shall be appointed, or any public officer shall take charge or control of the Trustee or of its property or affairs for the purpose of rehabilitation, conservation or liquidation,

then, in either case, the Company may by a Board Resolution remove the Trustee and appoint a successor trustee by written instrument, in duplicate, executed by order of the Board of Directors, one copy of which instrument shall be delivered to the Trustee so removed and one

copy to the successor trustee, or, subject to the provisions of Section 6.11, any Holder who has been a bona fide holder of a Note or Notes for at least six months (or since the date of this Indenture) may, on behalf of himself or herself and all others similarly situated, petition any court of competent jurisdiction at the expense of the Company for the removal of the Trustee and the appointment of a successor trustee. Such court may thereupon, after such notice, if any, as it may deem proper and prescribe, remove the Trustee and appoint a successor trustee.

(c) The Holders of a majority in aggregate principal amount of the Notes at the time outstanding, as determined in accordance with Section 8.04, may at any time remove the Trustee and nominate a successor trustee that shall be deemed appointed as successor trustee unless within ten days after notice to the Company of such nomination the Company objects thereto, in which case the Trustee so removed or any Holder, upon the terms and conditions and otherwise as in Section 7.09(a) provided, may petition any court of competent jurisdiction for an appointment of a successor trustee.

(d) Any resignation or removal of the Trustee and appointment of a successor trustee pursuant to any of the provisions of this Section 7.09 shall become effective upon acceptance of appointment by the successor trustee as provided in Section 7.10.

Section 7.10. *Acceptance by Successor Trustee.* Any successor trustee appointed as provided in Section 7.09 shall execute, acknowledge and deliver to the Company and to its predecessor trustee an instrument accepting such appointment hereunder, and thereupon the resignation or removal of the predecessor trustee shall become effective and such successor trustee, without any further act, deed or conveyance, shall become vested with all the rights, powers, duties and obligations of its predecessor hereunder, with like effect as if originally named as Trustee herein; but, nevertheless, on the written request of the Company or of the successor trustee, the trustee ceasing to act shall, upon payment of any amounts then due it pursuant to the provisions of Section 7.06, execute and deliver an instrument transferring to such successor trustee all the rights and powers of the trustee so ceasing to act. Upon request of any such successor trustee, the Company shall execute any and all instruments in writing for more fully and certainly vesting in and confirming to such successor trustee all such rights and powers. Any trustee ceasing to act shall, nevertheless, retain a senior lien to which the Notes are hereby made subordinate on all money or property held or collected by such trustee as such, except for funds held in trust for the benefit of Holders of particular Notes, to secure any amounts then due it pursuant to the provisions of Section 7.06.

No successor trustee shall accept appointment as provided in this Section 7.10 unless at the time of such acceptance such successor trustee shall be eligible under the provisions of Section 7.08.

Upon acceptance of appointment by a successor trustee as provided in this Section 7.10, each of the Company and the successor trustee, at the written direction and at the expense of the Company shall deliver or cause to be delivered notice of the succession of such trustee hereunder to the Holders. If the Company fails to deliver such notice within ten days after acceptance of

appointment by the successor trustee, the successor trustee shall cause such notice to be delivered at the expense of the Company.

Section 7.11. *Succession by Merger, Etc.* Any corporation or other entity into which the Trustee may be merged or converted or with which it may be consolidated, or any corporation or other entity resulting from any merger, conversion or consolidation to which the Trustee shall be a party, or any corporation or other entity succeeding to all or substantially all of the corporate trust business of the Trustee (including the administration of this Indenture), shall be the successor to the Trustee hereunder without the execution or filing of any paper or any further act on the part of any of the parties hereto; *provided* that in the case of any corporation or other entity succeeding to all or substantially all of the corporate trust business of the Trustee such corporation or other entity shall be eligible under the provisions of Section 7.08.

corporation or other entity shall be eligible under the provisions of Section 7.08.

In case at the time such successor to the Trustee shall succeed to the trusts created by this Indenture, any of the Notes shall have been authenticated but not delivered, any such successor to the Trustee may adopt the certificate of authentication of any predecessor trustee or authenticating agent appointed by such predecessor trustee, and deliver such Notes so authenticated; and in case at that time any of the Notes shall not have been authenticated, any successor to the Trustee or an authenticating agent appointed by such successor trustee may authenticate such Notes either in the name of any predecessor trustee hereunder or in the name of the successor trustee; and in all such cases such certificates shall have the full force which it is anywhere in the Notes or in this Indenture provided that the certificate of the Trustee shall have; *provided, however*, that the right to adopt the certificate of authentication of any predecessor trustee or to authenticate Notes in the name of any predecessor trustee shall apply only to its successor or successors by merger, conversion or consolidation.

Section 7.12. *Trustee's Application for Instructions from the Company.* Any application by the Trustee for written instructions from the Company (other than with regard to any action proposed to be taken or omitted to be taken by the Trustee that affects the rights of the Holders of the Notes under this Indenture) may, at the option of the Trustee, set forth in writing any action proposed to be taken or omitted by the Trustee under this Indenture and the date on and/or after which such action shall be taken or such omission shall be effective. The Trustee shall not be liable to the Company for any action taken by, or omission of, the Trustee in accordance with a proposal included in such application on or after the date specified in such application (which date shall not be less than three Business Days after notice that the Company has been deemed to have been given pursuant to Section 17.03, unless any such officer shall have consented in writing to any earlier date), unless, prior to taking any such action (or the effective date in the case of any omission), the Trustee shall have received written instructions in accordance with this Indenture in response to such application specifying the action to be taken or omitted.

ARTICLE 8 CONCERNING THE HOLDERS

Section 8.01. *Action by Holders.* Whenever in this Indenture it is provided that the Holders of a specified percentage of the aggregate principal amount of the Notes may take any

45

action (including the making of any demand or request, the giving of any notice, consent or waiver or the taking of any other action), the fact that at the time of taking any such action, the Holders of such specified percentage have joined therein may be evidenced (a) by any instrument or any number of instruments of similar tenor executed by Holders in person or by agent or proxy appointed in writing, or (b) by the record of the Holders voting in favor thereof at any meeting of Holders duly called and held in accordance with the provisions of Article 9, or (c) by a combination of such instrument or instruments and any such record of such a meeting of Holders. Whenever the Company or the Trustee solicits the taking of any action by the Holders of the Notes, the Company or the Trustee may fix, but shall not be required to, in advance of such solicitation, a date as the record date for determining Holders entitled to take such action. The record date if one is selected shall be not more than fifteen days prior to the date of commencement of solicitation of such action.

Section 8.02. *Proof of Execution by Holders.* Subject to the provisions of Section 7.01, Section 7.02 and Section 9.05, proof of the execution of any instrument by a Holder or its agent or proxy shall be sufficient if made in accordance with such reasonable rules and regulations as may be prescribed by the Trustee or in such manner as shall be satisfactory to the Trustee. The holding of Notes shall be proved by the Note Register or by a certificate of the Note Registrar. The record of any Holders' meeting shall be proved in the manner provided in Section 9.06.

Section 8.03. *Who Are Deemed Absolute Owners.* The Company, the Trustee, any authenticating agent, any Paying Agent, any Conversion Agent and any Note Registrar may deem the Person in whose name a Note shall be registered upon the Note Register to be, and may treat it as, the absolute owner of such Note (whether or not such Note shall be overdue and notwithstanding any notation of ownership or other writing thereon made by any Person other than the Company or any Note Registrar) for the purpose of receiving payment of or on account of the principal (including any Redemption Price and any Fundamental Change Repurchase Price) of and (subject to Section 2.03) accrued and unpaid interest on such Note, for conversion of such Note and for all other purposes under this Indenture; and neither the Company nor the Trustee nor any Paying Agent nor any Conversion Agent nor any Note Registrar shall be affected by any notice to the contrary. The sole registered holder of a Global Note shall be the Depository or its nominee. All such payments or deliveries so made to any Holder for the time being, or upon its order, shall be valid, and, to the extent of the sums or shares of Common Stock so paid or delivered, effectual to satisfy and discharge the liability for monies payable or shares deliverable upon any such Note. Notwithstanding anything to the contrary in this Indenture or the Notes following an Event of Default, any owner of a beneficial interest in a Global Note may directly enforce against the Company, without the consent, solicitation, proxy, authorization or any other action of the Depository or any other Person, such holder's right to exchange such beneficial interest for a Note in certificated form in accordance with the provisions of this Indenture.

Section 8.04. *Company-Owned Notes Disregarded.* In determining whether the Holders of the requisite aggregate principal amount of Notes have concurred in any direction, consent, waiver or other action under this Indenture, Notes that are owned by the Company, by any Subsidiary thereof or by any Person directly or indirectly controlling or controlled by or under direct or indirect common control with the Company or any Subsidiary thereof shall be

disregarded and deemed not to be outstanding for the purpose of any such determination; *provided* that for the purposes of determining whether the Trustee shall be protected in relying on any such direction, consent, waiver or other action only Notes that a Responsible Officer actually knows are so owned shall be so disregarded. Notes so owned that have been pledged in good faith may be regarded as outstanding for the purposes of this Section 8.04 if the pledgee shall establish to the satisfaction of the Trustee the pledgee's right to so act with respect to such Notes and that the pledgee is not the Company, a Subsidiary thereof or a Person directly or indirectly controlling or controlled by or under direct or indirect common control with the Company or a Subsidiary thereof. In the case of a dispute as to such right, any decision or indecision by the Trustee taken upon the advice of counsel shall be full protection to the Trustee. Upon request of the Trustee, the Company shall furnish to the Trustee promptly an Officer's Certificate listing and identifying all Notes, if any, known by the Company to be owned or held by or for the account of any of the above described Persons; and, subject to Section 7.01, the Trustee shall be entitled to accept such Officer's Certificate as conclusive evidence of the facts therein set forth and of the fact that all Notes not listed therein are outstanding for the purpose of any such determination. Notwithstanding Section 316(a)(1) of the Trust Indenture Act (which, for the avoidance of doubt, shall not apply to this Indenture unless and until this Indenture is qualified under the Trust Indenture Act) or anything herein to the contrary, to the fullest extent permitted by law, no Sponsor Notes shall be deemed to be owned by the Company or any of its Subsidiaries or Affiliates for purposes of this Indenture, the Notes and any direction, waiver or consent with respect thereto.

Section 8.05. *Revocation of Consents; Future Holders Bound.* At any time prior to (but not after) the evidencing to the Trustee, as provided in Section 8.01, of the taking of any action by the Holders of the percentage of the aggregate principal amount of the Notes specified in this Indenture in connection with such action, any Holder of a Note that is shown by the evidence to be included in the Notes the Holders of which have consented to such action may, by filing written notice with the Trustee at its Corporate Trust Office and upon proof of holding as provided in Section 8.02, revoke such action so far as concerns such Note. Except as aforesaid, any such action taken by the Holder of any Note shall be conclusive and binding upon such Holder and upon all future Holders and owners of such Note and of any Notes issued in exchange or substitution therefor or upon registration of transfer thereof, irrespective of whether any notation in regard thereto is made upon such Note or any Note issued in exchange or substitution therefor or upon registration of transfer thereof.

ARTICLE 9 HOLDERS' MEETINGS

Section 9.01. *Purpose of Meetings.* A meeting of Holders may be called at any time and from time to time pursuant to the provisions of this Article 9 for any of the following purposes:

(a) to give any notice to the Company or to the Trustee or to give any directions to the Trustee permitted under this Indenture, or to consent to the waiving of any Default or Event of Default hereunder (in each case, as permitted under this Indenture) and its consequences, or to

(b) to remove the Trustee and nominate a successor trustee pursuant to the provisions of Article 7;

(c) to consent to the execution of an indenture or indentures supplemental hereto pursuant to the provisions of Section 10.02; or

(d) to take any other action authorized to be taken by or on behalf of the Holders of any specified aggregate principal amount of the Notes under any other provision of this Indenture or under applicable law.

Section 9.02. *Call of Meetings by Trustee.* The Trustee may at any time call a meeting of Holders to take any action specified in Section 9.01, to be held at such time and at such place as the Trustee shall determine. Notice of every meeting of the Holders, setting forth the time and the place of such meeting and in general terms the action proposed to be taken at such meeting and the establishment of any record date pursuant to Section 8.01, shall be delivered to Holders of such Notes. Such notice shall also be delivered to the Company. Such notices shall be delivered not less than 20 nor more than 90 days prior to the date fixed for the meeting.

Any meeting of Holders shall be valid without notice if the Holders of all Notes then outstanding are present in person or by proxy or if notice is waived before or after the meeting by the Holders of all Notes then outstanding, and if the Company and the Trustee are either present by duly authorized representatives or have, before or after the meeting, waived notice.

Section 9.03. *Call of Meetings by Company or Holders.* In case at any time the Company, pursuant to a Board Resolution, or the Holders of at least 10% of the aggregate principal amount of the Notes then outstanding, shall have requested the Trustee to call a meeting of Holders, by written request setting forth in reasonable detail the action proposed to be taken at the meeting, and the Trustee shall not have delivered the notice of such meeting within 20 days after receipt of such request, then the Company or such Holders may determine the time and the place for such meeting and may call such meeting to take any action authorized in Section 9.01, by delivering notice thereof as provided in Section 9.02.

Section 9.04. *Qualifications for Voting.* To be entitled to vote at any meeting of Holders a Person shall (a) be a Holder of one or more Notes on the record date pertaining to such meeting or (b) be a Person appointed by an instrument in writing as proxy by a Holder of one or more Notes on the record date pertaining to such meeting. The only Persons who shall be entitled to be present or to speak at any meeting of Holders shall be the Persons entitled to vote at such meeting and their counsel and any representatives of the Trustee and its counsel and any representatives of the Company and its counsel.

Section 9.05. *Regulations.* Notwithstanding any other provisions of this Indenture, the Trustee may make such reasonable regulations as it may deem advisable for any meeting of Holders, in regard to proof of the holding of Notes and of the appointment of proxies, and in regard to the appointment and duties of inspectors of votes, the submission and examination of

proxies, certificates and other evidence of the right to vote, and such other matters concerning the conduct of the meeting as it shall think fit.

The Trustee shall, by an instrument in writing, appoint a temporary chairman of the meeting, unless the meeting shall have been called by the Company or by Holders as provided in Section 9.03, in which case the Company or the Holders calling the meeting, as the case may be, shall in like manner appoint a temporary chairman. A permanent chairman and a permanent secretary of the meeting shall be elected by vote of the Holders of a majority in aggregate principal amount of the outstanding Notes represented at the meeting and entitled to vote at the meeting.

Subject to the provisions of Section 8.04, at any meeting of Holders each Holder or

subject to the provisions of Section 9.04, at any meeting of Holders each Holder or proxyholder shall be entitled to one vote for each \$1,000 principal amount of Notes held or represented by him or her; *provided, however*, that no vote shall be cast or counted at any meeting in respect of any Note challenged as not outstanding and ruled by the chairman of the meeting to be not outstanding. The chairman of the meeting shall have no right to vote other than by virtue of Notes held by it or instruments in writing as aforesaid duly designating it as the proxy to vote on behalf of other Holders. Any meeting of Holders duly called pursuant to the provisions of Section 9.02 or Section 9.03 may be adjourned from time to time by the Holders of a majority of the aggregate principal amount of Notes represented at the meeting, whether or not constituting a quorum, and the meeting may be held as so adjourned without further notice.

Section 9.06. *Voting.* The vote upon any resolution submitted to any meeting of Holders shall be by written ballot on which shall be subscribed the signatures of the Holders or of their representatives by proxy and the outstanding aggregate principal amount of the Notes held or represented by them. The permanent chairman of the meeting shall appoint two inspectors of votes who shall count all votes cast at the meeting for or against any resolution and who shall make and file with the secretary of the meeting their verified written reports in duplicate of all votes cast at the meeting. A record in duplicate of the proceedings of each meeting of Holders shall be prepared by the secretary of the meeting and there shall be attached to said record the original reports of the inspectors of votes on any vote by ballot taken thereat and affidavits by one or more Persons having knowledge of the facts setting forth a copy of the notice of the meeting and showing that said notice was delivered as provided in Section 9.02. The record shall show the aggregate principal amount of the Notes voting in favor of or against any resolution. The record shall be signed and verified by the affidavits of the permanent chairman and secretary of the meeting and one of the duplicates shall be delivered to the Company and the other to the Trustee to be preserved by the Trustee, the latter to have attached thereto the ballots voted at the meeting.

Any record so signed and verified shall be conclusive evidence of the matters therein stated.

Section 9.07. *No Delay of Rights by Meeting.* Nothing contained in this Article 9 shall be deemed or construed to authorize or permit, by reason of any call of a meeting of Holders or any rights expressly or impliedly conferred hereunder to make such call, any hindrance or delay in the exercise of any right or rights conferred upon or reserved to the Trustee or to the Holders under any of the provisions of this Indenture or of the Notes. Nothing contained in this Article 9

shall be deemed or construed to limit any Holder's actions pursuant to the applicable procedures of the Depository so long as the Notes are Global Notes.

ARTICLE 10 SUPPLEMENTAL INDENTURES

Section 10.01. *Supplemental Indentures Without Consent of Holders.* Without the consent of any Holder, the Company and the Trustee, at the Company's expense, may from time to time and at any time enter into an indenture or indentures supplemental hereto for one or more of the following purposes:

(a) to cure any ambiguity, omission, defect or inconsistency (including, without limitation, any mistake or inconsistency between this Indenture and the Investment Agreement, as determined by the Company in good faith);

(b) to provide for the assumption by a Successor Company of the obligations of the Company under this Indenture pursuant to Article 11;

(c) to add guarantees with respect to the Notes;

- (d) to secure the Notes;
- (e) to add to the covenants or Events of Default of the Company for the benefit of the Holders or surrender any right or power conferred upon the Company under this Indenture;
- (f) to make any change that does not adversely affect the rights of any Holder, as determined by the Company in good faith;
- (g) to increase the Conversion Rate as provided in this Indenture;
- (h) to provide for the acceptance of appointment by a successor trustee pursuant to Section 7.09 or to facilitate the administration of the trusts by more than one trustee;
- (i) in connection with any Merger Event, to provide that the Notes are convertible into Reference Property, subject to the provisions of Section 14.02, and make such related changes to the terms of the Notes to the extent expressly required by Section 14.06; or
- (j) to comply with the rules of the Depository in a manner that does not adversely affect the rights of any Holder.

Upon the written request of the Company, the Trustee is hereby authorized to, and shall join with the Company in the execution of any such supplemental indenture, to make any further appropriate agreements and stipulations that may be therein contained, except that the Trustee shall not be obligated to, but may in its discretion, enter into any supplemental indenture that affects the Trustee's own rights, duties, liabilities or immunities under this Indenture or otherwise.

Any supplemental indenture authorized by the provisions of this Section 10.01 may be executed by the Company and the Trustee without the consent of the Holders of any of the Notes at the time outstanding, notwithstanding any of the provisions of Section 10.02. After any such supplemental indenture becomes effective, the Company shall deliver to the Holders (with a copy to the Trustee) a notice briefly describing such supplemental indenture. However, the failure to give such notice to all the Holders (with a copy to the Trustee), or any defect in the notice, will not impair or affect the validity of the supplemental indenture.

Section 10.02. *Supplemental Indentures with Consent of Holders.* With the consent (evidenced as provided in Article 8) of (i) the Holders of at least a majority of the aggregate principal amount of the Notes then outstanding (determined in accordance with Article 8 and including, without limitation, consents obtained in connection with a repurchase of, or tender or exchange offer for, the Notes), (ii) the Company and (iii) the Trustee, at the Company's expense, may from time to time and at any time enter into an indenture or indentures supplemental hereto for the purpose of adding any provisions to or changing in any manner or eliminating any of the provisions of this Indenture, the Notes or any supplemental indenture or of modifying in any manner the rights of the Holders; *provided, however,* that, without the consent of each Holder of an outstanding Note affected, no such supplemental indenture shall:

- (a) reduce the principal amount of Notes whose Holders must consent to an amendment;
- (b) reduce the rate of or extend the stated time for payment of interest on any Note;
- (c) reduce the principal of or extend the Maturity Date of any Note;
- (d) make any change that adversely affects the conversion rights of any Notes other than as required by this Indenture;
- (e) reduce the Redemption Price or the Fundamental Change Repurchase Price of any Note or amend or modify in any manner adverse to the Holders the Company's obligation to make such payments, whether through an amendment or waiver of provisions in the covenants, definitions or otherwise;
- (f) make any Note payable in a currency, or at a place of payment, other than that stated in the Note;
- (g) change the ranking of the Notes;
- (h) impair the right of any Holder to receive payment of principal and interest on such Holder's Notes on or after the due dates therefor or to institute suit for the enforcement of any payment on or with respect to such Holder's Note; or
- (i) make any change in this Article 10 that requires each Holder's consent or in the waiver provisions in Section 6.02 or Section 6.09.

Notwithstanding the foregoing or anything to the contrary, so long as any Sponsor Notes are outstanding, without the consent of the Holders of 100% of the aggregate principal amount of the Sponsor Notes, an amendment, supplement or waiver, including a waiver pursuant to Section

6.09, may not modify any provision contained in this Indenture specifically and uniquely applicable to the Sponsor Notes in a manner adverse to the Holders of, or the holders of a beneficial interest in, the Sponsor Notes.

Upon the written request of the Company, and upon the filing with the Trustee of evidence of the consent of the requisite Holders as aforesaid and subject to Section 10.05, the Trustee shall join with the Company in the execution of such supplemental indenture unless such supplemental indenture affects the Trustee's own rights, duties, liabilities or immunities under this Indenture or otherwise, in which case the Trustee may in its discretion, but shall not be obligated to, enter into such supplemental indenture.

Holders do not need under this Section 10.02 to approve the particular form of any proposed supplemental indenture. It shall be sufficient if such Holders approve the substance thereof. After any such supplemental indenture becomes effective, the Company shall deliver to the Holders (with a copy to the Trustee) a notice briefly describing such supplemental indenture. However, the failure to give such notice to all the Holders (with a copy to the Trustee), or any defect in the notice, will not impair or affect the validity of the supplemental indenture.

Section 10.03. *Effect of Supplemental Indentures.* Upon the execution of any supplemental indenture pursuant to the provisions of this Article 10, this Indenture shall be and be deemed to be modified and amended in accordance therewith and the respective rights, limitation of rights, obligations, duties and immunities under this Indenture of the Trustee, the Company and the Holders shall thereafter be determined, exercised and enforced hereunder subject in all respects to such modifications and amendments and all the terms and conditions of any such supplemental indenture shall be and be deemed to be part of the terms and conditions of this Indenture for any and all purposes.

Section 10.04. *Notation on Notes.* Notes authenticated and delivered after the execution of any supplemental indenture pursuant to the provisions of this Article 10 may, at the Company's request and expense, bear a notation in form approved by the Trustee as to any matter provided for in such supplemental indenture. If the Company or the Trustee shall so determine, new Notes so modified as to conform, in the opinion of the Trustee and the Company, to any modification of this Indenture contained in any such supplemental indenture may, at the Company's expense, be prepared and executed by the Company, authenticated, upon receipt of a Company Order, by the Trustee (or an authenticating agent duly appointed by the Trustee pursuant to Section 17.10) and delivered in exchange for the Notes then outstanding, upon surrender of such Notes then outstanding.

Section 10.05. *Evidence of Compliance of Supplemental Indenture to Be Furnished Trustee.* In addition to the documents required by Section 17.05, the Trustee shall receive an Officer's Certificate and an Opinion of Counsel as conclusive evidence that any supplemental indenture executed pursuant hereto complies with the requirements of this Article 10 and is permitted or authorized by this Indenture and that the supplemental indenture constitutes the legal, valid and binding obligation of the Company enforceable in accordance with its terms.

ARTICLE 11 CONSOLIDATION, MERGER, SALE, CONVEYANCE AND LEASE

Section 11.01. *Company May Consolidate, Etc. on Certain Terms.* Subject to the provisions of Section 11.02, the Company shall not consolidate with, merge with or into, or sell, convey, transfer or lease all or substantially all of the consolidated properties and assets of the Company and its Subsidiaries, taken as a whole, to another Person (other than one or more of its Wholly-Owned Subsidiaries), unless:

(a) the resulting, surviving or transferee Person (the "**Successor Company**"), if not the Company, shall be a corporation organized and existing under the laws of the United States of America, any State thereof or the District of Columbia, and the Successor Company (if not the

America, any State thereof or the District of Columbia, and the Successor Company (if not the Company) shall expressly assume by supplemental indenture all of the obligations of the Company under the Notes and this Indenture;

(b) immediately after giving effect to such transaction, no Default or Event of Default shall have occurred and be continuing under this Indenture; and

(c) the Company shall have delivered to the Trustee an Officer's Certificate and Opinion of Counsel to the Trustee.

Section 11.02. *Successor Corporation to Be Substituted.* In case of any such consolidation, merger, sale, conveyance, transfer or lease and upon the assumption by the Successor Company, by supplemental indenture, executed and delivered to the Trustee and satisfactory in form to the Trustee, of the due and punctual payment of the principal of and accrued and unpaid interest on all of the Notes, the due and punctual delivery or payment, as the case may be, of any consideration due upon conversion of the Notes and the due and punctual performance of all of the covenants and conditions of this Indenture to be performed by the Company, such Successor Company (if not the Company) shall succeed to and, except in the case of a lease of all or substantially all of the Company's properties and assets, shall be substituted for the Company, with the same effect as if it had been named herein as the party of the first part, and may thereafter exercise every right and power of the Company under this Indenture. Such Successor Company thereupon may cause to be signed, and may issue either in its own name or in the name of the Company any or all of the Notes issuable hereunder which theretofore shall not have been signed by the Company and delivered to the Trustee; and, upon the order of such Successor Company instead of the Company and subject to all the terms, conditions and limitations in this Indenture prescribed, the Trustee shall authenticate and shall deliver, or cause to be authenticated and delivered, any Notes that previously shall have been signed and delivered by the Officers of the Company to the Trustee for authentication, and any Notes that such Successor Company thereafter shall cause to be signed and delivered to the Trustee for that purpose. All the Notes so issued shall in all respects have the same legal rank and benefit under this Indenture as the Notes theretofore or thereafter issued in accordance with the terms of this Indenture as though all of such Notes had been issued at the date of the execution hereof. In the event of any such consolidation, merger, sale, conveyance or transfer (but not in the case of a lease), upon compliance with this Article 11 the Person named as the "Company" in the first paragraph of this Indenture (or any successor that shall thereafter have become such in the manner prescribed in this Article 11) may be dissolved, wound up and

liquidated at any time thereafter and, except in the case of a lease, such Person shall be released from its liabilities as obligor and maker of the Notes and from its obligations under this Indenture and the Notes.

In case of any such consolidation, merger, sale, conveyance, transfer or lease, such changes in phraseology and form (but not in substance) may be made in the Notes thereafter to be issued as may be appropriate.

ARTICLE 12

IMMUNITY OF INCORPORATORS, STOCKHOLDERS, OFFICERS AND DIRECTORS

Section 12.01. *Indenture and Notes Solely Corporate Obligations.* No recourse for the payment of the principal of or accrued and unpaid interest on any Note, nor for any claim based thereon or otherwise in respect thereof, and no recourse under or upon any obligation, covenant or agreement of the Company in this Indenture or in any supplemental indenture or in any Note, nor because of the creation of any indebtedness represented thereby, shall be had against any incorporator, stockholder, employee, agent, Officer or director or Subsidiary, as such, past, present or future, of the Company or of any successor corporation, either directly or through the Company or any successor corporation, whether by virtue of any constitution, statute or rule of

company or any successor corporation, whether by virtue of any constitution, statute or rule of law, or by the enforcement of any assessment or penalty or otherwise; it being expressly understood that all such liability is hereby expressly waived and released as a condition of, and as a consideration for, the execution of this Indenture and the issue of the Notes.

ARTICLE 13
INTENTIONALLY OMITTED

ARTICLE 14
CONVERSION OF NOTES

Section 14.01. *Conversion Privilege.*

(a) Subject to and upon compliance with the provisions of this Article 14 and, with respect to any Sponsor Note, subject to Section 4.11 of the Investment Agreement, each Holder of a Note shall have the right, at such Holder's option, to convert all or any portion (if the portion to be converted is \$1,000 principal amount or an integral multiple thereof) of such Note at any time prior to the close of business on the second Scheduled Trading Day immediately preceding the Maturity Date at an initial conversion rate of 22.9885 shares of Common Stock (subject to adjustment as provided in this Article 14, the "**Conversion Rate**") per \$1,000 principal amount of Notes (subject to, and in accordance with, the settlement provisions of Section 14.02, the "**Conversion Obligation**")

(b) If the Company calls any Note for Optional Redemption pursuant to Article 16, then after the close of business on the second Scheduled Trading Day prior to the Redemption

Date, the right to convert such Note shall expire, unless the Company defaults in the payment of the Redemption Price, in which case a Holder of the Note called for Optional Redemption may convert such Note (or a portion thereof) until the close of business on the Trading Day immediately preceding the date on which the Redemption Price has been paid or duly provided for.

Section 14.02. *Conversion Procedure; Settlement upon Conversion.*

(a) Subject to this Section 14.02 and Section 14.06(a), upon conversion of any Note, the Company shall satisfy its Conversion Obligation by paying or delivering, as the case may be, to the converting Holder, in respect of each \$1,000 principal amount of Notes being converted, cash (“**Cash Settlement**”), shares of Common Stock, together with cash, if applicable, in lieu of delivering any fractional share of Common Stock in accordance with subsection (j) of this Section 14.02 (“**Physical Settlement**”) or a combination of cash and shares of Common Stock, together with cash, if applicable, in lieu of delivering any fractional share of Common Stock in accordance with subsection (j) of this Section 14.02 (“**Combination Settlement**”), at its election, as set forth in this Section 14.02.

(i) All conversions for which the relevant Conversion Date occurs (x) on or after November 15, 2027 shall be settled using the same Settlement Method or (y) during a Redemption Period shall be settled using the same Settlement Method.

(ii) Except for any conversions for which the relevant Conversion Date occurs during a Redemption Period and any conversions for which the relevant Conversion Date occurs on or after November 15, 2027, the Company shall use the same Settlement Method for all conversions occurring on the same Conversion Date, but the Company shall not have any obligation to use the same Settlement Method with respect to conversions that occur on different Conversion Dates.

(iii) If, in respect of any Conversion Date (or in the case of any conversions occurring (x) during a Redemption Period or (y) on or after November 15, 2027), the Company elects to deliver a notice (the “**Settlement Notice**”) of the relevant Settlement Method in respect of such Conversion Date (or such period, as the case may be), the Company shall deliver such Settlement Notice to converting Holders, the Trustee and the Conversion Agent (if other than the Trustee) no later than the close of business on the Scheduled Trading Day immediately following the relevant Conversion Date (or, in the case of any conversions occurring (x) during a Redemption Period, in such Redemption Notice, or (y) on or after November 15, 2027, no later than the close of business on Scheduled Trading Day immediately preceding November 15, 2027) (in each case, the “**Settlement Method Election Deadline**”). If the Company does not timely elect a Settlement Method prior to the deadline set forth in the immediately preceding sentence, the Company shall no longer have the right to elect Cash Settlement or Combination Settlement for such Conversion Date or during such period and the Company shall be deemed to have elected Physical Settlement in respect of its Conversion Obligation. Such Settlement Notice shall specify the relevant Settlement Method and in the case of an election of Combination Settlement, the relevant Settlement Notice shall indicate the Specified Dollar Amount per \$1,000 principal amount of Notes. If the Company timely

delivers a Settlement Notice electing Combination Settlement in respect of its Conversion Obligation but does not indicate a Specified Dollar Amount per \$1,000 principal amount of Notes in such Settlement Notice, the Specified Dollar Amount per \$1,000 principal

amount of Notes shall be deemed to be \$1,000.

By notice to Holders, the Trustee and the Conversion Agent (if other than the Trustee), the Company may, prior to November 15, 2027, at its option, irrevocably elect to satisfy its Conversion Obligation with respect to the Notes through Combination Settlement with a Specified Dollar Amount per \$1,000 principal amount of Notes of at least \$1,000 for all Conversion Dates occurring subsequent to delivery of such notice. If the Company irrevocably elects Combination Settlement with an ability to continue to set the Specified Dollar Amount per \$1,000 principal amount of Notes at or above a specific amount, the Company will, after the date of such election, inform Holders converting their Notes, the Trustee and the Conversion Agent (if other than the Trustee) of such Specified Dollar Amount no later than the relevant Settlement Method Election Deadline, or, if the Company does not timely notify Holders, the Trustee and the Conversion Agent (if other than the Trustee), such Specified Dollar Amount will be the specific amount set forth in the Settlement Notice or, if no specific amount was set forth in the Settlement Notice, such Specified Dollar Amount will be \$1,000 per \$1,000 principal amount of Notes. The irrevocable election will apply to all Note conversions on Conversion Dates occurring subsequent to delivery of such notice; provided, however, that no such election will affect any settlement method theretofore elected (or deemed to be elected) with respect to any Note. For the avoidance of doubt, such an irrevocable election, if made, will be effective without the need to amend this Indenture or the Notes. However, the Company may nonetheless choose to execute such an amendment at its option.

If the Company irrevocably fixes the Settlement Method pursuant to this Section 14.02(a)(iii), then, concurrently with providing notice to Holders of the Notes, the Trustee and the Conversion Agent (if other than the Trustee) of such election, the Company shall either post the fixed settlement method on its website or disclose the same in a current report on Form 8-K (or any successor form) that is filed with the Commission.

(iv) The cash, shares of Common Stock or combination of cash and shares of Common Stock in respect of any conversion of Notes (the “**Settlement Amount**”) shall be computed as follows:

(A) if the Company elects to satisfy its Conversion Obligation in respect of such conversion by Physical Settlement, the Company shall deliver to the converting Holder in respect of each \$1,000 principal amount of Notes being converted a number of shares of Common Stock equal to the Conversion Rate in effect on the Conversion Date;

(B) if the Company elects to satisfy its Conversion Obligation in respect of such conversion by Cash Settlement, the Company shall pay to the converting Holder in respect of each \$1,000 principal amount of Notes being converted cash in an amount equal to the sum of the Daily Conversion Values for

56

each of the 30 consecutive Trading Days during the related Observation Period;
and

(C) if the Company elects (or is deemed to have elected) to satisfy its Conversion Obligation in respect of such conversion by Combination Settlement, the Company shall pay or deliver, as the case may be, to the converting Holder in respect of each \$1,000 principal amount of Notes being converted, a Settlement Amount equal to the sum of the Daily Settlement Amounts for each of the 30 consecutive Trading Days during the related Observation Period.

(v) The Daily Settlement Amounts (if applicable) and the Daily Conversion Values (if applicable) shall be determined by the Company promptly following the last

values (if applicable) shall be determined by the Company promptly following the last day of the Observation Period. Promptly after such determination of the Daily Settlement Amounts or the Daily Conversion Values, as the case may be, and the amount of cash payable in lieu of delivering any fractional share of Common Stock, the Company shall notify the Trustee and the Conversion Agent (if other than the Trustee) of the Daily Settlement Amounts or the Daily Conversion Values, as the case may be, and the amount of cash payable in lieu of delivering fractional shares of Common Stock. The Trustee and the Conversion Agent (if other than the Trustee) shall have no responsibility for any such determination.

(b) Subject to Section 14.02(e), before any Holder of a Note shall be entitled to convert a Note as set forth above, such Holder shall (i) in the case of a Global Note, comply with the applicable procedures of the Depository in effect at that time and, if required, pay funds equal to interest payable on the next Interest Payment Date to which such Holder is not entitled as set forth in Section 14.02(h) and (ii) in the case of a Physical Note (1) complete, manually sign and deliver an irrevocable notice to the Conversion Agent as set forth in the Form of Notice of Conversion (or a facsimile, PDF or other electronic transmission thereof) (a notice pursuant to the applicable procedures of the Depository or a notice as set forth in the Form of Notice of Conversion, a “**Notice of Conversion**”) at the office of the Conversion Agent and state in writing therein the principal amount of Notes to be converted and the name or names (with addresses) in which such Holder wishes the certificate or certificates for any shares of Common Stock to be delivered upon settlement of the Conversion Obligation to be registered, (2) surrender such Notes, duly endorsed to the Company or in blank (and accompanied by appropriate endorsement and transfer documents), at the office of the Conversion Agent, (3) if required, furnish appropriate endorsements and transfer documents and (4) if required, pay funds equal to interest payable on the next Interest Payment Date to which such Holder is not entitled as set forth in Section 14.02(h). The Trustee (and, if different, the Conversion Agent) shall notify the Company of any conversion pursuant to this Article 14 on the Conversion Date for such conversion. No Notes may be surrendered for conversion by a Holder thereof if such Holder has also delivered a Fundamental Change Repurchase Notice to the Company in respect of such Notes and has not validly withdrawn such Fundamental Change Repurchase Notice in accordance with Section 15.03.

If more than one Note shall be surrendered for conversion at one time by the same Holder, the Conversion Obligation with respect to such Notes shall be computed on the basis of

the aggregate principal amount of the Notes (or specified portions thereof to the extent permitted thereby) so surrendered.

(c) A Note shall be deemed to have been converted immediately prior to the close of business on the date (the “**Conversion Date**”) that the Holder has complied with the requirements set forth in subsection (b) above. Except as set forth in Section 14.06(a), the Company shall pay or deliver, as the case may be, the consideration due in respect of the Conversion Obligation on the second Business Day immediately following the relevant Conversion Date, if the Company elects Physical Settlement, or on the second Business Day immediately following the last Trading Day of the relevant Observation Period, in the case of any other Settlement Method. If any shares of Common Stock are due to a converting Holder, the Company shall issue or cause to be issued, and deliver to the Conversion Agent or to such Holder, or such Holder’s nominee or nominees, certificates or a book-entry transfer through the Depository for the full number of shares of Common Stock to which such Holder shall be entitled in satisfaction of the Company’s Conversion Obligation.

(d) In case any Note shall be surrendered for partial conversion, the Company shall execute and the Trustee shall authenticate and deliver to or upon the written order of the Holder of the Note so surrendered a new Note or Notes in authorized denominations in an aggregate principal amount equal to the unconverted portion of the surrendered Note, without payment of

any service charge by the converting Holder but, if required by the Company or Trustee, with payment of a sum sufficient to cover any documentary, stamp or similar issue or transfer tax or similar governmental charge required by law or that may be imposed in connection therewith as a result of the name of the Holder of the new Notes issued upon such conversion being different from the name of the Holder of the old Notes surrendered for such conversion.

(e) If a Holder submits a Note for conversion, the Company shall pay any documentary, stamp or similar issue or transfer tax due on the issue of any shares of Common Stock upon conversion, unless the tax is due because the Holder requests such shares to be issued in a name other than the Holder's name, in which case the Holder shall pay such tax. The Conversion Agent may refuse to deliver the certificates representing the shares of Common Stock being issued in a name other than the Holder's name until the Trustee receives a sum sufficient to pay any tax that is due by such Holder in accordance with the immediately preceding sentence.

(f) Except as provided in Section 14.03, no adjustment shall be made for dividends on any shares of Common Stock issued upon the conversion of any Note as provided in this Article 14.

(g) Upon the conversion of an interest in a Global Note, the Trustee, or the Custodian at the direction of the Trustee, shall make a notation on such Global Note as to the reduction in the principal amount represented thereby. The Company shall notify the Trustee in writing of any conversion of Notes effected through any Conversion Agent other than the Trustee.

(h) Upon conversion, a Holder shall not receive any separate cash payment for accrued and unpaid interest, if any, except as set forth below. The Company's settlement of the full Conversion Obligation shall be deemed to satisfy in full its obligation to pay the principal

amount of the Note and accrued and unpaid interest, if any, to, but excluding, the relevant Conversion Date. As a result, accrued and unpaid interest, if any, to, but excluding, the relevant Conversion Date shall be deemed to be paid in full rather than cancelled, extinguished or forfeited. Upon a conversion of Notes into a combination of cash and shares of Common Stock, accrued and unpaid interest will be deemed to be paid first out of the cash paid upon such conversion. Notwithstanding the foregoing, if Notes are converted after the close of business on a Regular Record Date and prior to the open of business on the corresponding Interest Payment Date, Holders of such Notes as of the close of business on such Regular Record Date will receive the full amount of interest payable on such Notes on the corresponding Interest Payment Date notwithstanding the conversion. Notes surrendered for conversion during the period from the close of business on any Regular Record Date to the open of business on the immediately following Interest Payment Date must be accompanied by funds equal to the amount of interest payable on the Notes so converted; *provided* that no such payment shall be required (1) for conversions following the Regular Record Date immediately preceding the Maturity Date; (2) if the Company has specified a Fundamental Change Repurchase Date that is after a Regular Record Date and on or prior to the Business Day immediately succeeding the corresponding Interest Payment Date; (3) if the Company has specified a Redemption Date that is after a Regular Record Date and on or prior to the second Scheduled Trading Day immediately succeeding the corresponding Interest Payment Date; or (4) to the extent of any Defaulted Amounts, if any Defaulted Amounts exists at the time of conversion with respect to such Note. Therefore, for the avoidance of doubt, all Holders of record on the Regular Record Date immediately preceding the Maturity Date, any Fundamental Change Repurchase Date or Redemption Date, in each case, as described above, shall receive the full interest payment due on the Maturity Date or other applicable Interest Payment Date in cash regardless of whether their Notes have been converted and/or repurchased, as applicable, following such Regular Record Date.

(i) The Person in whose name the certificate for any shares of Common Stock delivered upon conversion is registered shall be treated as a stockholder of record as of the close of business on the relevant Conversion Date (if the Company elects to satisfy the related Conversion Obligation by Physical Settlement) or the last Trading Day of the relevant Observation Period (if the Company elects to satisfy the related Conversion Obligation by Combination Settlement) as the case may be. Upon a conversion of Notes, such Person shall no longer be a Holder of such Notes surrendered for conversion.

(j) The Company shall not issue any fractional share of Common Stock upon conversion of the Notes and shall instead pay cash in lieu of delivering any fractional share of Common Stock issuable upon conversion based on the Daily VWAP on the relevant Conversion Date (in the case of Physical Settlement) or based on the Daily VWAP on the last Trading Day of the relevant Observation Period (in the case of Combination Settlement). For each Note surrendered for conversion, if the Company has elected (or is deemed to have elected) Combination Settlement, the full number of shares that shall be issued upon conversion thereof shall be computed on the basis of the aggregate Daily Settlement Amounts for the relevant Observation Period and any fractional shares remaining after such computation shall be paid in cash.

participate (other than in the case of (x) a share split or share combination or (y) a tender or exchange offer), at the same time and upon the same terms as holders of the Common Stock and solely as a result of holding the Notes, in any of the transactions described in this Section 14.03, without having to convert their Notes, as if they held a number of shares of Common Stock equal to the Conversion Rate, *multiplied by* the principal amount (expressed in thousands) of Notes held by such Holder.

(a) If the Company exclusively issues shares of Common Stock as a dividend or distribution on shares of the Common Stock, or if the Company effects a share split or share combination, the Conversion Rate shall be adjusted based on the following formula:

$$CR' = CR_0 \times \frac{OS'}{OS_0}$$

where,

- CR₀ = the Conversion Rate in effect immediately prior to the open of business on the Ex-Dividend Date of such dividend or distribution, or immediately prior to the open of business on the Effective Date of such share split or share combination, as applicable;
- CR' = the Conversion Rate in effect immediately after the open of business on such Ex-Dividend Date or Effective Date, as the case may be;
- OS₀ = the number of shares of Common Stock outstanding immediately prior to the open of business on such Ex-Dividend Date or Effective Date (before giving effect to any such dividend, distribution, share split or share combination), as the case may be; and
- OS' = the number of shares of Common Stock outstanding immediately after giving effect to such dividend, distribution, share split or share combination, as the case may be.

Any adjustment made under this Section 14.03(a) shall become effective immediately after the open of business on the Ex-Dividend Date for such dividend or distribution, or immediately after the open of business on the Effective Date for such share split or share combination, as applicable. If any dividend or distribution of the type described in this Section 14.03(a) is declared but not so paid or made, the Conversion Rate shall be immediately readjusted, effective as of the date the Board of Directors determines not to pay such dividend or distribution, to the Conversion Rate that would then be in effect if such dividend or distribution had not been declared.

(b) If the Company issues to all or substantially all holders of the Common Stock any rights, options or warrants (other than in connection with a stockholder rights plan) entitling

60

them, for a period of not more than 60 calendar days after the announcement date of such issuance, to subscribe for or purchase shares of the Common Stock at a price per share that is less than the average of the Last Reported Sale Prices of the Common Stock for the 10 consecutive Trading Day period ending on, and including, the Trading Day immediately preceding the date of announcement of such issuance, the Conversion Rate shall be increased based on the following formula:

$$CR' = CR_0 \times \frac{OS_0 + X}{OS_0 + Y}$$

where,

- CR₀ = the Conversion Rate in effect immediately prior to the open of business on the Ex-Dividend Date for such issuance;
- CR' = the Conversion Rate in effect immediately after the open of business on such Ex-Dividend Date;
- OS₀ = the number of shares of Common Stock outstanding immediately prior to the open of business on such Ex-Dividend Date;
- X = the total number of shares of Common Stock issuable pursuant to such rights, options or warrants; and
- Y = the number of shares of Common Stock equal to the aggregate price payable to exercise such rights, options or warrants, *divided by* the average of the Last Reported Sale Prices of the Common Stock over the 10 consecutive Trading Day period ending on, and including, the Trading Day immediately preceding the date of announcement of the issuance of such rights, options or warrants.

Any increase made under this Section 14.03(b) shall be made successively whenever any such rights, options or warrants are issued and shall become effective immediately after the open of business on the Ex-Dividend Date for such issuance. To the extent that shares of the Common Stock are not delivered after the expiration of such rights, options or warrants, the Conversion Rate shall be decreased to the Conversion Rate that would then be in effect had the increase with respect to the issuance of such rights, options or warrants been made on the basis of delivery of only the number of shares of Common Stock actually delivered. If such rights, options or warrants are not so issued, the Conversion Rate shall be decreased to the Conversion Rate that would then be in effect if such Ex-Dividend Date for such issuance had not occurred.

For purposes of this Section 14.03(b), in determining whether any rights, options or warrants entitle the holders of Common Stock to subscribe for or purchase shares of the Common Stock at less than such average of the Last Reported Sale Prices of the Common Stock for the 10 consecutive Trading Day period ending on, and including, the Trading Day immediately preceding the date of announcement of such issuance, and in determining the aggregate offering price of such shares of Common Stock, there shall be taken into account any consideration received by the Company for such rights, options or warrants and any amount

61

payable on exercise or conversion thereof, the value of such consideration, if other than cash, to be determined by the Company.

(c) If the Company distributes shares of its Capital Stock, evidences of its indebtedness, other assets or property of the Company or rights, options or warrants to acquire its Capital Stock or other securities of the Company, to all or substantially all holders of the Common Stock, excluding (i) dividends, distributions or issuances (including share splits) as to which an adjustment was effected pursuant to Section 14.03(a) or Section 14.03(b), (ii) dividends or distributions paid exclusively in cash as to which an adjustment was effected pursuant to Section 14.03(d), (iii) rights issued pursuant a stockholder rights plan except as set forth in Section 14.10, (iv) distributions of Reference Property in a transaction described in Section 14.06 and (v) Spin-Offs as to which the provisions set forth below in this Section 14.03(c) shall apply (any of such shares of Capital Stock, evidences of indebtedness, other assets or property or rights, options or warrants to acquire Capital Stock or other securities, the “**Distributed Property**”), then the Conversion Rate shall be increased based on the following formula:

$$CR' = CR_0 \times \frac{SP_0}{SP_0 - FMV}$$

where

where,

- CR₀ = the Conversion Rate in effect immediately prior to the open of business on the Ex-Dividend Date for such distribution;
- CR' = the Conversion Rate in effect immediately after the open of business on such Ex-Dividend Date;
- SP₀ = the average of the Last Reported Sale Prices of the Common Stock over the 10 consecutive Trading Day period ending on, and including, the Trading Day immediately preceding the Ex-Dividend Date for such distribution; and
- FMV = the fair market value (as determined by the Board of Directors) of the Distributed Property with respect to each outstanding share of the Common Stock on the Ex-Dividend Date for such distribution.

Any increase made under the portion of this Section 14.03(c) above shall become effective immediately after the open of business on the Ex-Dividend Date for such distribution. If such distribution is not so paid or made, the Conversion Rate shall be decreased to the Conversion Rate that would then be in effect if such distribution had not been declared.

Notwithstanding the foregoing, if "FMV" (as defined above) is equal to or greater than "SP₀" (as defined above), in lieu of the foregoing increase, each Holder of a Note shall receive, in respect of each \$1,000 principal amount thereof, at the same time and upon the same terms as holders of the Common Stock receive the Distributed Property, the amount and kind of Distributed Property such Holder would have received if such Holder owned a number of shares of Common Stock equal to the Conversion Rate in effect on the Ex-Dividend Date for the distribution.

With respect to an adjustment pursuant to this Section 14.03(c) where there has been a payment of a dividend or other distribution on the Common Stock of shares of Capital Stock of any class or series, or similar equity interest, of or relating to any of its Subsidiaries or other business units of the Company, that are, or, when issued, will be, listed or admitted for trading on a U.S. national securities exchange (a “**Spin-Off**”), the Conversion Rate shall be increased based on the following formula:

$$CR' = CR_0 \times \frac{FMV_0 + MP_0}{MP_0}$$

where,

CR₀ = the Conversion Rate in effect immediately prior to the end of the Valuation Period;

CR' = the Conversion Rate in effect immediately after the end of the Valuation Period;

FMV₀ = the average of the Last Reported Sale Prices of the Capital Stock or similar equity interest distributed to holders of the Common Stock applicable to one share of the Common Stock (determined by reference to the definition of Last Reported Sale Price as set forth in Section 1.01 as if references therein to Common Stock were to such Capital Stock or similar equity interest) over the first 10 consecutive Trading Day period after, and including, the Ex-Dividend Date of the Spin-Off (the “**Valuation Period**”) *provided* that, if there is no Last Reported Sale Price of the Capital Stock or similar equity interest distributed to holders of the Common Stock on such Ex-Dividend Date, the “Valuation Period” shall be the 10 consecutive Trading Day period after, and including the first Trading Day such Last Reported Sale Price is available; and

MP₀ = the average of the Last Reported Sale Prices of the Common Stock over the Valuation Period.

The adjustment to the Conversion Rate under the preceding paragraph shall occur at the close of business on the last Trading Day of the Valuation Period; *provided* that (x) in respect of any conversion of Notes for which Physical Settlement is applicable, if the relevant Conversion Date occurs during the Valuation Period, references to “10” in the portion of this Section 14.03(c) related to Spin-Offs shall be deemed to be replaced with such lesser number of Trading Days as have elapsed from, and including, the Ex-Dividend Date of such Spin-Off to, and including, the Conversion Date in determining the Conversion Rate and (y) in respect of any conversion of Notes for which Cash Settlement or Combination Settlement is applicable, for any Trading Day that falls within the relevant Observation Period for such conversion and within the Valuation Period, references to “10” in the portion of this Section 14.03(c) related to Spin-Offs shall be deemed to be replaced with such lesser number of Trading Days as have elapsed from, and including, the Ex-Dividend Date of such Spin-Off to, and including, such Trading Day in determining the Conversion Rate as of such Trading Day of such Observation Period. If any dividend or distribution that constitutes a Spin-Off is declared but not so paid or made, the Conversion Rate shall be immediately decreased, effective as of the date the Board of Directors

determines not to pay or make such dividend or distribution, to the Conversion Rate that would then be in effect if such dividend or distribution had not been declared or announced.

For purposes of this Section 14.03(c) (and subject in all respect to Section 14.10), rights, options or warrants distributed by the Company to all holders of the Common Stock entitling them to subscribe for or purchase shares of the Company's Capital Stock, including Common Stock (either initially or under certain circumstances), which rights, options or warrants, until the occurrence of a specified event or events ("**Trigger Event**"): (i) are deemed to be transferred with such shares of the Common Stock; (ii) are not exercisable; and (iii) are also issued in respect of future issuances of the Common Stock, shall be deemed not to have been distributed for purposes of this Section 14.03(c) (and no adjustment to the Conversion Rate under this Section 14.03(c) will be required) until the occurrence of the earliest Trigger Event, whereupon such rights, options or warrants shall be deemed to have been distributed and an appropriate adjustment (if any is required) to the Conversion Rate shall be made under this Section 14.03(c). If any such right, option or warrant, including any such existing rights, options or warrants distributed prior to the date of this Indenture, are subject to events, upon the occurrence of which such rights, options or warrants become exercisable to purchase different securities, evidences of indebtedness or other assets, then the date of the occurrence of any and each such event shall be deemed to be the date of distribution and Ex-Dividend Date with respect to new rights, options or warrants with such rights (in which case the existing rights, options or warrants shall be deemed to terminate and expire on such date without exercise by any of the holders thereof). In addition, in the event of any distribution (or deemed distribution) of rights, options or warrants, or any Trigger Event or other event (of the type described in the immediately preceding sentence) with respect thereto that was counted for purposes of calculating a distribution amount for which an adjustment to the Conversion Rate under this Section 14.03(c) was made, (1) in the case of any such rights, options or warrants that shall all have been redeemed or purchased without exercise by any holders thereof, upon such final redemption or purchase (x) the Conversion Rate shall be readjusted as if such rights, options or warrants had not been issued and (y) the Conversion Rate shall then again be readjusted to give effect to such distribution, deemed distribution or Trigger Event, as the case may be, as though it were a cash distribution, equal to the per share redemption or purchase price received by a holder or holders of Common Stock with respect to such rights, options or warrants (assuming such holder had retained such rights, options or warrants), made to all holders of Common Stock as of the date of such redemption or purchase, and (2) in the case of such rights, options or warrants that shall have expired or been terminated without exercise by any holders thereof, the Conversion Rate shall be readjusted as if such rights, options and warrants had not been issued.

For purposes of Section 14.03(a), Section 14.03(b) and this Section 14.03(c), if any dividend or distribution to which this Section 14.03(c) is applicable also includes one or both of:

(A) a dividend or distribution of shares of Common Stock to which Section 14.03(a) is applicable (the "**Clause A Distribution**"); or

(B) a dividend or distribution of rights, options or warrants to which Section 14.03(b) is applicable (the "**Clause B Distribution**"),

then, in either case, (1) such dividend or distribution, other than the Clause A Distribution and the Clause B Distribution, shall be deemed to be a dividend or distribution to which this Section 14.03(c) is applicable (the "**Clause C Distribution**") and any Conversion Rate adjustment required by this Section 14.03(c) with respect to such Clause C Distribution shall then be made, and (2) the Clause A Distribution and Clause B Distribution shall be deemed to immediately follow the Clause C Distribution and any Conversion Rate adjustment required by Section 14.03(a) and Section 14.03(b) with respect thereto shall then be made, except that, if determined by the Company (I) the "Ex-Dividend Date" of the Clause A Distribution and the Clause B Distribution shall be deemed to be the Ex-Dividend Date of the Clause C Distribution and (II) any shares of Common Stock included in the Clause A Distribution or Clause B Distribution shall be deemed not to be "outstanding immediately prior to the open of business on such Ex-

Dividend Date or Effective Date” within the meaning of Section 14.03(a) or “outstanding immediately prior to the open of business on such Ex-Dividend Date” within the meaning of Section 14.03(b).

(d) If the Company makes any cash dividend or distribution to all or substantially all holders of the Common Stock, the Conversion Rate shall be adjusted based on the following formula:

$$CR' = CR_0 \times \frac{SP_0}{SP_0 - C}$$

where,

- CR₀ = the Conversion Rate in effect immediately prior to the open of business on the Ex-Dividend Date for such dividend or distribution;
- CR' = the Conversion Rate in effect immediately after the open of business on the Ex-Dividend Date for such dividend or distribution;
- SP₀ = the Last Reported Sale Price of the Common Stock on the Trading Day immediately preceding the Ex-Dividend Date for such dividend or distribution; and
- C = the amount in cash per share the Company distributes to all or substantially all holders of the Common Stock.

Any increase made under this Section 14.03(d) shall become effective immediately after the open of business on the Ex-Dividend Date for such dividend or distribution. If such dividend or distribution is not so paid, the Conversion Rate shall be decreased, effective as of the date the Board of Directors determines not to make or pay such dividend or distribution, to be the Conversion Rate that would then be in effect if such dividend or distribution had not been declared. Notwithstanding the foregoing, if “C” (as defined above) is equal to or greater than “SP₀” (as defined above), in lieu of the foregoing increase, each Holder of a Note shall receive, for each \$1,000 principal amount of Notes it holds, at the same time and upon the same terms as holders of shares of the Common Stock, the amount of cash that such Holder would have received if such Holder owned a number of shares of Common Stock equal to the Conversion Rate in effect on the Ex-Dividend Date for such cash dividend or distribution.

65

(e) If the Company or any of its Subsidiaries make a payment in respect of a tender or exchange offer for the Common Stock that is subject to the then applicable tender offer rules under the Exchange Act, other than an odd lot tender offer, to the extent that the cash and value of any other consideration included in the payment per share of the Common Stock exceeds the average of the Last Reported Sale Prices of the Common Stock over the 10 consecutive Trading Day period commencing on, and including, the Trading Day next succeeding the last date on which tenders or exchanges may be made pursuant to such tender or exchange offer, the Conversion Rate shall be increased based on the following formula:

$$CR' = CR_0 \times \frac{AC + (SP' \times OS')}{OS_0 \times SP'}$$

where,

- CR₀ = the Conversion Rate in effect immediately prior to the close of business on the 10th Trading Day immediately following, and including, the Trading Day next succeeding the date such tender or exchange offer expires;
- CR' = the Conversion Rate in effect immediately after the close of business on the 10th Trading Day immediately following, and including, the Trading Day next

Trading Day immediately following, and including, the Trading Day next succeeding the date such tender or exchange offer expires;

- AC = the aggregate value of all cash and any other consideration (as determined by the Board of Directors) paid or payable for shares of Common Stock purchased in such tender or exchange offer;
- OS₀ = the number of shares of Common Stock outstanding immediately prior to the date such tender or exchange offer expires (prior to giving effect to the purchase of all shares of Common Stock accepted for purchase or exchange in such tender or exchange offer);
- OS' = the number of shares of Common Stock outstanding immediately after the date such tender or exchange offer expires (after giving effect to the purchase of all shares of Common Stock accepted for purchase or exchange in such tender or exchange offer); and
- SP' = the average of the Last Reported Sale Prices of the Common Stock over the 10 consecutive Trading Day period commencing on, and including, the Trading Day next succeeding the date such tender or exchange offer expires.

The adjustment to the Conversion Rate under this Section 14.03(e) shall occur at the close of business on the 10th Trading Day immediately following, and including, the Trading Day next succeeding the date such tender or exchange offer expires; *provided* that (x) in respect of any conversion of Notes for which Physical Settlement is applicable, if the relevant Conversion Date occurs during the 10 Trading Days immediately following, and including, the Trading Day next succeeding the expiration date of any tender or exchange offer, references to “10” or “10th” in this Section 14.03(e) shall be deemed replaced with such lesser number of Trading Days as have

elapsed from, and including, the Trading Day next succeeding the expiration date of such tender or exchange offer to, and including, such Conversion Date in determining the Conversion Rate and (y) in respect of any conversion of Notes for which Cash Settlement or Combination Settlement is applicable, for any Trading Day that falls within the relevant Observation Period for such conversion and within the 10 Trading Days immediately following, and including, the Trading Day next succeeding the expiration date of any tender or exchange offer, references to “10” or “10th” in this Section 14.03(e) shall be deemed replaced with such lesser number of Trading Days as have elapsed from, and including, the Trading Day next succeeding the expiration date of such tender or exchange offer to, and including, such Trading Day in determining the Conversion Rate as of such Trading Day. If the Company or one of its Subsidiaries is obligated to purchase Common Stock pursuant to any such tender or exchange offer described in this Section 14.03(e) but the Company is, or such Subsidiary is, permanently prevented by applicable law from effecting any such purchase or all such purchases are rescinded, the Conversion Rate will be decreased to be the Conversion Rate that would then be in effect if such tender or exchange offer had not been made or had been made only in respect of the purchases that have been effected.

(f) Notwithstanding this Section 14.03 or any other provision of this Indenture or the Notes, if a Conversion Rate adjustment becomes effective on any Ex-Dividend Date, and a Holder that has converted its Notes on or after such Ex-Dividend Date and on or prior to the related Record Date would be treated as the record holder of the shares of Common Stock as of the related Conversion Date as described under Section 14.02(i) based on an adjusted Conversion Rate for such Ex-Dividend Date, then, notwithstanding the Conversion Rate adjustment provisions in this Section 14.03, the Conversion Rate adjustment relating to such Ex-Dividend Date shall not be made for such converting Holder. Instead, such Holder shall be treated as if such Holder were the record owner of the shares of Common Stock on an unadjusted basis and participate in the related dividend, distribution or other event giving rise to such adjustment.

(g) Except as stated herein, the Company shall not adjust the Conversion Rate for the issuance of shares of the Common Stock or any securities convertible into or exchangeable for shares of the Common Stock or the right to purchase shares of the Common Stock or such convertible or exchangeable securities.

(h) In addition to those adjustments required by clauses (a), (b), (c), (d) and (e) of this Section 14.03, and subject to the applicable listing standards of The Nasdaq Global Select Market (or, if the Common Stock is not then listed on The Nasdaq Global Select Market, the applicable listing standards of the principal other U.S. national or regional securities exchange on which the Common Stock is listed), the Company from time to time may increase the Conversion Rate by any amount for a period of at least 20 Business Days if the Board of Directors determines that such increase would be in the Company’s best interest. In addition, subject to the applicable listing standards of The Nasdaq Global Select Market (or, if the Common Stock is not then listed on The Nasdaq Global Select Market, the applicable listing standards of the principal other U.S. national or regional securities exchange on which the Common Stock is listed), the Company may (but is not required to) increase the Conversion Rate to avoid or diminish any income tax to holders of Common Stock or rights to purchase Common

(i) Notwithstanding anything to the contrary in this Article 14, the Conversion Rate shall not be adjusted:

(i) upon the issuance of shares of Common Stock at a price below the Conversion Price or otherwise, other than any such issuance described in Section 14.04(a), Section 14.04(b) and Section 14.04(c) above;

(ii) upon the issuance of any shares of Common Stock pursuant to any present or future plan providing for the reinvestment of dividends or interest payable on the Company's securities and the investment of additional optional amounts in shares of Common Stock under any plan;

(iii) upon the issuance of any shares of Common Stock or options or rights to purchase those shares pursuant to any present or future employee, director or consultant benefit or incentive plan or program (including pursuant to any evergreen plan) of or assumed by the Company or any of the Company's Subsidiaries;

(iv) upon the issuance of any shares of the Common Stock pursuant to any option, warrant, right or exercisable, exchangeable or convertible security not described in clause (iii) of this subsection and outstanding as of the date the Notes were first issued;

(v) for a third-party tender offer by any party other than a tender offer by one or more of the Company's Subsidiaries as described in Section 14.04(e) above;

(vi) upon the repurchase of any shares of Common Stock pursuant to an open-market share repurchase program or other buy-back transaction (including, without limitation, through any structured or derivative transactions such as accelerated share repurchase transactions or similar forward derivatives), or other buy-back transaction, that is not a tender offer or exchange offer of the nature described in Section 14.03(e);

(vii) solely for a change in the par value (or lack of par value) of the Common Stock; or

(viii) for accrued and unpaid interest, if any.

(j) The Company shall not be required to make an adjustment pursuant to clauses (a), (b), (c), (d) or (e) of this Section 14.03 unless such adjustment would result in a change of at least 1% of the then effective Conversion Rate. However, the Company shall carry forward any adjustment that the Company would otherwise have to make and take that adjustment into account in any subsequent adjustment. Notwithstanding the foregoing, all such carried-forward adjustments shall be made with respect to the Notes (i) when the aggregate of all such carried-forward adjustments equals or exceeds 1% of the Conversion Rate, (ii) regardless of whether the aggregate adjustment is less than 1% of the Conversion Rate, (x) on the Conversion Date for any Notes (in the case of Physical Settlement) and (y) on each Trading Day of any Observation

Period (in the case of Cash Settlement or Combination Settlement), (iii) on November 15, 2027, and (iv) on any date on which a Redemption Notice is delivered by the Company, in each case, unless the adjustment has already been made. All calculations and other determinations under this Article 14 shall be made by the Company and shall be made to the nearest one-ten thousandth (1/10,000th) of a share.

(k) Whenever the Conversion Rate is adjusted as herein provided, the Company shall promptly file with the Trustee (and the Conversion Agent if not the Trustee) an Officer's Certificate setting forth the Conversion Rate after such adjustment and setting forth a brief statement of the facts requiring such adjustment. Neither the Trustee nor the Conversion Agent shall have any responsibility to verify the accuracy of any adjustment to the Conversion Rate. Unless and until a Responsible Officer of the Trustee shall have received such Officer's

Unless and until a Responsible Officer of the Trustee shall have received such Officer's Certificate, the Trustee shall not be deemed to have knowledge of any adjustment of the Conversion Rate and may assume without inquiry that the last Conversion Rate of which it has knowledge is still in effect. Promptly after delivery of such certificate, the Company shall prepare a notice of such adjustment of the Conversion Rate setting forth the adjusted Conversion Rate and the date on which each adjustment becomes effective and shall deliver such notice of such adjustment of the Conversion Rate to each Holder. Failure to deliver such notice shall not affect the legality or validity of any such adjustment.

(l) For purposes of this Section 14.03, the number of shares of Common Stock at any time outstanding shall not include shares of Common Stock held in the treasury of the Company so long as the Company does not pay any dividend or make any distribution on shares of Common Stock held in the treasury of the Company, but shall include shares of Common Stock issuable in respect of scrip certificates issued in lieu of fractions of shares of Common Stock.

Section 14.04. *Adjustments of Prices.* Whenever any provision of this Indenture requires the Company to calculate the Last Reported Sale Prices, the Daily VWAPs, the Daily Conversion Values or the Daily Settlement Amounts over a span of multiple days (including, without limitation, an Observation Period), the Company shall make appropriate adjustments (without duplication in respect of any adjustment made pursuant to the provisions described under Section 14.04) to each to account for any adjustment to the Conversion Rate that becomes effective, or any event requiring an adjustment to the Conversion Rate where the Ex-Dividend Date, Effective Date or expiration date of the event occurs, at any time during the period when the Last Reported Sale Prices, the Daily VWAPs, the Daily Conversion Values or the Daily Settlement Amounts are to be calculated.

Section 14.05. *Shares to Be Fully Paid.* The Company shall provide, free from preemptive rights, out of its authorized but unissued shares or shares held in treasury, sufficient shares of Common Stock to provide for conversion of the Notes from time to time as such Notes are presented for conversion (assuming that at the time of computation of such number of shares, all such Notes would be converted by a single Holder and that Physical Settlement is applicable).

Section 14.06. *Effect of Recapitalizations, Reclassifications and Changes of the Common Stock.*

69

- (a) In the case of:
- (i) any recapitalization, reclassification or change of the Common Stock (other than a change to par value, or from par value to no par value, or changes resulting from a subdivision or combination),
 - (ii) any consolidation, merger, combination or similar transaction involving the Company,
 - (iii) any sale, lease or other transfer to a third party of the consolidated assets of the Company and the Company's Subsidiaries substantially as an entirety or
 - (iv) any statutory share exchange,

in each case, as a result of which the Common Stock would be converted into, or exchanged for, stock, other securities, other property or assets (including cash or any combination thereof) (any such event, a "**Merger Event**"), then, at and after the effective time of such Merger Event, the right to convert each \$1,000 principal amount of Notes shall be changed into a right to convert such principal amount of Notes into the kind and amount of shares of stock, other securities or other property or assets (including cash or any combination thereof) that a holder of a number of

shares of Common Stock equal to the Conversion Rate immediately prior to such Merger Event would have owned or been entitled to receive (the “**Reference Property**”, with each “**unit of Reference Property**” meaning the kind and amount of Reference Property that a holder of one share of Common Stock is entitled to receive) upon such Merger Event and, at the effective time of such Merger Event, the Company or the successor or purchasing Person, as the case may be, shall execute with the Trustee a supplemental indenture permitted Section 10.01(i) providing for such change in the right to convert each \$1,000 principal amount of Notes; *provided, however*, that at and after the effective time of the Merger Event (A) the Company or the successor or acquiring Person, as the case may be, shall continue to have the right to determine the form of consideration to be paid or delivered, as the case may be, upon conversion of Notes in accordance with Section 14.02 and (B) (I) any amount payable in cash upon conversion of the Notes in accordance with Section 14.02 shall continue to be payable in cash, (II) any shares of Common Stock that the Company would have been required to deliver upon conversion of the Notes in accordance with Section 14.02 shall instead be deliverable in the amount and type of Reference Property that a holder of that number of shares of Common Stock would have received in such Merger Event and (III) the Daily VWAP shall be calculated based on the value of a unit of Reference Property.

If the Merger Event causes the Common Stock to be converted into, or exchanged for, the right to receive more than a single type of consideration, then the Reference Property into which the Notes will be convertible shall be deemed to be the weighted average of the types and amounts of consideration actually received by the holders of Common Stock. If the holders of the Common Stock receive only cash in such Merger Event, then for all conversions for which the relevant Conversion Date occurs after the effective date of such Merger Event (A) the consideration due upon conversion of each \$1,000 principal amount of Notes shall be solely cash in an amount equal to the Conversion Rate in effect on the Conversion Date , *multiplied by* the price paid per share of Common Stock in such Merger Event and (B) the Company shall satisfy

the Conversion Obligation by paying cash to converting Holders on the second Business Day immediately following the relevant Conversion Date. The Company shall notify Holders, the Trustee and the Conversion Agent (if other than the Trustee) in writing of such weighted average as soon as reasonably practicable after such determination is made.

If the Reference Property in respect of any such Merger Event includes, in whole or in part, shares of Common Equity, the supplemental indenture described in the second immediately preceding paragraph shall provide for anti-dilution and other adjustments that shall be as nearly equivalent as is possible to the adjustments provided for in this Article 14 with respect to the portion of Reference Property constituting such Common Equity. If, in the case of any Merger Event, the Reference Property includes shares of stock, securities or other property or assets (other than cash and/or cash equivalents) of a Person other than the Company or the successor or purchasing corporation, as the case may be, in such Merger Event, then such supplemental indenture shall also be executed by such other Person and shall contain such additional provisions to protect the interests of the Holders as the Company shall reasonably consider necessary by reason of the foregoing, including the provisions providing for the purchase rights set forth in Article 15. The Company shall not become party to any such Merger Event unless its terms are consistent with this Section 14.07.

(b) When the Company executes a supplemental indenture pursuant to subsection (a) of this Section 14.06, the Company shall promptly file with the Trustee an Officer's Certificate briefly stating the reasons therefor, the kind or amount of cash, securities or property or asset that will comprise a unit of Reference Property after any such Merger Event, any adjustment to be made with respect thereto and that all conditions precedent have been complied with, and shall promptly deliver or cause to be delivered notice thereof to all Holders. The Company shall cause notice of the execution of such supplemental indenture to be delivered to each Holder within 20 days after execution thereof. Failure to deliver such notice shall not affect the legality or validity of such supplemental indenture.

(c) None of the foregoing provisions shall affect the right of a holder of Notes to convert its Notes into cash, shares of Common Stock or a combination of cash and shares of Common Stock, as applicable, as set forth in Section 14.01 and Section 14.02 prior to the effective date of such Merger Event.

(d) The above provisions of this Section shall similarly apply to successive Merger Events.

(e) Upon the consummation of any Merger Event, references to "Common Stock" shall be deemed to refer to any Reference Property that constitutes capital stock after giving effect to such Merger Event.

Section 14.07. *Certain Covenants.* (a) The Company covenants that all shares of Common Stock issued upon conversion of Notes will be fully paid and non-assessable by the Company and free from all taxes, liens and charges with respect to the issue thereof.

(b) The Company covenants that, if any shares of Common Stock to be provided for the purpose of conversion of Notes hereunder require registration with or approval of any

(c) The Company further covenants that if at any time the Common Stock shall be listed on any national securities exchange or automated quotation system the Company will list and keep listed, so long as the Common Stock shall be so listed on such exchange or automated quotation system, any Common Stock issuable upon conversion of the Notes.

Section 14.08. *Responsibility of Trustee.* The Trustee and any other Conversion Agent shall not at any time be under any duty or responsibility to any Holder to determine the Conversion Rate (or any adjustment thereto) or whether any facts exist that may require any adjustment (including any increase) of the Conversion Rate, or with respect to the nature or extent or calculation of any such adjustment when made, or with respect to the method employed, or herein or in any supplemental indenture provided to be employed, in making the same. The Trustee and the Conversion Agent shall have no obligation to monitor any party's compliance with the Investment Agreement, and may conclusively presume that any actions taken by the Company or any Holder (including any beneficial owner) are in compliance with the terms of the Investment Agreement. The Trustee and any other Conversion Agent shall not be accountable with respect to the validity or value (or the kind or amount) of any shares of Common Stock, or of any securities, property or cash that may at any time be issued or delivered upon the conversion of any Note; and the Trustee and any other Conversion Agent make no representations with respect thereto. Neither the Trustee nor any Conversion Agent shall be responsible for any failure of the Company to issue, transfer or deliver any shares of Common Stock or stock certificates or other securities or property or cash upon the surrender of any Note for the purpose of conversion or to comply with any of the duties, responsibilities or covenants of the Company contained in this Article. Without limiting the generality of the foregoing, neither the Trustee nor any Conversion Agent shall be under any responsibility to determine the correctness of any provisions contained in any supplemental indenture entered into pursuant to Section 14.06 relating either to the kind or amount of shares of stock or securities or property (including cash) receivable by Holders upon the conversion of their Notes after any event referred to in such Section 14.06 or to any adjustment to be made with respect thereto, but, subject to the provisions of Section 7.01, may accept (without any independent investigation) as conclusive evidence of the correctness of any such provisions, and shall be protected in conclusively relying upon, the Officer's Certificate (which the Company shall be obligated to file with the Trustee prior to the execution of any such supplemental indenture) with respect thereto. Except as otherwise expressly provided herein, neither the Trustee nor any other agent acting under this Indenture (other than the Company, if acting in such capacity) shall have any obligation to make any calculation or to determine whether the Notes may be surrendered for conversion pursuant to this Indenture, or to notify the Company or the Depositary or any of the Holders if the Notes have become convertible pursuant to the terms of this Indenture.

Section 14.09. *Notice to Holders Prior to Certain Actions.* In case of any:

(a) action by the Company or one of its Subsidiaries that would require an adjustment in the Conversion Rate pursuant to Section 14.03 or Section 14.10; or

72

(b) voluntary or involuntary dissolution, liquidation or winding-up of the Company;

then, in each case (unless notice of such event is otherwise required pursuant to another provision of this Indenture), the Company shall cause to be filed with the Trustee and the Conversion Agent (if other than the Trustee) and to be delivered to each Holder, as promptly as possible but in any event at least 10 days prior to the applicable date hereinafter specified, a notice stating (i) the date on which a record is to be taken for the purpose of such action by the Company or one of its Subsidiaries or, if a record is not to be taken, the date as of which the holders of Common Stock of record are to be determined for the purposes of such action by the Company or one of its Subsidiaries, or (ii) the date on which such dissolution, liquidation or winding-up is expected to become effective or occur, and the date as of which it is expected that holders of Common Stock of record shall be entitled to exchange their Common Stock for

holders of Common Stock of record shall be entitled to exchange their Common Stock for securities or other property deliverable upon such dissolution, liquidation or winding-up. Failure to give such notice, or any defect therein, shall not affect the legality or validity of such action by the Company or one of its Subsidiaries, dissolution, liquidation or winding-up.

Section 14.10. *Stockholder Rights Plans.* If the Company has a stockholder rights plan in effect upon conversion of the Notes, each share of Common Stock, if any, issued upon such conversion shall be entitled to receive the appropriate number of rights, if any, and the certificates representing the Common Stock issued upon such conversion shall bear such legends, if any, in each case as may be provided by the terms of any such stockholder rights plan, as the same may be amended from time to time. However, if, prior to any conversion of Notes, the rights have separated from the shares of Common Stock in accordance with the provisions of the applicable stockholder rights plan so that the Holders would not be entitled to receive any rights in respect of Common Stock, if any, issuable upon conversion of the Notes, the Conversion Rate shall be adjusted at the time of separation as if the Company distributed to all or substantially all holders of the Common Stock Distributed Property as provided in Section 14.03(c), subject to readjustment in the event of the expiration, termination or redemption of such rights.

Section 14.11. *Exchange In Lieu Of Conversion.* (a) When a Holder surrenders its Notes for conversion, the Company may, at its election, direct the Conversion Agent to surrender, on or prior to the Trading Day immediately following the relevant Conversion Date, such Notes to one or more financial institutions designated by the Company (each, a “**Designated Institution**”) for exchange in lieu of conversion (an “**Exchange Election**”). In order to accept any Notes surrendered for conversion for exchange in lieu of conversion, the Designated Institution(s) must agree to timely pay and/or deliver, as the case may be, in exchange for such Notes, the cash, shares of Common Stock or combination of cash and Common Stock, at the Company’s election, that would otherwise be due upon conversion (the “**Conversion Consideration**”) as described in Section 14.02 above. If the Company makes an Exchange Election, the Company shall, by the close of business on the Trading Day following the relevant Conversion Date, notify the Holder surrendering Notes for conversion, the Trustee and the Conversion Agent (if other than the Trustee), in writing that it has made an Exchange Election, and the Company shall concurrently notify the Designated Institution(s) of the relevant deadline for delivery of the Conversion Consideration and the type of conversion consideration to be paid and/or delivered, as the case

may be. Any Notes exchanged by the Designated Institution(s) will remain outstanding, subject to applicable procedures of the Depository.

(b) If the Designated Institution(s) agree(s) to accept any Notes for exchange but does not timely pay and/or deliver, as the case may be, the related Conversion Consideration to the Conversion Agent, or if the Designated Institution(s) do(es) not accept such Notes for exchange, the Company shall, within the time period specified in Section 14.02(c), pay and/or deliver, as the case may be, the Conversion Consideration in accordance with the provisions of Section 14.02.

(c) For the avoidance of doubt, in no event will the Company’s designation of any Designated Institution(s) pursuant to this Section 14.11 require the Designated Institution(s) to accept any Notes for exchange.

ARTICLE 15
REPURCHASE OF NOTES AT OPTION OF HOLDERS

Section 15.01. *Intentionally Omitted.*

Section 15.02. *Repurchase at Option of Holders Upon a Fundamental Change.* (a) If a Fundamental Change occurs at any time prior to the Maturity Date, each Holder shall have the right, at such Holder's option, to require the Company to repurchase for cash all of such Holder's Notes, or any portion thereof properly surrendered and not validly withdrawn pursuant to Section 15.03 that is equal to \$1,000 or an integral multiple of \$1,000, on the date (the "**Fundamental Change Repurchase Date**") specified by the Company that is not less than 20 Business Days or more than 35 Business Days following the date of the Fundamental Change Company Notice at a repurchase price equal to 100% of the principal amount thereof, *plus* accrued and unpaid interest thereon to, but excluding, the Fundamental Change Repurchase Date ("**Accrued Interest**") *plus* all unpaid interest from the Fundamental Change Repurchase Date to, but excluding, the Maturity Date (the "**Make-Whole Interest Payment**") (together, the "**Fundamental Change Repurchase Price**") unless the Fundamental Change Repurchase Date falls after a Regular Record Date but on or prior to the Interest Payment Date to which such Regular Record Date relates, in which case the Company shall instead pay the full amount of the Accrued Interest to Holders of record as of such Regular Record Date, and the Fundamental Change Repurchase Price shall be equal to 100% of the principal amount of Notes to be repurchased *plus* the Make-Whole Interest Payment pursuant to this Article 15.

(b) Repurchases of Notes under this Section 15.02 shall be made, at the option of the Holder thereof, upon:

(i) delivery to the Paying Agent by a Holder of a duly completed notice (the "**Fundamental Change Repurchase Notice**") in the form set forth in Attachment 2 to the Form of Note attached hereto as Exhibit A, if the Notes are Physical Notes, or in compliance with the Depository's procedures for surrendering interests in Global Notes, if the Notes are Global Notes, in each case on or before the close of business on the Business Day immediately preceding the Fundamental Change Repurchase Date; and

(ii) delivery of the Notes, if the Notes are Physical Notes, to the Paying Agent at any time after delivery of the Fundamental Change Repurchase Notice (together with all necessary endorsements for transfer) at the Corporate Trust Office of the Paying Agent, or book-entry transfer of the Notes, if the Notes are Global Notes, in compliance with the procedures of the Depository, in each case such delivery being a condition to receipt by the Holder of the Fundamental Change Repurchase Price therefor.

The Fundamental Change Repurchase Notice in respect of any Physical Notes to be repurchased shall state:

- (i) the certificate numbers of the Notes to be delivered for repurchase;
- (ii) the portion of the principal amount of Notes to be repurchased, which must be \$1,000 or an integral multiple thereof; and
- (iii) that the Notes are to be repurchased by the Company pursuant to the applicable provisions of the Notes and this Indenture.

If the Notes are Global Notes, to exercise the Fundamental Change repurchase right, Holders must surrender their Notes in accordance with applicable Depository procedures.

Notwithstanding anything herein to the contrary, any Holder delivering to the Paying Agent the Fundamental Change Repurchase Notice contemplated by this Section 15.02 shall have the right to withdraw, in whole or in part, such Fundamental Change Repurchase Notice at any time prior to the close of business on the Business Day immediately preceding the Fundamental Change Repurchase Date by delivery of a written notice of withdrawal to the Paying Agent in accordance with Section 15.03.

The Paying Agent shall promptly notify the Company of the receipt by it of any Fundamental Change Repurchase Notice or written notice of withdrawal thereof.

(c) On or before the 20th Business Day after the occurrence of the effective date of a Fundamental Change, the Company shall provide to all Holders and the Trustee, the Conversion Agent (in the case of a Conversion Agent other than the Trustee) and the Paying Agent (in the case of a Paying Agent other than the Trustee) a written notice (the “**Fundamental Change Company Notice**”) of the occurrence of the effective date of the Fundamental Change and of the repurchase right at the option of the Holders arising as a result thereof. In the case of Physical Notes, such notice shall be by first class mail or, in the case of Global Notes, such notice shall be delivered in accordance with the applicable procedures of the Depository. Each Fundamental Change Company Notice shall specify:

- (i) the events causing the Fundamental Change;
- (ii) the effective date of the Fundamental Change;
- (iii) the last date on which a Holder may exercise the repurchase right pursuant to this Article 15;

- (iv) the Fundamental Change Repurchase Price;
- (v) the Fundamental Change Repurchase Date;

(vi) the name and address of the Paying Agent and the Conversion Agent, if applicable;

(vii) if applicable, the Conversion Rate and any adjustments to the Conversion Rate as a result of such Fundamental Change;

(viii) that the Notes with respect to which a Fundamental Change Repurchase Notice has been delivered by a Holder may be converted only if the Holder withdraws the Fundamental Change Repurchase Notice in accordance with the terms of this Indenture; and

(ix) the procedures that Holders must follow to require the Company to repurchase their Notes.

No failure of the Company to give the foregoing notices and no defect therein shall limit the Holders' repurchase rights or affect the validity of the proceedings for the repurchase of the Notes pursuant to this Section 15.02.

At the Company's request, given at least five days prior to the date the Fundamental Change Company Notice is to be sent (or such lesser amount of time as agreed to by the Trustee in its reasonable discretion), the Trustee shall give such notice in the Company's name and at the Company's expense; *provided, however*, that, in all cases, the text of such Fundamental Change Company Notice shall be prepared by the Company.

Simultaneously with providing such notice, the Company shall publish the information on its website or through such other public medium as it may use at that time.

(d) Notwithstanding the foregoing, no Notes may be repurchased by the Company on any date at the option of the Holders upon a Fundamental Change if the principal amount of the Notes has been accelerated, and such acceleration has not been rescinded, on or prior to such date (except in the case of an acceleration resulting from a Default by the Company in the payment of the Fundamental Change Repurchase Price with respect to such Notes). The Paying Agent will promptly return to the respective Holders thereof any Physical Notes held by it during the acceleration of the Notes (except in the case of an acceleration resulting from a Default by the Company in the payment of the Fundamental Change Repurchase Price with respect to such Notes), or any instructions for book-entry transfer of the Notes in compliance with the applicable procedures of the Depository shall be deemed to have been cancelled, and, upon such return or cancellation, as the case may be, the Fundamental Change Repurchase Notice with respect thereto shall be deemed to have been withdrawn.

(e) Notwithstanding anything to the contrary in this Article 15, the Company shall not be required to repurchase, or to make an offer to repurchase, the Notes upon a Fundamental Change if a third party makes such an offer in the same manner, at the same time and otherwise

in compliance with the requirements for an offer made by the Company as set forth in this Article 15 and such third party purchases all Notes properly surrendered and not validly withdrawn under its offer in the same manner, at the same time and otherwise in compliance with the requirements for an offer made by the Company as set forth above.

Section 15.03. *Withdrawal of Fundamental Change Repurchase Notice.* (a) A Fundamental Change Repurchase Notice may be withdrawn (in whole or in part) in respect of Physical Notes by means of a written notice of withdrawal received by the Paying Agent in accordance with this Section 15.03 at any time prior to the close of business on the Business Day immediately preceding the Fundamental Change Repurchase Date, specifying:

(i) the principal amount of the Notes with respect to which such notice of

(i) the principal amount of the Notes with respect to which such notice of withdrawal is being submitted, which must be \$1,000 or an integral multiple thereof,

(ii) the certificate number of the Note in respect of which such notice of withdrawal is being submitted, and

(iii) the principal amount, if any, of such Note that remains subject to the original Fundamental Change Repurchase Notice, which portion must be in principal amounts of \$1,000 or an integral multiple of \$1,000;

If the Notes are Global Notes, Holders may withdraw their Notes subject to repurchase at any time prior to the close of business on the Business Day immediately preceding the Fundamental Change Repurchase Date in accordance with the applicable procedures of the Depository.

Section 15.04. *Deposit of Fundamental Change Repurchase Price.* (a) The Company will deposit with the Trustee (or other Paying Agent appointed by the Company, or if the Company is acting as its own Paying Agent, set aside, segregate and hold in trust as provided in Section 4.04) on or prior to 11:00 a.m., New York City time, on the Fundamental Change Repurchase Date an amount of money sufficient to repurchase all of the Notes to be repurchased at the appropriate Fundamental Change Repurchase Price. Subject to receipt of funds and/or Notes by the Trustee (or other Paying Agent appointed by the Company), payment for Notes surrendered for repurchase (and not validly withdrawn prior to the close of business on the Business Day immediately preceding the Fundamental Change Repurchase Date) will be made on the later of (i) the Fundamental Change Repurchase Date (*provided* the Holder has satisfied the conditions in Section 15.02) and (ii) the time of book-entry transfer or the delivery of such Note to the Trustee (or other Paying Agent appointed by the Company) by the Holder thereof in the manner required by Section 15.02 by mailing checks for the amount payable to the Holders of such Notes entitled thereto as they shall appear in the Note Register; *provided, however*, that payments to the Depository shall be made by wire transfer of immediately available funds to the account of the Depository or its nominee. The Trustee shall, promptly after such payment and upon written demand by the Company, return to the Company any funds in excess of the Fundamental Change Repurchase Price.

(b) If by 11:00 a.m. New York City time, on the Fundamental Change Repurchase Date, the Trustee (or other Paying Agent appointed by the Company) holds money sufficient to pay the Fundamental Change Repurchase Price to be repurchased on such Fundamental Change

Repurchase Date, then, with respect to the Notes that have been properly surrendered for repurchase and have not been validly withdrawn in accordance with the provisions of this Indenture, (i) such Notes will cease to be outstanding, (ii) interest will cease to accrue on such Notes on the Fundamental Change Repurchase Date (whether or not book-entry transfer of the Notes has been made or the Notes have been delivered to the Trustee or Paying Agent) and (iii) all other rights of the Holders with respect to such Notes will terminate on the Fundamental Change Repurchase Date (other than (x) the right to receive the Fundamental Change Repurchase Price and (y) if the Fundamental Change Repurchase Date falls after a Regular Record Date but on or prior to the related Interest Payment Date, the right of the Holder of record on such Regular Record Date to receive the full amount of Accrued Interest to, but excluding, such Interest Payment Date).

(c) Upon surrender of a Note that is to be repurchased in part pursuant to Section 15.02, the Company shall execute and the Trustee shall authenticate and deliver to the Holder a new Note in an authorized denomination equal in principal amount to the unreurchased portion of the Note surrendered.

Section 15.05. *Covenant to Comply with Applicable Laws Upon Repurchase of Notes.* In connection with any repurchase offer upon a Fundamental Change pursuant to this Article 15, the Company will, if required:

- (a) comply with the tender offer rules under the Exchange Act that may then be applicable;
- (b) file a Schedule TO or any other required schedule under the Exchange Act; and
- (c) otherwise comply in all material respects with all federal and state securities laws in connection with any offer by the Company to repurchase the Notes;

in each case, so as to permit the rights and obligations under this Article 15 to be exercised in the time and in the manner specified in this Article 15. To the extent that the provisions of any securities laws or regulations conflict with the provisions of this Article 15 relating to the Company's obligations to repurchase the Notes upon a Fundamental Change, the Company will comply with the applicable securities laws and regulations and will not be deemed to have breached its obligations under such provisions of this Article 15 by virtue of such conflict.

ARTICLE 16 OPTIONAL REDEMPTION

Section 16.01. *Optional Redemption.* The Notes shall not be redeemable by the Company prior to February 20, 2026. On or after February 20, 2026 and prior to the 31st Scheduled Trading Day immediately preceding the Maturity Date, the Company may redeem (an "**Optional Redemption**") for cash all or any portion of the Notes (subject to the limitations set forth in Section 16.02(e)), at the Redemption Price, if the Last Reported Sale Price of the Common Stock has been at least 150% of the Conversion Price then in effect for at least 20 Trading Days (whether or not consecutive) during any 30 consecutive Trading Day period

(including the last Trading Day of such period) ending on, and including, the Trading Day immediately preceding the date on which the Company provides the Redemption Notice in accordance with Section 16.02.

Section 16.02. *Notice of Optional Redemption; Selection of Notes.* (a) In case the Company exercises its Optional Redemption right to redeem all or, as the case may be, any part of the Notes pursuant to Section 16.01, it shall fix a date for redemption (each, a “**Redemption Date**”) and it or, at its written request received by the Trustee not less than 5 Business Days prior to the date such Redemption Notice is to be sent (or such shorter period of time as may be acceptable to the Trustee), the Trustee, in the name of and at the expense of the Company, shall deliver or cause to be delivered a notice of such Optional Redemption (a “**Redemption Notice**”) not less than 35 nor more than 60 Trading Days prior to the Redemption Date to each Holder of Notes so to be redeemed as a whole or in part; *provided, however*, that if the Company shall give such notice, it shall also give written notice of the Redemption Date to the Trustee, the Conversion Agent (if other than the Trustee) and the Paying Agent (if other than the Trustee). The Redemption Date must be a Business Day. The Company may not specify a Redemption Date that falls on or after the 31st Scheduled Trading Day immediately preceding the Maturity Date.

(b) The Redemption Notice, if delivered in the manner herein provided, shall be conclusively presumed to have been duly given, whether or not the Holder receives such notice. In any case, failure to give such Redemption Notice or any defect in the Redemption Notice to the Holder of any Note designated for redemption as a whole or in part shall not affect the validity of the proceedings for the redemption of any other Note.

(c) Each Redemption Notice shall specify:

(i) the Redemption Date;

(ii) the Redemption Price;

(iii) that on the Redemption Date, the Redemption Price will become due and payable upon each Note to be redeemed, and that interest thereon, if any, shall cease to accrue on and after the Redemption Date;

(iv) the place or places where such Notes are to be surrendered for payment of the Redemption Price;

(v) that Holders called (or deemed called) for redemption may surrender their Notes for conversion at any time prior to the close of business on the Scheduled Trading Day immediately preceding the Redemption Date;

(vi) the procedures a converting Holder must follow to convert its Notes and the Settlement Method and Specified Dollar Amount, if applicable;

(vii) the Conversion Rate;

79

(viii) the CUSIP, ISIN or other similar numbers, if any, assigned to such Notes;
and

(ix) in case any Note is to be redeemed in part only, the portion of the principal amount thereof to be redeemed and on and after the Redemption Date, upon surrender of such Note, a new Note in principal amount equal to the unredeemed portion thereof shall be issued, which principal amount must be \$1,000 or an integral multiple thereof.

A Redemption Notice shall be irrevocable. An Optional Redemption may not be conditional. If the Company calls any Note for Optional Redemption pursuant to this Article 16, then after the close of business on the second Scheduled Trading Day prior to the Redemption Date, the right to convert such Note shall expire, unless the Company defaults in the payment of the Redemption Price, in which case a Holder of the Note called for Optional Redemption may convert such Note (or a portion thereof) until the close of business on the Trading Day immediately preceding the date on which the Redemption Price has been paid or duly provided for.

(d) If the Company elects to redeem fewer than all of the outstanding Notes, the Notes to be redeemed will be selected according to the Depository's applicable procedures, in the case of Notes represented by a Global Note, or, in the case of Notes represented by Physical Notes, by lot, on a pro rata basis or by another method the Trustee deems to be appropriate and fair. If the Trustee selects a portion of any Holder's Notes for partial redemption and such Holder converts a portion of such Notes, the converted portion shall be deemed (so far as may be possible) to be from the portion selected for redemption.

(e) If the Company elects to redeem fewer than all of the outstanding Notes, after giving effect to such redemption, at least \$150,000,000 aggregate principal amount of the Notes shall be outstanding and not subject to such redemption as of the date the Redemption Notice is delivered.

Section 16.03. *Payment of Notes Called for Redemption.* (a) If any Redemption Notice has been given in respect of the Notes in accordance with Section 16.02, the Notes shall become due and payable on the Redemption Date at the place or places stated in the Redemption Notice and at the applicable Redemption Price. On presentation and surrender of the Notes at the place or places stated in the Redemption Notice, the Notes shall be paid and redeemed by the Company at the applicable Redemption Price.

(b) Prior to 11:00 a.m. New York City time on the Redemption Date, the Company shall deposit with the Paying Agent or, if the Company or a Subsidiary of the Company is acting as the Paying Agent, shall segregate and hold in trust as provided in Section 7.05 an amount of cash (in immediately available funds if deposited on the Redemption Date), sufficient to pay the Redemption Price of all of the Notes to be redeemed on such Redemption Date. Subject to receipt of funds by the Paying Agent, payment for the Notes to be redeemed shall be made on the Redemption Date for such Notes. The Paying Agent shall, promptly after such payment and upon written demand by the Company, return to the Company any funds in excess of the Redemption Price.

Section 16.04. *Restrictions on Redemption.* The Company may not redeem any Notes on any date if the principal amount of the Notes has been accelerated in accordance with the terms of this Indenture, and such acceleration has not been rescinded, on or prior to the Redemption Date (except in the case of an acceleration resulting from a Default by the Company in the payment of the Redemption Price with respect to such Notes).

Section 16.05 *Conversion.* None of the foregoing provisions shall affect the right of a holder of Notes to convert its Notes into cash, shares of Common Stock or a combination of cash and shares of Common Stock, as applicable, as set forth in Section 14.01 and Section 14.02 prior to the Redemption Date.

ARTICLE 17
MISCELLANEOUS PROVISIONS

Section 17.01. *Provisions Binding on Company's Successors.* All the covenants, stipulations, promises and agreements of the Company contained in this Indenture shall bind its successors and assigns whether so expressed or not.

Section 17.02. *Official Acts by Successor Corporation.* Any act or proceeding by any provision of this Indenture authorized or required to be done or performed by any board, committee or Officer of the Company shall and may be done and performed with like force and effect by the like board, committee or officer of any corporation or other entity that shall at the time be the lawful sole successor of the Company.

Section 17.03. *Addresses for Notices, Etc.* Any notice or demand that by any provision of this Indenture is required or permitted to be given or served by the Trustee or by the Holders on the Company shall be deemed to have been sufficiently given or made, for all purposes if given or served by being deposited postage prepaid by registered or certified mail in a post office letter box addressed (until another address is filed by the Company with the Trustee) to Pacific Biosciences of California, Inc., 1305 O'Brien Drive, Menlo Park, CA 94025, Attention: Chief Financial Officer. Any notice, direction, request or demand hereunder to or upon the Trustee shall be deemed to have been sufficiently given or made, for all purposes, if given or served by being deposited postage prepaid by registered or certified mail in a post office letter box addressed to the Corporate Trust Office or sent electronically in PDF format.

The Trustee, by notice to the Company, may designate additional or different addresses for subsequent notices or communications.

Any notice or communication delivered or to be delivered to a Holder of Physical Notes shall be mailed to it by first class mail, postage prepaid, at its address as it appears on the Note Register and shall be sufficiently given to it if so mailed within the time prescribed. Any notice or communication delivered or to be delivered to a Holder of Global Notes shall be delivered in accordance with the applicable procedures of the Depository and shall be sufficiently given to it if so delivered within the time prescribed. Notwithstanding any other provision of this Indenture or any Note, where this Indenture or any Note provides for notice of any event (including any Fundamental Change Company Notice) to a Holder of a Global Note (whether by mail or

otherwise), such notice shall be sufficiently given if given to the Depository (or its designee) pursuant to the standing instructions from the Depository or its designee, including by electronic mail in accordance with the Depository's applicable procedures.

Failure to mail or deliver a notice or communication to a Holder or any defect in it shall not affect its sufficiency with respect to other Holders. If a notice or communication is mailed or delivered, as the case may be, in the manner provided above, it is duly given, whether or not the addressee receives it.

In case by reason of the suspension of regular mail service or by reason of any other cause it shall be impracticable to give such notice to Holders by mail, then such notification as shall be made with the approval of the Trustee shall constitute a sufficient notification for every purpose hereunder.

Section 17.04. *Governing Law; Jurisdiction.* THIS INDENTURE AND EACH NOTE, AND ANY CLAIM, CONTROVERSY OR DISPUTE ARISING UNDER OR RELATED TO THIS INDENTURE AND EACH NOTE, SHALL BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF NEW YORK.

The Company irrevocably consents and agrees, for the benefit of the Holders from time

to time of the Notes and the Trustee, that any legal action, suit or proceeding against it with respect to obligations, liabilities or any other matter arising out of or in connection with this Indenture or the Notes may be brought in the courts of the State of New York or the courts of the United States located in the Borough of Manhattan, New York City, New York and, until amounts due and to become due in respect of the Notes have been paid, hereby irrevocably consents and submits to the non-exclusive jurisdiction of each such court *in personam*, generally and unconditionally with respect to any action, suit or proceeding for itself in respect of its properties, assets and revenues.

The Company irrevocably and unconditionally waives, to the fullest extent permitted by law, any objection which it may now or hereafter have to the laying of venue of any of the aforesaid actions, suits or proceedings arising out of or in connection with this Indenture brought in the courts of the State of New York or the courts of the United States located in the Borough of Manhattan, New York City, New York and hereby further irrevocably and unconditionally waives and agrees not to plead or claim in any such court that any such action, suit or proceeding brought in any such court has been brought in an inconvenient forum.

Section 17.05. *Evidence of Compliance with Conditions Precedent; Certificates and Opinions of Counsel to Trustee.* Upon any application or demand by the Company to the Trustee to take any action under any of the provisions of this Indenture, the Company shall furnish to the Trustee an Officer's Certificate and, if requested by the Trustee, an Opinion of Counsel stating that such action is permitted by the terms of this Indenture and that all conditions precedent including any covenants compliance with such which constitutes a condition precedent to such action have been complied with; *provided* that no Opinion of Counsel shall be required to be delivered in connection with (1) the original issuance of Notes on the date hereof under this Indenture and (2) the removal of the restricted CUSIP of the Restricted Securities to an unrestricted CUSIP pursuant to the applicable procedures of the Depository upon the Notes

becoming freely tradable by non-Affiliates of the Company under Rule 144, unless a new Note is to be issued; *provided further* that no Opinion of Counsel shall be required to be delivered in connection with a request by the Company that the Trustee deliver a notice to Holders under the Indenture where the Trustee receives an Officer's Certificate with respect to such notice. With respect to matters of fact, an Opinion of Counsel may rely on an Officer's Certificate or certificates of public officials.

Each Officer's Certificate and Opinion of Counsel provided for, by or on behalf of the Company in this Indenture and delivered to the Trustee with respect to compliance with this Indenture (other than the Officer's Certificates provided for in Section 4.08) shall include (a) a statement that the person signing such certificate is familiar with the requested action and this Indenture; (b) a brief statement as to the nature and scope of the examination or investigation upon which the statement contained in such certificate is based; (c) a statement that, in the judgment of such person, he or she has made such examination or investigation as is necessary to enable him or her to express an informed judgment as to whether or not such action is permitted by this Indenture; and (d) a statement as to whether or not, in the judgment of such person, such action is permitted by this Indenture and that all conditions precedent thereto have been complied with.

Notwithstanding anything to the contrary in this Section 17.05, if any provision in this Indenture specifically provides that the Trustee shall or may receive an Opinion of Counsel in connection with any action to be taken by the Trustee or the Company hereunder, the Trustee shall be entitled to such Opinion of Counsel.

Section 17.06. *Legal Holidays.* In any case where any Interest Payment Date, Fundamental Change Repurchase Date, Redemption Date or Maturity Date is not a Business Day, then any action to be taken on such date need not be taken on such date, but may be taken on the next succeeding Business Day with the same force and effect as if taken on such date, and no interest shall accrue in respect of the delay; *provided that*, solely for purposes of this Section 17.06, a day on which the applicable place of payment is authorized or required by law or executive order to close or be closed will be deemed not to be a Business Day.

Section 17.07. *No Security Interest Created.* Nothing in this Indenture or in the Notes, expressed or implied, shall be construed to constitute a security interest under the Uniform Commercial Code or similar legislation, as now or hereafter enacted and in effect, in any jurisdiction.

Section 17.08. *Benefits of Indenture.* Nothing in this Indenture or in the Notes, expressed or implied, shall give to any Person, other than the Holders, the parties hereto, any Paying Agent, any Conversion Agent, any authenticating agent, any Note Registrar and their successors hereunder, any benefit or any legal or equitable right, remedy or claim under this Indenture.

Section 17.09. *Table of Contents, Headings, Etc.* The table of contents and the titles and headings of the articles and sections of this Indenture have been inserted for convenience of reference only, are not to be considered a part hereof, and shall in no way modify or restrict any of the terms or provisions hereof.

Section 17.10. *Authenticating Agent.* The Trustee may appoint an authenticating agent that shall be authorized to act on its behalf and subject to its direction in the authentication and delivery of Notes in connection with the original issuance thereof and transfers and exchanges of

Notes hereunder, including under Section 2.04, Section 2.05, Section 2.06, Section 2.07, Section 10.04 and Section 15.04 as fully to all intents and purposes as though the authenticating agent had been expressly authorized by this Indenture and those Sections to authenticate and deliver Notes. For all purposes of this Indenture, the authentication and delivery of Notes by the authenticating agent shall be deemed to be authentication and delivery of such Notes “by the Trustee” and a certificate of authentication executed on behalf of the Trustee by an authenticating agent shall be deemed to satisfy any requirement hereunder or in the Notes for the Trustee’s certificate of authentication. Such authenticating agent shall at all times be a Person eligible to serve as trustee hereunder pursuant to Section 7.08.

Any corporation or other entity into which any authenticating agent may be merged or converted or with which it may be consolidated, or any corporation or other entity resulting from any merger, consolidation or conversion to which any authenticating agent shall be a party, or any corporation or other entity succeeding to the corporate trust business of any authenticating agent, shall be the successor of the authenticating agent hereunder, if such successor corporation or other entity is otherwise eligible under this Section 17.10, without the execution or filing of any paper or any further act on the part of the parties hereto or the authenticating agent or such successor corporation or other entity.

Any authenticating agent may at any time resign by giving written notice of resignation to the Trustee and to the Company. The Trustee may at any time terminate the agency of any authenticating agent by giving written notice of termination to such authenticating agent and to the Company. Upon receiving such a notice of resignation or upon such a termination, or in case at any time any authenticating agent shall cease to be eligible under this Section, the Trustee may appoint a successor authenticating agent (which may be the Trustee), shall give written notice of such appointment to the Company and shall deliver notice of such appointment to all Holders.

The Company agrees to pay to the authenticating agent from time to time reasonable compensation for its services although the Company may terminate the authenticating agent, if it determines such agent’s fees to be unreasonable.

The provisions of Section 7.02, Section 7.03, Section 7.04, Section 8.03 and this Section 17.10 shall be applicable to any authenticating agent.

If an authenticating agent is appointed pursuant to this Section 17.10, the Notes may have endorsed thereon, in addition to the Trustee’s certificate of authentication, an alternative certificate of authentication in the following form:

_____,
as Authenticating Agent, certifies that this is one of the Notes described
in the within-named Indenture.

By: _____
Authorized Signatory

Section 17.11. *Execution in Counterparts.* This Indenture may be executed in any number of counterparts, each of which shall be an original, but such counterparts shall together constitute but one and the same instrument. The exchange of copies of this Indenture and of signature pages by facsimile, PDF or other electronic transmission shall constitute effective execution and delivery of this Indenture as to the parties hereto and may be used in lieu of the original Indenture for all purposes. Signatures of the parties hereto transmitted by facsimile, PDF or other electronic transmission shall constitute effective execution and delivery of this Indenture as to the other parties hereto shall be deemed to be their original signatures for all purposes.

All notices, approvals, consents, requests and any communications hereunder must be in writing (provided that any such communication sent to Trustee hereunder must be in the form of

writing (provided that any such communication sent to Trustee hereunder must be in the form of a document that is signed manually or by way of a digital signature provided by DocuSign or other electronic signature provider that the Company plans to use (or such other digital signature provider as specified in writing to Trustee by the authorized representative), in English. Company agrees to assume all risks arising out of the use of using digital signatures and electronic methods to submit communications to Trustee, including without limitation the risk of Trustee acting on unauthorized instructions, and the risk of interception and misuse by third parties.

Section 17.12. *Severability.* In the event any provision of this Indenture or in the Notes shall be invalid, illegal or unenforceable, then (to the extent permitted by law) the validity, legality or enforceability of the remaining provisions shall not in any way be affected or impaired.

Section 17.13. *Waiver of Jury Trial.* EACH OF THE COMPANY AND THE TRUSTEE HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY LEGAL PROCEEDING ARISING OUT OF OR RELATING TO THIS INDENTURE, THE NOTES OR THE TRANSACTIONS CONTEMPLATED HEREBY.

Section 17.14. *Force Majeure.* In no event shall the Trustee be responsible or liable for any failure or delay in the performance of its obligations hereunder arising out of or caused by, directly or indirectly, forces beyond its control, including, without limitation, strikes, work stoppages, accidents, epidemics, pandemics, acts of war or terrorism, civil or military disturbances, nuclear or natural catastrophes or acts of God, and interruptions, loss or malfunctions of utilities, communications or computer (software and hardware) services; it being understood that the Trustee shall use reasonable efforts that are consistent with accepted practices in the banking industry to resume performance as soon as practicable under the circumstances.

Section 17.15. *Calculations.* Except as otherwise provided herein, the Company shall be responsible for making all calculations called for under the Notes. These calculations include, but are not limited to, determinations of the Redemption Price, the Last Reported Sale Prices of the Common Stock, the Daily VWAPs, the Daily Conversion Values, the Daily Settlement Amounts, accrued interest payable on the Notes and the Conversion Rate of the Notes. The Company shall make all these calculations in good faith and, absent manifest error, the

85

Company's calculations shall be final and binding on Holders. The Company shall provide a schedule of its calculations to each of the Trustee and the Conversion Agent, and each of the Trustee and Conversion Agent is entitled to rely conclusively upon the accuracy of the Company's calculations without independent verification. The Trustee will forward the Company's calculations to any Holder of Notes upon the written request of that Holder at the sole cost and expense of the Company.

Section 17.16. *U.S.A. PATRIOT Act.* The parties hereto acknowledge that in accordance with Section 326 of the U.S.A. PATRIOT Act, the Trustee, like all financial institutions and in order to help fight the funding of terrorism and money laundering, is required to obtain, verify, and record information that identifies each person or legal entity that establishes a relationship or opens an account with the Trustee. The parties to this Indenture agree that they will provide the Trustee with such information as it may request in order for the Trustee to satisfy the requirements of the U.S.A. Patriot Act.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, the parties hereto have caused this Indenture to be duly executed as of the date first written above.

PACIFIC BIOSCIENCES OF CALIFORNIA,
INC.

By: /s/ Susan Kim
Name: Susan Kim
Title: Chief Financial Officer

U.S. BANK NATIONAL ASSOCIATION, as
Trustee

By: /s/ David A. Jason
Name: David A. Jason
Title: Vice President

[INCLUDE FOLLOWING LEGEND IF A GLOBAL NOTE]

[UNLESS THIS CERTIFICATE IS PRESENTED BY AN AUTHORIZED REPRESENTATIVE OF THE DEPOSITORY TRUST COMPANY, A NEW YORK CORPORATION (“DTC”), TO THE COMPANY OR ITS AGENT FOR REGISTRATION OF TRANSFER, EXCHANGE, OR PAYMENT, AND ANY CERTIFICATE ISSUED IS REGISTERED IN THE NAME OF CEDE & CO. OR IN SUCH OTHER NAME AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC (AND ANY PAYMENT HEREUNDER IS MADE TO CEDE & CO. OR TO SUCH OTHER ENTITY AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC), ANY TRANSFER, PLEDGE, OR OTHER USE HEREOF FOR VALUE OR OTHERWISE BY OR TO ANY PERSON IS WRONGFUL INASMUCH AS THE REGISTERED OWNER HEREOF, CEDE & CO., HAS AN INTEREST HEREIN.]

[INCLUDE FOLLOWING LEGEND IF A RESTRICTED SECURITY]

[THIS SECURITY AND THE COMMON STOCK, IF ANY, ISSUABLE UPON CONVERSION OF THIS SECURITY HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE “SECURITIES ACT”), AND MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED EXCEPT IN ACCORDANCE WITH THE FOLLOWING SENTENCE. BY ITS ACQUISITION HEREOF OR OF A BENEFICIAL INTEREST HEREIN, THE ACQUIRER:

(1) REPRESENTS THAT IT AND ANY ACCOUNT FOR WHICH IT IS ACTING IS A “QUALIFIED INSTITUTIONAL BUYER” (WITHIN THE MEANING OF RULE 144A UNDER THE SECURITIES ACT) AND THAT IT EXERCISES SOLE INVESTMENT DISCRETION WITH RESPECT TO EACH SUCH ACCOUNT, AND

(2) AGREES FOR THE BENEFIT OF PACIFIC BIOSCIENCES OF CALIFORNIA, INC. (THE “COMPANY”) THAT IT WILL NOT OFFER, SELL, PLEDGE OR OTHERWISE TRANSFER THIS SECURITY OR ANY BENEFICIAL INTEREST HEREIN PRIOR TO THE DATE THAT IS THE LATER OF (X) ONE YEAR AFTER THE LAST DATE OF ORIGINAL ISSUANCE HEREOF OR SUCH SHORTER PERIOD OF TIME AS PERMITTED BY RULE 144 UNDER THE SECURITIES ACT OR ANY SUCCESSOR PROVISION THERETO AND (Y) SUCH LATER DATE, IF ANY, AS MAY BE REQUIRED BY APPLICABLE LAW, EXCEPT:

(A) TO THE COMPANY OR ANY SUBSIDIARY THEREOF, OR

(B) PURSUANT TO A REGISTRATION STATEMENT WHICH HAS BECOME EFFECTIVE UNDER THE SECURITIES ACT, OR

A-1

(C) TO A QUALIFIED INSTITUTIONAL BUYER IN COMPLIANCE WITH RULE 144A UNDER THE SECURITIES ACT, OR

(D) PURSUANT TO AN EXEMPTION FROM REGISTRATION PROVIDED BY RULE 144 UNDER THE SECURITIES ACT OR ANY OTHER AVAILABLE EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT.

PRIOR TO THE REGISTRATION OF ANY TRANSFER IN ACCORDANCE WITH CLAUSE (2)(D) ABOVE, THE COMPANY AND THE TRUSTEE RESERVE THE RIGHT TO REQUIRE THE DELIVERY OF SUCH LEGAL OPINIONS, CERTIFICATIONS OR OTHER EVIDENCE AS MAY REASONABLY BE REQUIRED IN ORDER FOR THE COMPANY TO

EVIDENCE AS MAY REASONABLY BE REQUIRED IN ORDER FOR THE COMPANY TO DETERMINE THAT THE PROPOSED TRANSFER IS BEING MADE IN COMPLIANCE WITH THE SECURITIES ACT AND APPLICABLE STATE SECURITIES LAWS. NO REPRESENTATION IS MADE AS TO THE AVAILABILITY OF ANY EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT.]

[THIS SECURITY IS A SPONSOR NOTE WITHIN THE MEANING OF THE INDENTURE.]

A-2

Pacific Biosciences of California, Inc.

1.50% Convertible Senior Note due 2028

No. [_____]

[Initially]¹ \$[_____]

CUSIP No. [69404D AA6]²[69404D AC2]³⁴

Pacific Biosciences of California, Inc., a corporation duly organized and validly existing under the laws of the State of Delaware (the “**Company**,” which term includes any successor corporation or other entity under the Indenture referred to on the reverse hereof), for value received hereby promises to pay to [CEDE & CO.]⁵ [_____]⁶, or registered assigns, the principal sum [as set forth in the “Schedule of Exchanges of Notes” attached hereto]⁷ [of \$[_____]]⁸, which amount, taken together with the principal amounts of all other outstanding Notes, shall not, unless permitted by the Indenture, exceed \$900,000,000 in aggregate at any time, in accordance with the rules and procedures of the Depository, on February 15, 2028, and interest thereon as set forth below.

This Note shall bear interest at the rate of 1.50% per year from February 16, 2021, or from the most recent date to which interest has been paid or provided for to, but excluding, the

next scheduled Interest Payment Date until February 15, 2028. Accrued interest on this Note shall be computed on the basis of a 360-day year composed of twelve 30-day months and, for partial months, on the basis of the number of days actually elapsed in a 30-day month. Interest is payable semi-annually in arrears on each February 15 and August 15, commencing on August 15, 2021, to Holders of record at the close of business on the preceding February 1 and August 1 (whether or not such day is a Business Day), respectively. Additional Interest will be payable as set forth in Section 6.03 of the within-mentioned Indenture, and any reference to interest on, or in respect of, any Note therein shall be deemed to include Additional Interest if, in such context, Additional Interest is, was or would be payable pursuant to any of such Section 6.03, and any express mention of the payment of Additional Interest in any provision therein shall not be construed as excluding Additional Interest in those provisions thereof where such express mention is not made.

¹ Include if a global note.

² If a Sponsor Note within the meaning of the Indenture.

³ If a Note other than a Sponsor Note within the meaning of the Indenture.

⁴ This Note will be deemed to be identified by CUSIP No. 69404D AB4, if a Sponsor Note within the meaning of the Indenture, and 69404D AD0, if a Note other than a Sponsor Note, from and after such time when the Company delivers, pursuant to Section 2.05(c) of the within-mentioned Indenture, written notice to the Trustee of the occurrence of the Resale Restriction Termination Date and the removal of the restrictive legend affixed to this Note in accordance with the applicable procedures of the Depository.

⁵ Include if a global note.

⁶ Include if a physical note.

⁷ Include if a global note.

⁸ Include if a physical note.

Any Defaulted Amounts shall accrue interest per annum at the rate borne by the Notes, from, and including, the relevant payment date to, but excluding, the date on which such Defaulted Amounts shall have been paid by the Company, at its election, in accordance with Section 2.03(c) of the Indenture.

The Company shall pay the principal of and interest on this Note, if and so long as such Note is a Global Note, in immediately available funds in lawful money of the United States at the time to the Depository or its nominee, as the case may be, as the registered Holder of such Note. As provided in and subject to the provisions of the Indenture, the Company shall pay the principal of any Notes (other than Notes that are Global Notes) at the office or agency designated by the Company for that purpose. The Company has initially designated the Trustee as its Paying Agent and Note Registrar in respect of the Notes and its Corporate Trust Office located in the United States of America, as a place where Notes may be presented for payment or for registration of transfer and exchange.

Reference is made to the further provisions of this Note set forth on the reverse hereof, including, without limitation, provisions giving the Holder of this Note the right to convert this Note into cash, shares of Common Stock or a combination of cash and shares of Common Stock, as applicable, on the terms and subject to the limitations set forth in the Indenture. Such further provisions shall for all purposes have the same effect as though fully set forth at this place.

This Note, and any claim, controversy or dispute arising under or related to this Note, shall be construed in accordance with and governed by the laws of the State of New York.

In the case of any conflict between this Note and the Indenture, the provisions of the Indenture shall control and govern.

This Note shall not be valid or become obligatory for any purpose until the certificate of authentication hereon shall have been signed manually by the Trustee or a duly authorized authenticating agent under the Indenture.

[Remainder of page intentionally left blank]

By: _____
Name:
Title:

Dated:

TRUSTEE'S CERTIFICATE OF AUTHENTICATION

U.S. BANK NATIONAL ASSOCIATION
as Trustee, certifies that this is one of the Notes described
in the within-named Indenture.

By: _____
Authorized Signatory

[FORM OF REVERSE OF NOTE]

Pacific Biosciences of California, Inc.
1.50% Convertible Senior Note due 2028

This Note is one of a duly authorized issue of Notes of the Company, designated as its 1.50% Convertible Senior Notes due 2028 (the "**Notes**"), initially limited to the aggregate principal amount of \$900,000,000 all issued or to be issued under and pursuant to an Indenture dated as of February 16, 2021 (the "**Indenture**"), between the Company and U.S. Bank National Association (the "**Trustee**"), to which Indenture and all indentures supplemental thereto reference is hereby made for a description of the rights, limitations of rights, obligations, duties and immunities thereunder of the Trustee, the Company and the Holders of the Notes.

and immunities hereunder of the Trustee, the Company and the Holders of the Notes. Capitalized terms used in this Note and not defined in this Note shall have the respective meanings set forth in the Indenture.

In case certain Events of Default shall have occurred and be continuing, the principal of, and interest on, all Notes may be declared, by either the Trustee or Holders of at least 25% in aggregate principal amount of Notes then outstanding, and upon said declaration shall become, due and payable, in the manner, with the effect and subject to the conditions and certain exceptions set forth in the Indenture.

Subject to the terms and conditions of the Indenture, the Company will make all payments and deliveries in respect of the Fundamental Change Repurchase Price on the Fundamental Change Repurchase Date, the Redemption Price on the Redemption Date and the principal amount on the Maturity Date, as the case may be, to the Holder who surrenders a Note to a Paying Agent to collect such payments in respect of the Note. The Company will pay cash amounts in money of the United States that at the time of payment is legal tender for payment of public and private debts.

The Indenture contains provisions permitting the Company and the Trustee in certain circumstances, without the consent of the Holders of the Notes, and in certain other circumstances, with the consent of the Holders of not less than a majority in aggregate principal amount of the Notes at the time outstanding, evidenced as in the Indenture provided, to execute supplemental indentures modifying the terms of the Indenture and the Notes as described therein. It is also provided in the Indenture that, subject to certain exceptions, the Holders of a majority in aggregate principal amount of the Notes at the time outstanding may on behalf of the Holders of all of the Notes waive any past Default or Event of Default under the Indenture and its consequences.

No reference herein to the Indenture and no provision of this Note or of the Indenture shall alter or impair the obligation of the Company, which is absolute and unconditional, to pay or deliver, as the case may be, the principal (including the Redemption Price and the Fundamental Change Repurchase Price, if applicable) of, accrued and unpaid interest on, and the consideration due upon conversion of, this Note at the place, at the respective times, at the rate and in the lawful money herein prescribed.

R-1

The Notes are issuable in registered form without coupons in minimum denominations of \$1,000 principal amount and integral multiples thereof. At the office or agency of the Company referred to on the face hereof, and in the manner and subject to the limitations provided in the Indenture, Notes may be exchanged for a like aggregate principal amount of Notes of other authorized denominations, without payment of any service charge but, if required by the Company or Trustee, with payment of a sum sufficient to cover any transfer or similar tax that may be imposed in connection therewith as a result of the name of the Holder of the new Notes issued upon such exchange of Notes being different from the name of the Holder of the old Notes surrendered for such exchange.

The Notes shall be redeemable at the Company's option on or after February 20, 2026, in accordance with the terms and subject to the conditions specified in the Indenture. No sinking fund is provided for the Notes.

Upon the occurrence of a Fundamental Change, the Holder has the right, at such Holder's option, to require the Company to repurchase for cash all of such Holder's Notes or any portion thereof (in principal amounts of \$1,000 or integral multiples thereof) on the Fundamental Change Repurchase Date at a price equal to the Fundamental Change Repurchase Price.

Subject to the provisions of the Indenture, the Holder hereof has the right, at its option,

prior to the close of business on the second Scheduled Trading Day immediately preceding the Maturity Date, to convert any Notes or portion thereof that is \$1,000 or an integral multiple thereof, into cash, shares of Common Stock or a combination of cash and shares of Common Stock, as applicable, at the Conversion Rate specified in the Indenture, as adjusted from time to time as provided in the Indenture.

Terms used in this Note and defined in the Indenture are used herein as therein defined.

ABBREVIATIONS

The following abbreviations, when used in the inscription of the face of this Note, shall be construed as though they were written out in full according to applicable laws or regulations:

TEN COM = as tenants in common

UNIF GIFT MIN ACT = Uniform Gifts to Minors Act

CUST = Custodian

TEN ENT = as tenants by the entireties

JT TEN = joint tenants with right of survivorship and not as tenants in common

Additional abbreviations may also be used though not in the above list.

Pacific Biosciences of California, Inc.
1.50% Convertible Senior Notes due 2028

The initial principal amount of this Global Note is _____ MILLION DOLLARS
(\$[_____]). The following increases or decreases in this Global Note have been made:

<u>Date of exchange</u>	<u>Amount of decrease in principal amount of this Global Note</u>	<u>Amount of increase in principal amount of this Global Note</u>	<u>Principal amount of this Global Note following such decrease or increase</u>	<u>Signature of authorized signatory of Trustee or Custodian</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
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_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

⁹ Include if a global note.

ATTACHMENT 1

[FORM OF NOTICE OF CONVERSION]

To: Pacific Biosciences of California, Inc.

To: U.S. Bank National Association
1 California Street, Suite 1000
San Francisco, CA 94111

Attention: D. Jason (Pacific Biosciences of California, Inc. 1.50% Convertible Senior Notes due

The undersigned registered owner of this Note hereby exercises the option to convert this Note, or the portion hereof (that is \$1,000 principal amount or an integral multiple thereof) below designated, into cash, shares of Common Stock or a combination of cash and shares of Common Stock, as applicable, in accordance with the terms of the Indenture referred to in this Note, and directs that any cash payable and any shares of Common Stock issuable and deliverable upon such conversion, together with any cash for any fractional share, and any Notes representing any unconverted principal amount hereof, be issued and delivered to the registered Holder hereof unless a different name has been indicated below. If any shares of Common Stock or any portion of this Note not converted are to be issued in the name of a Person other than the undersigned, the undersigned will pay all documentary, stamp or similar issue or transfer taxes, if any, in accordance with Section 14.02(d) and Section 14.02(e) of the Indenture. Any amount required to be paid to the undersigned on account of interest accompanies this Note. Capitalized terms used herein but not defined shall have the meanings ascribed to such terms in the Indenture.

Dated: _____

Signature(s)

Signature Guarantee

Signature(s) must be guaranteed by an eligible Guarantor Institution (banks, stock brokers, savings and loan associations and credit unions) with membership in an approved signature guarantee medallion program

pursuant to Securities and Exchange Commission Rule 17Ad-15 if shares of Common Stock are to be issued, or Notes are to be delivered, other than to and in the name of the registered holder.

Fill in for registration of shares if to be issued, and Notes if to be delivered, other than to and in the name of the registered holder:

(Name)

(Street Address)

(City, State and Zip Code)

Please print name and address

Principal amount to be converted (if less than all):
\$_____,000

NOTICE: The above signature(s) of the Holder(s) hereof must correspond with the name as written upon the face of the Note in every particular without alteration or enlargement or any change whatever.

Social Security or Other Taxpayer
Identification Number

[FORM OF FUNDAMENTAL CHANGE REPURCHASE NOTICE]

To: Pacific Biosciences of California, Inc.

To: U.S. Bank National Association
1 California Street, Suite 1000
San Francisco, CA 94111

Attention: D. Jason (Pacific Biosciences of California, Inc. 1.50% Convertible Senior Notes due 2028)

The undersigned registered owner of this Note hereby acknowledges receipt of a notice from Pacific Biosciences of California, Inc. (the “**Company**”), as to the occurrence of a Fundamental Change with respect to the Company and specifying the Fundamental Change Repurchase Date and requests and instructs the Company to pay to the registered holder hereof in accordance with Section 15.02 of the Indenture referred to in this Note (1) the entire principal amount of this Note, or the portion thereof (that is \$1,000 principal amount or an integral multiple thereof) below designated, (2) if such Fundamental Change Repurchase Date does not fall during the period after a Regular Record Date and on or prior to the corresponding Interest Payment Date, accrued and unpaid interest, if any, thereon to, but excluding, such Fundamental Change Repurchase Date and (3) all unpaid interest from the Fundamental Change Repurchase Date to, but excluding, the Maturity Date. Capitalized terms used herein but not defined shall have the meanings ascribed to such terms in the Indenture.

In the case of Physical Notes, the certificate numbers of the Notes to be repurchased are as set forth below:

Dated: _____

Signature(s)

Social Security or Other Taxpayer
Identification Number

Principal amount to be repurchased (if less than all):
\$ _____,000

NOTICE: The above signature(s) of the Holder(s) hereof must correspond with the name as written upon the face of

[FORM OF ASSIGNMENT AND TRANSFER]

To: Pacific Biosciences of California, Inc.

To: U.S. Bank National Association
1 California Street, Suite 1000
San Francisco, CA 94111

Attention: D. Jason (Pacific Biosciences of California, Inc. 1.50% Convertible Senior Notes due

For value received _____ hereby sell(s), assign(s) and transfer(s) unto _____ (Please insert social security or Taxpayer Identification Number of assignee) the within Note, and hereby irrevocably constitutes and appoints _____ attorney to transfer the said Note on the books of the Company, with full power of substitution in the premises.

In connection with any transfer of the within Note occurring prior to the Resale Restriction Termination Date, as defined in the Indenture governing such Note, the undersigned confirms that such Note is being transferred:

- To Pacific Biosciences of California, Inc., or a subsidiary thereof; or
- Pursuant to a registration statement that has become or been declared effective under the Securities Act of 1933, as amended; or
- Pursuant to and in compliance with Rule 144A under the Securities Act of 1933, as amended; or
- Pursuant to and in compliance with Rule 144 under the Securities Act of 1933, as amended, or any other available exemption from the registration requirements of the Securities Act of 1933, as amended.
- If such Note is a Sponsor Note, pursuant to and in accordance with Section 4.02 of the Investment Agreement to (i) a Purchaser’s Affiliate that executes and delivers to the Company a Joinder becoming a Purchaser party to the Investment Agreement and the Confidentiality Agreement and a duly completed and executed IRS Form W-9 (or a substantially equivalent form) or (ii) the Company or any of its Subsidiaries. Capitalized terms used in clauses (i) and (ii) of this paragraph but not defined in the Indenture shall have the meanings ascribed to such terms in the Investment Agreement.

Dated: _____

Signature(s)

Signature Guarantee

Signature(s) must be guaranteed by an eligible Guarantor Institution (banks, stock brokers, savings and loan associations and credit unions) with membership in an approved signature guarantee medallion program pursuant to Securities and Exchange Commission Rule 17Ad-15 if Notes are to be delivered, other than to and in the name of the registered holder.

NOTICE: The signature on the assignment must correspond with the name as written upon the

**CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO
SECURITIES EXCHANGE ACT RULES 13a-14(a) AND 15d-14(a), AS ADOPTED PURSUANT
TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Christian Henry, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Pacific Biosciences of California, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 4, 2023

By: _____ /s/ Christian O. Henry
2 Christian O. Henry
President and Chief Executive Officer
(Principal Executive Officer)

**CERTIFICATION OF CHIEF FINANCIAL OFFICER PURSUANT TO
SECURITIES EXCHANGE ACT RULES 13a-14(a) AND 15d-14(a), AS ADOPTED PURSUANT
TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Susan Kim, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Pacific Biosciences of California, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 4, 2023

By: _____
/s/ Susan G. Kim
Susan G. Kim
Chief Financial Officer
(Principal Financial Officer)

**Certification of CEO Furnished Pursuant to 18 U.S.C. Section 1350,
As Adopted Pursuant To
Section 906 of The Sarbanes-Oxley Act of 2002**

In connection with the Quarterly Report of Pacific Biosciences of California, Inc. (the "Company") on Form 10-Q for the period ended June 30, 2023, as filed with the Securities and Exchange Commission on the date hereof, I, Christian Henry, Chief Executive Officer of the Company, certify for the purposes of section 1350 of chapter 63 of title 18 of the United States Code, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge,

- (i) the Quarterly Report of the Company on Form 10-Q for the period ended June 30, 2023 (the "Report"), fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, and
- (ii) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: August 4, 2023

By: _____ /s/ Christian O. Henry
Christian O. Henry
President and Chief Executive Officer
(Principal Executive Officer)

**Certification of CFO Furnished Pursuant to 18 U.S.C. Section 1350,
As Adopted Pursuant To
Section 906 of The Sarbanes-Oxley Act of 2002**

In connection with the Quarterly Report of Pacific Biosciences of California, Inc. (the "Company") on Form 10-Q for the period ended June 30, 2023, as filed with the Securities and Exchange Commission on the date hereof, I, Susan Kim, Chief Financial Officer of the Company, certify for the purposes of section 1350 of chapter 63 of title 18 of the United States Code, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge,

- (i) the Quarterly Report of the Company on Form 10-Q for the period ended June 30, 2023 (the "Report"), fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, and
- (ii) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: August 4, 2023

By: _____ /s/ Susan G. Kim
Susan G. Kim
Chief Financial Officer
(Principal Financial Officer)