UNITED STATES OF AMERICA
FEDERAL TRADE COMMISSION
OFFICE OF ADMINISTRATIVE LAW JUDGES

In the Matter of **Illumina, Inc.,** **a corporation,** **and** **GRAIL, Inc.,** **a corporation,** **Respondents.**	Docket No. 9401

NON-PARTY THERMO FISHER SCIENTIFIC INC.
MOTION FOR *IN CAMERA* TREATMENT

Pursuant to Rule 3.45 of the Federal Trade Commission's Rules of Practices, non-party Thermo Fisher Scientific Inc. ("Thermo Fisher") respectfully moves this Court for *in camera* treatment, in whole or in part, of seventeen confidential, competitively sensitive documents and testimony identified in Exhibit B hereto ("Confidential Materials"). These Confidential Materials were produced pursuant to subpoenas issued by the Federal Trade Commission and Respondent GRAIL, Inc. (the "Subpoenas"). The Federal Trade Commission ("FTC") and Respondent GRAIL, Inc. ("GRAIL") have notified non-party Thermo Fisher that they intend to introduce the Confidential Materials that are the subject of this motion into evidence at the administrative trial in the above-captioned matter. Thermo Fisher closely reviewed every proposed trial exhibit identified by the Parties, and it limits its request for *in camera* treatment to only those documents and/or portions of documents that contain competitively sensitive, non-public information.

This motion seeks to prevent disclosure of documents and testimony that contain confidential business information that Thermo Fisher has kept secret and that are material to

Thermo Fisher's business. If these Confidential Materials were to become part of the public record, Thermo Fisher would be significantly harmed in its ability to compete in the development, manufacturing, and sale of next-generation sequencing (NGS) instruments, consumables, and other products. The Confidential Materials collectively provide insights into Thermo Fisher's strategic plans, competitive analyses, financial information, and present and future R&D plans. Disclosure of such information would give Thermo Fisher's competitors – including Illumina – an unfair competitive advantage resulting in serious competitive injury to Thermo Fisher.

For the avoidance of doubt, and to the extent the materials are not already protected by the existing Protective Order, Thermo Fisher also requests that this Court restrict access to the Confidential Materials to only those persons set forth in Paragraph 7 of the Protective Order entered in this matter.

I. THERMO FISHER'S DOCUMENTS ARE SECRET AND MATERIAL TO ITS BUSINESS SUCH THAT DISCLOSURE WOULD RESULT IN SERIOUS COMPETITIVE INJURY TO THERMO FISHER

Thermo Fisher's Confidential Materials contain information that, if publicly disclosed, will cause irreparable harm to Thermo Fisher, and therefore warrants *in camera* treatment pursuant to 16 C.F.R. § 3.45(b).

In camera treatment of material is appropriate when its "public disclosure will likely result in a clearly defined, serious injury to the person, partnership, or corporation" requesting such treatment. 16 C.F.R. § 3.45(b). A proponent demonstrates such injury by showing that the documents are secret and material to its business. *In re General Foods Corp.*, 95 F.T.C. 352, 355 (1980). "The likely loss of business advantages is a good example of a 'clearly defined, serious injury.'" *In re Dura Lube Corp.*, 1999 FTC Lexis 255, at *7 (Dec. 23, 1999) (quoting *Gen. Foods*, 95 F.T.C. at 355). Moreover, "it is proper to infer, without a specific showing of how a competitor

would use it, that disclosure of allegedly sensitive information would seriously affect the firm's commercial position." *In re E.I. Dupont de Nemours & Co.*, No. 9108, 1981 WL 389447, at *1 (1981) (hereinafter *Dupont I*).

Courts generally attempt "to protect confidential business information from unnecessary airing." *In re HP. Hood & Sons, Inc*., 58 F.T.C. 1184, 1188 (1961). "There can be no question that the confidential records of businesses involved in Commission proceedings should be protected insofar as possible." *Id.* In determining whether the document or testimony is sufficiently secret and material, the Court may consider:

> (1) the extent to which the information is known outside of the business; (2) the extent to which it is known by employees and others involved in the business; (3) the extent of measures taken to guard the secrecy of information; (4) the value of the information to the business and its competitors; (5) the amount of effort or money expended in developing the information; and (6) the ease or difficulty with which information could be acquired or duplicated by others.

In re Bristol-Myers Co., 90 F.T.C. 455, 456-57 (1977).

Thermo Fisher's status as a third party is relevant to the *in camera* treatment of the materials sought. Non-parties deserve "special solicitude" when requesting in camera treatment for confidential information. *In re Kaiser Aluminum & Chem. Corp.*, No. 9080, 1984 WL 565325, at *1 (1984) ("As a policy matter, extensions of confidential or *in camera* treatment in appropriate cases involving third party bystanders encourages cooperation with future adjudicative discovery requests."). Thermo Fisher's status as a non-party thus weighs in favor of granting *in camera* status to its Confidential Materials.

A. Thermo Fisher Has Preserved the Secrecy of the Confidential Materials

Thermo Fisher has taken significant steps to protect the secrecy of the Confidential Materials. Thermo Fisher produced the Confidential Materials pursuant to the Subpoenas. All of the Confidential Materials were produced with stamps marking them "Confidential," "Highly Confidential" or "Highly Confidential Business Information." *See* Felton Decl. ¶ 9. Thermo Fisher designated each of the Confidential Materials pursuant to (i) the Protective Order entered in the related *FTC v. Illumina Inc.* case in the federal district court or (ii) in the case of documents produced to the FTC prior to the entry of the Protective Order, pursuant to statute and the FTC's rules of practice. *See* Protective Order, *FTC v. Illumina Inc.*, 3:21-cv-00800-CAB-BGS, (S.D. Cal. Apr. 01, 2021), ECF No. 15; 15 U.S.C. § 57b-2(b); 16 C.F.R. § 4.10-.11.

With the exception of disclosure described above and of contracts to R&D partners and customers, Thermo Fisher has limited disclosure of the Confidential Materials to select Thermo Fisher employees with reason to have access to the information. This court has previously held that contracts between the business and an external party meet the burden of being sufficiently secret. *See In re Axon Enter., Inc., & Safariland, LLC,* No. 9389, 2020 WL 6058522, at *7 (Oct. 2, 2020) (finding Motorola's contracts were sufficiently secret); *In re Louisiana Real Est. Appraisers Bd.*, No. 9374, 2021 WL 1223991, at *5 (Mar. 29, 2021) (finding Clear Capital contracts with vendors were sufficiently secret).

As such, Thermo Fisher has taken all reasonable steps to guard the secrecy of the information contained in its Confidential Materials. Absent disclosure in the current matter, it would be difficult for Thermo Fisher's competitors or others within the industry to access or duplicate the information contained in the Confidential Materials. The "secrecy" prong of the "serious injury" standard is therefore met.

To assist the Court in analyzing Thermo Fisher's request for *in camera* treatment of the Confidential Materials, Thermo Fisher has grouped each document comprising the Confidential Materials into the following categories: i) strategic plans containing strategic objectives and considerations, competitive analyses, and financial information; ii) R&D plans and R&D-related contracts; and iii) Andrew Felton's deposition and investigative hearing transcripts and Declaration.

B. Disclosure of Strategic Plans Containing Thermo Fisher's Strategic Objectives and Considerations, Competitive Analyses, and Financial Information Will Give Competitors an Unfair Advantage.

This Court has previously held that strategic plans and competitive analyses shall be protected for up to ten years. *See In re Tronox Ltd.*, No. 9377, 2018 WL 2336016, at *5, *7, *9 (May 15, 2018) (granting ten years *in camera* treatment for documents revealing "business plans," "competitive analyses," and "strategic plans"). Thermo Fisher requests the following documents be afforded *in camera* treatment for ten years, except for certain information related to R&D discussed below in Section C for which Thermo Fisher requests indefinite, or alternatively ten years *in camera* treatment.

Exhibit	Description	Type(s) of Information	*In Camera* Treatment Requested
PX8444	November 25, 2019 Presentation: Turing dPCR Market Opportunity Assessment	Business strategy, competitive analyses	Full
PX8649	March 17, 2021 Cover email from Ira Herbst to Andrew Felton re Recent strategic planning documents. Attachments included in the exhibit are Valhalla CEO discussion 11222020 final.pptx; NIPT scenarios v10 2021.01.27.pptx; 2020 CSD STRAP v23 2020.10.28.pptx; and 2020 CSD STRAP vPre-Read for CLT.pptx	Business strategy, competitive analyses	Full (Note: Indefinite *in camera* treatment is requested specifically for PX8649-017, PX8649-021, PX8649-024, and PX8649-236 due to R&D sensitivity. See "R&D Plans and Information" Table.)
PX8650	March 18, 2019 cover email from Peter Vuong to Andrew Felton re Offcite_Roadmapping.pptx Attachment included in the exhibit is March 2019 Presentation: A Look into the Future	Business strategy, competitive analyses	Full (Note: Indefinite *in camera* treatment is requested specifically for PX8650-011to PX8650-016 due to R&D sensitivity. See "R&D Plans and Information" Table.)
RX2728	March 20, 2020 Presentation: CSD - Strategy and Bus Dev Review	Business strategy, competitive analyses	Full
RX2729	March 2019 Presentation: A Look into the Future	Business strategy, competitive analyses	Full (Note: Indefinite *in camera* treatment is requested specifically for RX2729-9 to RX2729-14 due to R&D sensitivity. See "R&D Plans and Information" Table.)

RX2730	April 10, 2018 Email from Suresh Pisharody to Joydeep Goswami re Re: Interested in speaking	Business strategy	Full
RX2732	October 9, 2019 Presentation: IVD Strategy	Business strategy	Full
RX2735	October 30, 20 Presentation: Clinical Next-Generation Sequencing Division STRAP 2020	Business strategy; competitive analysis; financial information	Full
RX2737	October 27, 2020 Email from Luca Quagliata to Garret Hampton et al re RE: EXAS -- Flash I Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt I Outperform	Business strategy	Partial

Thermo Fisher's business and strategic plans containing its strategic objectives and considerations and competitive analyses are competitively sensitive because they shed light on Thermo Fisher's positioning and strategy to compete against other NGS players. Competitors, such as Illumina, could use this information to adjust their own strategies or development efforts to reposition against Thermo Fisher. This type of sensitive information has previously received *in camera* treatment. *In re 1-800 Contacts, Inc.*, No. 9372, 2017 WL 1345290, at *5 (Apr. 4, 2017) (granting *in camera* treatment for internal documents containing positioning, marketing, and other strategy information). Financial information, including pricing and cost information, is competitively sensitive because competitors could use it to adjust their own prices or sales strategies to disadvantage Thermo Fisher. *See In re Polypore Int'l, Inc.,* No. 9327, 2009 WL 1499350, at *5 (May 13, 2009) (granting *in camera* treatment for "costing data" and "sales and financial information"). If made public, this information would provide competitors insight into Thermo Fisher's revenue, profits, and overall strategy.

Disclosure of these internal analyses will give competitors considerable and unfair advantage at Thermo Fisher's expense. FTC precedent makes clear that a specific showing of how competitors might use the confidential information is not necessary. *Dupont I*, 1981 WL 389447, at *1. Strategic planning in the NGS business involves long lead times in keeping with the substantial investments and development cycles for NGS products, and strategic plans accordingly have significant business values for many years after they are created. Felton Decl. ¶ 9.

The Court should therefore grant *in camera* treatment for ten years over the documents containing Thermo Fisher's strategic plans. *See In re Tronox Ltd.*, No. 9377, 2018 WL 2336016, at *5, *7, *9, *12 (May 15, 2018) (granting ten years *in camera* treatment for documents revealing "business plans," "competitive analyses," and "strategic plans").

C. Disclosure of Documents Regarding Thermo Fisher's R&D Plans and R&D-related Contracts and Partnership Terms Will Cause Serious Injury.

This Court has previously conferred indefinite *in camera* treatment on competitively sensitive R&D materials. *See Tronox*, 2018 WL 2336016, at *9-10 (granting indefinite *in camera* treatment for R&D test results). R&D plans have also received in camera treatment for ten years. *See Otto Bock Non-Parties' Motions Order*, ECF No. 591472 ("The second category contains one document, Endolite's research and development plan...Endolite has met its burden of demonstrating that this document is entitled to *in camera* treatment for a period of ten years."); *see also* Federal Rule of Civil Procedure 26(c)(1)(G) (upon a showing of good cause, a court may enter an order "requiring that a trade secret or other confidential research, development, or commercial information not be revealed or be revealed only in a specified way").

This Court has also provided *in camera* treatment for contracts that should also extend to R&D-related contractual provisions and deal terms that appear in the documents. *See Axon Enter.*, 2020 WL 6058522, at *7 (granting *in camera* treatment for Motorola's contracts); *Louisiana Real*

Est. Appraisers Bd., 2021 WL 1223991, at *5 (granting *in camera* treatment for Clear Capital contracts with vendors).

Furthermore, references to non-public R&D partners or customer names should receive *in camera* treatment. *See* Administrative Law Judge's Order on Non-Parties' Motions for *In Camera* Treatment, *In re Otto Bock Healthcare N. Am., Inc.*, No. 9378, 2018 WL 3373830, at *3 (July 6, 2018) ECF No. 591472 ("...ordinary business records include information such as customer names, pricing to customers, business costs and profits, as well as business plans, marketing plans, or sales documents").

Thermo Fisher requests the following documents or portions of documents be afforded *in camera* treatment indefinitely, or alternatively for at least 10 years:

Exhibit	Description	Type(s) of Information	*In Camera* Treatment Requested
PX8649	March 17, 2021 Cover email from Ira Herbst to Andrew Felton re Recent strategic planning documents. Attachments included in the exhibit are Valhalla CEO discussion 11222020 final.pptx; NIPT scenarios v10 2021.01.27.pptx; 2020 CSD STRAP v23 2020.10.28.pptx; and 2020 CSD STRAP vPre-Read for CLT.ppt	Detailed information on R&D product, partnership, and budgeting	Partial (PX8649-017; PX8649-021; PX8649-024; PX8649-236) (Note: Full *in camera* treatment for 10 years is requested for non-R&D materials in this document. See "Strategic" Table.)

PX8650	Mar. 18, 2019 cover email from Peter Vuong to Andrew Felton re Offcite_Roadmapping.pptx Attachments in the exhibit include March 2019 Presentation: A Look into the Future	Detailed R&D roadmaps	Partial (PX8650-011to PX8650-016) (Note: Full *in camera* treatment for 10 years is requested for non-R&D materials in this document. See "Strategic" Table.)
RX2729	March 2019 Presentation: A Look into the Future	Detailed information on R&D including new product details and development timeline	Partial (RX2729-9 to RX2729-14) (Note: Full *in camera* treatment for 10 years is requested for non-R&D materials in this document. See "Strategic" Table.)
RX2731	March 2020 Presentation: Partnering Strategy; March 2020	Detailed information on R&D including product development and new specifications	Full
RX2733	August 13, 2020 Presentation: [redacted]	Detailed information on R&D including R&D strategy; contract terms; financial information; and non-public R&D partner/ customer name	Full
RX2734	February 12, 2021 Presentation: Project Starship - Equity Investment Overview	Detailed information on R&D partnership including details about R&D product and partnership contract terms	Full
RX2736	April 12, 2021 Term Sheet-Commercial Agreement between Thermo Fisher and Strata	R&D partnership contract contains details about R&D plans and partnership deal terms	Full
RX2738	April 30, 2020 Thermo Fisher Supply Agreement with Strata	Detailed information on R&D partnership contract	Full

Thermo Fisher competes in the constantly innovating market for analytical, research and bioprocessing products, including NGS instruments and consumables. *See* Felton Decl. ¶ 11. Research and product development in the NGS business involves long lead times in keeping with the substantial investments and development cycles for NGS products, and R&D plans accordingly have significant business values for many years after they are created. Felton Decl. ¶ 11. Its R&D efforts are essential to its ability to compete in the industry and achieve success. Felton Decl. ¶ 11. Innovation is particularly key to competition in this industry as customers' needs evolve for their own scientific and medical research and product development. Felton Decl. ¶ 11. As a result, Thermo Fisher invests significant time and money on research and development in order to remain competitive, and those pursuits could then take even more years to come to market. Felton Decl. ¶ 11. Thermo Fisher also makes significant efforts to protect the confidentiality of its R&D projects, especially from its competitors. Felton Decl. ¶ 12.

Thermo Fisher seeks protection of its competitively sensitive and highly confidential R&D plans and related information that appear in R&D focused documents, strategic plans, and contracts. The documents contain highly confidential Thermo Fisher R&D plans for [redacted]. More specifically, they contain specific, detailed descriptions and pictures of the development of Thermo Fisher's [redacted]. The highly confidential information also includes project names; project and new product descriptions; project timelines and roadmaps; expected financial results and revenue impact from the projects; current and considered partners names and assessments of individual partnerships;

and detailed R&D spending. It also includes contracts with partners for R&D development detailing the specific commercial and financial terms of the partnership.

Disclosure of such R&D specific and related information will give competitors considerable and unfair advantage at Thermo Fisher's expense. The Court should therefore grant *in camera* treatment indefinitely, or alternatively for ten years over the documents containing Thermo Fisher's R&D plans and R&D related information because the need for confidentiality of the material is not likely to decrease over time. *See Tronox*, 2018 WL 2336016, at *9-10 (granting indefinite *in camera* treatment for R&D test results). *See also Otto Bock Non-Parties' Motion Order*, ECF No. 591472 (granting ten year *in camera* treatment for R&D plan)

D. Disclosure of Andrew Felton's Investigative Hearing and Deposition Testimonies and Declaration, which Contain Competitively Sensitive Information, Will Cause Serious Injury

This Court has previously conferred at least ten years *in camera* treatment to deposition testimony discussing R&D plans and at least five years *in camera* treatment to other competitively sensitive information. *See Otto Bock Non-Parties' Motions Order*, ECF No. 591472, at *6 (granting Endolite portions of a deposition transcript "relating to research and development plans...*in camera* treatment for a period of ten years" and other competitively sensitive information *in camera* treatment for a period of five years). "[I]ndividuals' names and addresses...have been found to be 'sensitive personal information'" that "shall be accorded permanent *in camera* treatment." *See In re Altria Grp., Inc., & Juul Labs, Inc.*, No. 9393, 2021 WL 2379509, at *3 (May 26, 2021).

Andrew Felton's deposition and investigative hearing testimonies and Declaration encompass information in all of the categories above, including discussions of current and future R&D plans and sensitive personal information. Thermo Fisher requests the following portions

from the transcripts containing sensitive personal information be afforded *in camera* treatment indefinitely:

Testimony Cite	Type of Information
Mar. 23, 2021 Andrew Felton Investigative Hearing Transcript (PX7070): 8:16-8:19	Employee information

Thermo Fisher requests the following the following portions from the transcripts and Declaration containing R&D information be afforded *in camera* treatment indefinitely, or alternatively for at least ten years:

Mar. 23, 2021 Andrew Felton Investigative Hearing (PX7070) R&D Testimony Cite	June 2, 2021 Andrew Felton Deposition (PX7097/RX3823) R&D Testimony Cite	Declaration Cite *(Page & paragraph number)*
36:10-37:21; 38:1-38:3; 38:14- 38:18; 55:8-55:12; 55:17-55:20; 55:22-55:23; 56:1-57:1	21:23-21:25; 22:2-22:5; 22:7-22:13; 30:4-30:7; 30:9-30:22; 30:24-31:8; 31:10-31:17; 31:20-31:24; 32:2-32:10; 32:13-32:14; 93:17-93:20; 93:22-94:7; 94:9-94:12; 117:21-117:23; 118:1-118:3; 118:5-118:21; 118:24-119:1; 119:3-119:10; 119:13-119:16; 119:18-119:24; 120:2-120:9; 125:5-125:8; 125:15-125:16; 125:19-125:22; 125:24-126:1; 126:4-126:13; 126:20-126:22; 126:24-127:24; 128:1-128:6; 128:8-129:8; 129:10-129:20; 129:23-130:21; 130:24-131:16; 131:18-131:22; 131:25-132:6; 132:8-132:11; 132:13-132:15; 132:18-133:20; 133:23-134:3; 134:6-135:12; 135:14-136:12; 136:15-137:20; 137:23-138:9; 138:12-138:15; 138:17-139:3; 139:5-139:6 ; 168:1 - 168:24	Paragraph 10 limited portions Paragraph 13 limited portions

Thermo Fisher requests the following the following portions from the transcripts be afforded *in camera* treatment for a period of five years :

Testimony Cite	Type of Information
Mar. 23, 2021 Andrew Felton Investigative Hearing Transcript (PX7070):26:9-26:15; 26:22-27:12; 27:25-28:15; 57:2-57:21 June 2, 2021 Andrew Felton Deposition Transcript (PX7097/RX3823): 27:7-27:9; 27:11-27:19; 32:23-33:1; 33:4; 35:4-35:6; 35:9-35:21; 68:3-68:6; 68:8-68:17; 68:20-68:21; 103:4-103:7; 103:9-103:11; 105:4-105:8; 105:10-105:15; 120:10-120:15; 173:21-173:23; 173:25-174:12; 174:14-174:22; 174:24-175:4; 175:7 176:2; 176:5-176:13	Competitive analysis
Mar. 23, 2021 Andrew Felton Investigative Hearing Transcript (PX7070): 32:12-32:25; 34:1-34:21; 34:25-35:15; 48:15-49:3; 57:22-60:18; 68:7-69:13; 70:3-71:5 June 2, 2021 Andrew Felton Deposition Transcript (PX7097/RX3823): 23:9-23:11; 23:13-23:22; 29:2-29:5; 29:8-29:10; 36:14-36:19; 36:23-37:2; 37:4-37:5; 42:12-42:15; 42:17-42:21; 42:23-43:1; 52:20-52:23; 60:10-60:15; 60:22-60:23; 60:25-61:14; 61:18-61:20; 61:22-62:6; 62:8-62:16; 62:18-62:20; 70:21-70:25; 71:8-71:11; 71:13-71:25; 72:3-72:7; 72:12-72:14; 72:16-72:21; 72:24-73:12; 73:14-74:4; 74:7-74:14; 74:16-74:25; 75:2-75:16; 75:23-75:25; 76:3-76:5; 76:7-76:14; 76:17-76:25; 77:3-77:12; 78:13-78:14; 78:16; 79:1-79:5; 79:12-79:17; 79:19-79:21; 79:23-79:25; 80:13-80:18; 80:21-81:7; 81:10-81:14; 82:9-83:4; 83:7-83:19; 83:21-83:22; 83:25-84:11; 85:5-85:9; 85:11; 86:2-86:5; 86:7-86:23; 86:25-87:9; 87:12-87:13; 87:15-87:24; 88:1-88:6; 88:8-88:11; 89:1-89:7; 91:11-91:22; 91:24-91:25; 103:23-104:1; 104:3-104:6; 105:22-106:9; 107:16-109:2; 109:6-110:7; 110:19-110:21; 110:24-111:6; 111:9-111:25; 112:4-112:5; 112:8-112:11; 113:1-113:3; 113:6-113:12; 113:20-113:23; 114:9-114:11; 114:14-114:21; 114:24-115:2; 115:7-115:11; 115:13-115:15; 115:17-115:23; 116:1-116:8; 116:12-117:2; 115:9-115:11; 124:8-124:17; 140:23-141:9; 141:17-142:1; 142:6-142:10; 142:13-143:2; 143:4-143:11; 143:13-143:19; 144:1-144:4; 148:19-149:16; 149:18-149:22; 149:25-150:2; 150:18-150:24; 151:1-151:8; 152:3-152:13; 152:15-152:21; 152:23-152:25; 153:13-153:15; 153:17-154:5; 154:8-154:9; 155:13 - 155:21; 160:13 - 161:10; 172:9-173:1	Business strategy
Mar. 23, 2021 Andrew Felton Investigative Hearing Transcript (PX7070): 38:5-38:9	Financial information
Mar. 23, 2021 Andrew Felton Investigative Hearing Transcript (PX7070): 51:3-51:8 June 2, 2021 Andrew Felton Deposition Transcript (PX7097/RX3823): 48:23-49:2; 49:4; 49:14-49:18; 158:18 - 159:4	Non-public partner or customer name

Competitively sensitive information in the transcripts include Thermo Fisher's competitive assessment and positioning of its NGS products and its competitors' NGS products, current and potential customer names, and, significantly, its NGS R&D plans, [redacted], and contract terms with its R&D partners. Portions of Andrew Felton's Declaration include specific information related to Thermo Fisher's R&D plans. Sensitive personal information appearing in the transcript such as Dr. Felton's home address [redacted] should also receive protection.

Thermo Fisher therefore requests confidential treatment of competitively sensitive portions of Dr. Felton's investigative hearing and deposition testimonies for a minimum of five years, discussions of sensitive personal information to receive indefinite *in camera* treatment, and discussions about Thermo Fisher's R&D plans to receive *in camera* treatment indefinitely, or alternatively for at least ten years.

II. NONE OF THE CONFIDENTIAL MATERIALS ARE NECESSARY TO EXPLAIN THE RATIONALE OF THE CASE OR FOR PUBLIC UNDERSTANDING

The importance of the information in explaining the rationale of FTC decisions is "the principal countervailing consideration weighing in favor of disclosure." *Otto Bock Non-Parties' Motions Order*, ECF No. 591472. The *Kaiser* court found that, "a public understanding of this proceeding does not depend on access to [this] data submitted by these third party firms." *See Kaiser*, 1984 WL 565325, at *1. Here, the competitively sensitive information in the Confidential Materials, detailing Thermo Fisher's strategic and R&D plans is not necessary or even useful in explaining the rationale of the case or for public understanding. *See id*. The need to explain the rationale of the outcome of the above-captioned matter therefore does not overcome the need for *in camera* treatment of the Confidential Materials.

CONCLUSION

For the foregoing reasons, Thermo Fisher respectfully requests that this Court grant *in camera* treatment for the Confidential Materials, in whole or in part, as set forth in Exhibit B.

Dated: August 5, 2021

Respectfully submitted,

s/ John D. Harkrider

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CERTIFICATE OF SERVICE

I hereby certify that on August 5, 2021, I filed the foregoing documents electronically using the FTC's E-Filing System, which will send notification of such filings to:

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The Honorable D. Michael Chappell
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I also certify that I delivered via electronic mail a copy of the foregoing documents to:

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August 5, 2021

s/ John D. Harkrider
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CERTIFICATE OF ELECTRONIC FILING

I certify that the electronic copy sent to the Secretary of the Commission is a true and correct copy of the paper original and that I possess a paper original of the signed document that is available for review by the parties and the adjudicator.

August 5, 2021

s/ John D. Harkrider
John D. Harkrider

PUBLIC VERSION

EXHIBIT A
Declaration of Andrew Charles Felton

PARTIAL IN CAMERA TREATMENT REQUESTED

UNITED STATES OF AMERICA
FEDERAL TRADE COMMISSION
OFFICE OF ADMINISTRATIVE LAW JUDGES

In the Matter of **Illumina, Inc.,** **a corporation,** **and** **GRAIL, Inc.,** **a corporation,** **Respondents.**	Docket No. 9401

DECLARATION OF ANDREW CHARLES FELTON
IN SUPPORT OF THERMO FISHER'S MOTION FOR *IN CAMERA* TREATMENT

I, Andrew Charles Felton, pursuant to 28 U.S.C. §1746, declare as follows:

1. I am Vice President of Product Management, Platforms and Research for Thermo Fisher Inc. ("Thermo Fisher"). Thermo Fisher is a global manufacturer and supplier of a broad range of analytical, research and bioprocessing products, including next-generation sequencing (NGS) instruments and consumables. As part of my duties, I participate in strategic planning and decisions for Thermo Fisher.

2. I submit this Declaration on behalf of Thermo Fisher in support of the Motion for *In Camera* Treatment (the "Motion") for documents containing confidential and commercially sensitive information belonging to Thermo Fisher (the "Confidential Materials") in this matter.

3. I have personal knowledge of the facts set forth in this Declaration or believe such facts to be true based upon personal knowledge, information provided by knowledgeable persons who work with me at Thermo Fisher, and upon review of records kept in the ordinary course of Thermo Fisher's business.

4. This case concerns an antitrust dispute between Plaintiff Federal Trade Commission ("Plaintiff" or "FTC") and Respondents Illumina, Inc. and GRAIL, Inc. (collectively, "Respondents"), where the FTC alleges that, among other things, Respondents' proposed merger would harm competition.

5. Given my position at Thermo Fisher, I am familiar with the type of information contained in the Confidential Materials to Thermo Fisher's Motion and their competitive significance to Thermo Fisher. The confidential information included in the Confidential Materials is sourced from Thermo Fisher's sensitive proprietary and commercial information regarding, among other things, forward-looking business and R&D strategies, its partnership and contract terms with R&D partners, and assessments of competition in NGS. I am also familiar with the measures Thermo Fisher takes to protect the confidentiality of these materials. As detailed further below, these materials contain highly confidential, sensitive information that Thermo Fisher maintains in strict confidentiality.

6. If the Confidential Materials were to become available to the public or Thermo Fisher's competitors, Thermo Fisher would suffer serious commercial injury. Public disclosure of Thermo Fisher's sensitive business information would give competitors an unfair advantage, potentially causing Thermo Fisher significant competitive harm. I submit that disclosure of these documents to the public and to competitors of Thermo Fisher would cause serious competitive injury to Thermo Fisher.

7. The FTC and Respondent GRAIL have informed Thermo Fisher they plan to use eighteen exhibits. Of those potential exhibits, seventeen are particularly sensitive and contain confidential business or proprietary information. As described in the Motion, Thermo Fisher seeks *in camera* treatment of the following documents:

Strategic Plans		
Exhibit	**Description**	***In Camera* Treatment Requested**
PX8444	November 25, 2019 Presentation: Turing dPCR Market Opportunity Assessment	Full
PX8649	March 17, 2021 Cover email from Ira Herbst to Andrew Felton re Recent strategic planning documents. Attachments included in the exhibit are Valhalla CEO discussion 11222020 final.pptx; NIPT scenarios v10 2021.01.27.pptx; 2020 CSD STRAP v23 2020.10.28.pptx; and 2020 CSD STRAP vPre-Read for CLT.pptx	Full (Note: Indefinite *in camera* treatment is requested specifically for PX8649-017, PX8649-021, PX8649-024, and PX8649-236 due to R&D sensitivity. See "R&D Plans and Information" Table.)
PX8650	March 18, 2019 cover email from Peter Vuong to Andrew Felton re Offcite_Roadmapping.pptx Attachment included in the exhibit is March 2019 Presentation: A Look into the Future	Full (Note: Indefinite *in camera* treatment is requested specifically for PX8650-011to PX8650-016 due to R&D sensitivity. See "R&D Plans and Information" Table.)
RX2728	March 20, 2020 Presentation: CSD - Strategy and Bus Dev Review	Full
RX2729	March 2019 Presentation: A Look into the Future	Full (Note: Indefinite *in camera* treatment is requested specifically for RX2729-9 to RX2729-14 due to R&D sensitivity. See "R&D Plans and Information" Table.)
RX2730	April 10, 2018 Email from Suresh Pisharody to Joydeep Goswami re Re: Interested in speaking	Full
RX2732	October 9, 2019 Presentation: IVD Strategy	Full

RX2735	October 30, 20 Presentation: Clinical Next-Generation Sequencing Division STRAP 2020	Full
RX2737	October 27, 2020 Email from Luca Quagliata to Garret Hampton et al re RE: EXAS -- Flash I Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt I Outperform	Partial

R&D Plans and Information		
Exhibit	**Description**	***In Camera* Treatment Requested**
PX8649	March 17, 2021 Cover email from Ira Herbst to Andrew Felton re Recent strategic planning documents. Attachments included in the exhibit are Valhalla CEO discussion 11222020 final.pptx; NIPT scenarios v10 2021.01.27.pptx; 2020 CSD STRAP v23 2020.10.28.pptx; and 2020 CSD STRAP vPre-Read for CLT.ppt	Partial (PX8649-017; PX8649-021; PX8649-024; PX8649-236) (Note: Full *in camera* treatment for 10 years is requested for non-R&D materials in this document. See "Strategic" Table.)
PX8650	Mar. 18, 2019 cover email from Peter Vuong to Andrew Felton re Offcite_Roadmapping.pptx Attachments in the exhibit include March 2019 Presentation: A Look into the Future	Partial (PX8650-011 to PX8650-016) (Note: Full *in camera* treatment for 10 years is requested for non-R&D materials in this document. See "Strategic" Table.)
RX2729	March 2019 Presentation: A Look into the Future	Partial (RX2729-9 to RX2729-14) (Note: Full *in camera* treatment for 10 years is requested for non-R&D materials in this document. See "Strategic" Table.)
RX2731	March 2020 Presentation: Partnering Strategy; March 2020	Full
RX2733	August 13, 2020 Presentation: [redacted]	Full

RX2734	February 12, 2021 Presentation: Project Starship - Equity Investment Overview	Full
RX2736	April 12, 2021 Term Sheet-Commercial Agreement between Thermo Fisher and Strata	Full
RX2738	April 30, 2020 Thermo Fisher Supply Agreement with Strata	Full

Mar. 23, 2021 Andrew Felton Investigative Hearing (PX7070) R&D Testimony Cite	**June 2, 2021 Andrew Felton Deposition (PX7097/RX3823) R&D Testimony Cite**	**Declaration Cite** *(Page & paragraph number)*
8:16-8:19; 36:10-37:21; 38:1-38:3; 38:14- 38:18; 55:8-55:12; 55:17-55:20; 55:22-55:23; 56:1-57:1	21:23-21:25; 22:2-22:5; 22:7-22:13; 30:4-30:7; 30:9-30:22; 30:24-31:8; 31:10-31:17; 31:20-31:24; 32:2-32:10; 32:13-32:14; 93:17-93:20; 93:22-94:7; 94:9-94:12; 117:21-117:23; 118:1-118:3; 118:5-118:21; 118:24-119:1; 119:3-119:10; 119:13-119:16; 119:18-119:24; 120:2-120:9; 125:5-125:8; 125:15-125:16; 125:19-125:22; 125:24-126:1; 126:4-126:13; 126:20-126:22; 126:24-127:24; 128:1-128:6; 128:8-129:8; 129:10-129:20; 129:23-130:21; 130:24-131:16; 131:18-131:22; 131:25-132:6; 132:8-132:11; 132:13-132:15; 132:18-133:20; 133:23-134:3; 134:6-135:12; 135:14-136:12; 136:15-137:20; 137:23-138:9; 138:12-138:15; 138:17-139:3; 139:5-139:6 ; 168:1 -168:24	Paragraph 10 limited portions Paragraph 13 limited portions

Mar. 23, 2021 Andrew Felton Investigative Hearing Transcript (PX7070)	June 2, 2021 Andrew Felton Deposition (PX7097/RX3823) Testimony Cite
26:9-26:15; 26:22-27:12; 27:25-28:15; 32:12-32:25; 34:1-34:21; 34:25-35:15; 38:5-38:9; 48:15-49:3; 51:3-51:8; 57:2-60:18; 68:7-69:13; 70:3-71:5	23:9-23:11; 23:13-23:22; 27:7-27:9; 27:11-27:19; 29:2-29:5; 29:8-29:10; 32:23-33:1; 33:4; 35:4-35:6; 35:9-35:21; 36:14-36:19; 36:23-37:2; 37:4-37:5; 42:12-42:15; 42:17-42:21; 42:23-43:1; 48:23-49:2; 49:4; 49:14-49:18; 52:20-52:23; 60:10-60:15; 60:22-60:23; 60:25-61:14; 61:18-61:20; 61:22-62:6; 62:8-62:16; 62:18-62:20; 68:3-68:6; 68:8-68:17; 68:20-68:21; 70:21-70:25; 71:8-71:11; 71:13-71:25; 72:3-72:7; 72:12-72:14; 72:16-72:21; 72:24-73:12; 73:14-74:4; 74:7-74:14; 74:16-74:25; 75:2-75:16; 75:23-75:25; 76:3-76:5; 76:7-76:14; 76:17-76:25; 77:3-77:12; 78:13-78:14; 78:16; 79:1-79:5; 79:12-79:17; 79:19-79:21; 79:23-79:25; 80:13-80:18; 80:21-81:7; 81:10-81:14; 82:9-83:4; 83:7-83:19; 83:21-83:22; 83:25-84:11; 85:5-85:9; 85:11; 86:2-86:5; 86:7-86:23; 86:25-87:9; 87:12-87:13; 87:15-87:24; 88:1-88:6; 88:8-88:11; 89:1-89:7; 91:11-91:22; 91:24-91:25; 103:4-103:7; 103:9-103:11; 103:23-104:1; 104:3-104:6; 105:4-105:8; 105:10-105:15; 105:22-106:9; 107:16-109:2; 109:6-110:7; 110:19-110:21; 110:24-111:6; 111:9-111:25; 112:4-112:5; 112:8-112:11; 113:1-113:3; 113:6-113:12; 113:20-113:23; 114:9-114:11; 114:14-114:21; 114:24-115:2; 115:7-115:11; 115:13-115:15; 115:17-115:23; 116:1-116:8; 116:12-117:2; 120:10-120:15; 124:8-124:17; 140:23-141:9; 141:17-142:1; 142:6-142:10; 142:13-143:2; 143:4-143:11; 143:13-143:19; 144:1-144:4; 148:19-149:16; 149:18-149:22; 149:25-150:2; 150:18-150:24; 151:1-151:8; 152:3-152:13; 152:15-152:21; 152:23-152:25; 153:13-153:15; 153:17-154:5; 154:8-154:9; 155:13 - 155:21; 158:18 - 159:4; 160:13 - 161:10; 166:9 - 167:21; 172:9-173:1; 173:21-173:23; 173:25-174:12; 174:14-174:22; 174:24-175:4; 175:7 176:2; 176:5-176:13

8. The first category of documents contains Strategic Plans. Those competitively sensitive documents reflect Thermo Fisher's strategic objectives, as well as the competitive intelligence it relies on to develop its strategies and position itself in the marketplace. They also contain competitively sensitive financial information and customer and partner names.

9. The documents in this category are maintained in confidence. They are created and maintained by Thermo Fisher's senior executives and not disseminated widely around the company. Additionally, all of the Confidential Materials were produced with stamps marking them "Confidential," "Highly Confidential" or "Highly Confidential Business Information" when produced pursuant to a subpoena or in connection with regulatory review of a different transaction. The documents in this category reveal highly-confidential information regarding Thermo Fisher's strategic planning on business maintenance and development. For example, the documents contain Thermo Fisher's internal analysis of its business strategies in the NGS and related markets, assessment of competitors and its own products, and financial models and projections. Disclosure of these internal analyses will give competitors considerable and unfair advantage at the expense of Thermo Fisher's success. Strategic planning in the NGS business involves long lead times in keeping with the substantial investments and development cycles for NGS products, and strategic plans accordingly have significant business values for many years after they are created.

10. The second document category contains highly confidential Thermo Fisher R&D strategies for [redacted]. More specifically, it contains specific, detailed descriptions and pictures of the development of Thermo Fisher's [redacted]

[redacted]. The highly confidential information includes project names; project and new product descriptions; project timelines and roadmaps; expected financial results and revenue impact from the projects; and current and considered partners' names and assessments of individual partnerships. It also includes contracts with partners for R&D development detailing the specific commercial and financial terms of the partnership.

11. R&D efforts are significant to Thermo Fisher's business as a global manufacturer and supplier of a broad range of analytical, research and bioprocessing products, including NGS instruments and consumables. Research and product development in the NGS business involves long lead times in keeping with the substantial investments and development cycles for NGS products, and R&D plans accordingly have significant business values for many years after they are created. Thermo Fisher's R&D efforts are essential to its ability to compete in the industry and achieve success. Innovation is particularly key to competition in this industry as customers' needs evolve for their own scientific and medical research and product development. A substantial portion of Thermo Fisher's resources are devoted to developing innovative products to continuously meet its customers' needs. Thermo Fisher often takes years to decide whether to pursue R&D objectives, and those pursuits could then take even more years to come to market.

12. Thermo Fisher takes great care to maintain the confidentiality of its R&D plans, limiting distribution to only senior executives and the R&D team of Thermo Fisher, unless R&D efforts are pursued in partnership with external parties in which case our partners sign non-disclosure agreements. Disclosure of competitively sensitive R&D materials will

permanently disadvantage Thermo Fisher by revealing future product development and innovation strategies to competitors, giving them an unfair advantage over Thermo Fisher.

13. Finally, the last document category is the investigative hearing and deposition testimonies I gave on March 23, 2021 and June 2, 2021 in response to the Subpoenas and this Declaration. The investigative hearing and deposition transcripts include discussions of Thermo Fisher's competitively sensitive material in each of the categories described above. For example, the transcripts discuss Thermo Fisher's competitive assessment and positioning of its NGS products and its competitors' NGS products, current and potential customer names, contract terms with its R&D partners, and, significantly, its NGS R&D plans, including a **{new platform in development}**. This Declaration also includes statements about Thermo Fisher's NGS R&D plans.

* * *

Pursuant to 28 U.S.C. § 1746, I declare, under the penalty of perjury, that the foregoing is true and correct to the best of my knowledge, information, and belief.

Executed on: 08/05/21

Name: Andrew Charles Felton
Title: Vice President of Product Management, Platforms and Research Thermo Fisher Scientific Inc.

PUBLIC VERSION

EXHIBIT B
In Camera Treatment Exhibit List

I. Strategic Plans

Exhibit	Description	PX/RX Beginning No.	PX/RX Ending No.	*In Camera* Treatment Requested
PX8444	November 25, 2019 Presentation: Turing dPCR Market Opportunity Assessment	PX8444-001	PX8444-017	Full
PX8649	March 17, 2021 Cover email from Ira Herbst to Andrew Felton re Recent strategic planning documents. Attachments included in the exhibit are Valhalla CEO discussion 11222020 final.pptx; NIPT scenarios v10 2021.01.27.pptx; 2020 CSD STRAP v23 2020.10.28.pptx; and 2020 CSD STRAP vPre-Read for CLT.pptx	PX8649-001	PX8649-240	Full (Note: Indefinite *in camera* treatment is requested specifically for PX8649-017, PX8649-021, PX8649-024, and PX8649-236 due to R&D sensitivity. See "R&D Plans and Information" Table.)
PX8650	March 18, 2019 cover email from Peter Vuong to Andrew Felton re Offcite_Roadmapping.pptx Attachment included in the exhibit is March 2019 Presentation: A Look into the Future	PX8650-001	PX8650-032	Full (Note: Indefinite in camera treatment is requested specifically for PX8650-011 to PX8650-016 due to R&D sensitivity. See "R&D Plans and Information" Table.)
RX2728	March 20, 2020 Presentation: CSD -	RX2728-1	RX2728-36	Full

	Strategy and Bus Dev Review			
RX2729	March 2019 Presentation: A Look into the Future	RX2729-1	RX2729-30	Full (Note: Indefinite *in camera* treatment is requested specifically for RX2729-9 to RX2729-14 due to R&D sensitivity. See "R&D Plans and Information" Table.)
RX2730	April 10, 2018 Email from Suresh Pisharody to Joydeep Goswami re Re: Interested in speaking	RX2730-1	RX2730-4	Full
RX2732	October 9, 2019 Presentation: IVD Strategy	RX2732-1	RX2732-22	Full
RX2735	October 30, 20 Presentation: Clinical Next-Generation Sequencing Division STRAP 2020	RX2735-1	RX2735-157	Full
RX2737	October 27, 2020 Email from Luca Quagliata to Garret Hampton et al re RE: EXAS -- Flash I Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt I Outperform	RX2737-1	RX2737-3	Partial

II. R&D Plans and Information

Exhibit	Description	PX/RX Beginning No.	PX/RX Ending No.	*In Camera* Treatment Requested
PX8649	Nov. 20, 2020 Presentation CSD STRAP follow-up #1 Valhalla IVD	PX8649-001	PX8649-240	Partial (PX8649-017; PX8649-021; PX8649-024; PX8649-236) (Note: Full *in camera* treatment for 10 years is requested for non-R&D materials in this document. See "Strategic" Table.)
PX8650	Mar. 18, 2019 cover email from Peter Vuong to Andrew Felton re Offcite_Roadmapping .pptx Attachments in the exhibit include March 2019 Presentation: A Look into the Future	PX8650-001	PX8650-032	Partial (PX8650-011 to PX8650-016) (Note: Full *in camera* treatment for 10 years is requested for non-R&D materials in this document. See "Strategic" Table.)
RX2729	March 2019 Presentation: A Look into the Future	RX2729-1	RX2729-30	Partial (RX2729-9 to RX2729-14) (Note: Full *in camera* treatment for 10 years is requested for non-R&D materials in this document. See "Strategic" Table.)
RX2731	March 2020 Presentation: Partnering Strategy; March 2020	RX2731-1	RX2731-14	Full
RX2733	August 13, 2020 Presentation: [redacted]	RX2733-1	RX2733-9	Full

RX2734	February 12, 2021 Presentation: Project Starship - Equity Investment Overview	RX2734-1	RX2734-17	Full
RX2736	April 12, 2021 Term Sheet-Commercial Agreement between Thermo Fisher and Strata	RX2736-1	RX2736-12	Full
RX2738	April 30, 2020 Thermo Fisher Supply Agreement with Strata	RX2738-1	RX2738-31	Full

III. Investigative and Deposition Transcripts and Declaration

Mar. 23, 2021 Andrew Felton Investigative Hearing (PX7070) R&D Testimony Cite	**June 2, 2021 Andrew Felton Deposition (PX7097/RX3823) R&D Testimony Cite**	**Declaration Cite** *(Page & paragraph number)*
8:16-8:19; 36:10-37:21; 38:1-38:3; 38:14- 38:18; 55:8-55:12; 55:17-55:20; 55:22-55:23; 56:1-57:1	21:23-21:25; 22:2-22:5; 22:7-22:13; 30:4-30:7; 30:9-30:22; 30:24-31:8; 31:10-31:17; 31:20-31:24; 32:2-32:10; 32:13-32:14; 93:17-93:20; 93:22-94:7; 94:9-94:12; 117:21-117:23; 118:1-118:3; 118:5-118:21; 118:24-119:1; 119:3-119:10; 119:13-119:16; 119:18-119:24; 120:2-120:9; 125:5-125:8; 125:15-125:16; 125:19-125:22; 125:24-126:1; 126:4-126:13; 126:20-126:22; 126:24-127:24; 128:1-128:6; 128:8-129:8; 129:10-129:20; 129:23-130:21; 130:24-131:16; 131:18-131:22; 131:25-132:6; 132:8-132:11; 132:13-132:15; 132:18-133:20; 133:23-134:3; 134:6-135:12; 135:14-136:12; 136:15-137:20; 137:23-138:9; 138:12-	Paragraph 10 limited portions Paragraph 13 limited portions

	138:15; 138:17-139:3; 139:5-139:6 ; 168:1 -168:24	

Mar. 23, 2021 Andrew Felton Investigative Hearing Transcript (PX7070)	**June 2, 2021 Andrew Felton Deposition (PX7097/RX3823) Testimony Cite**
26:9-26:15; 26:22-27:12; 27:25-28:15; 32:12-32:25; 34:1-34:21; 34:25-35:15; 38:5-38:9; 48:15-49:3; 51:3-51:8; 57:2-60:18; 68:7-69:13; 70:3-71:5	23:9-23:11; 23:13-23:22; 27:7-27:9; 27:11-27:19; 29:2-29:5; 29:8-29:10; 32:23-33:1; 33:4; 35:4-35:6; 35:9-35:21; 36:14-36:19; 36:23-37:2; 37:4-37:5; 42:12-42:15; 42:17-42:21; 42:23-43:1; 48:23-49:2; 49:4; 49:14-49:18; 52:20-52:23; 60:10-60:15; 60:22-60:23; 60:25-61:14; 61:18-61:20; 61:22-62:6; 62:8-62:16; 62:18-62:20; 68:3-68:6; 68:8-68:17; 68:20-68:21; 70:21-70:25; 71:8-71:11; 71:13-71:25; 72:3-72:7; 72:12-72:14; 72:16-72:21; 72:24-73:12; 73:14-74:4; 74:7-74:14; 74:16-74:25; 75:2-75:16; 75:23-75:25; 76:3-76:5; 76:7-76:14; 76:17-76:25; 77:3-77:12; 78:13-78:14; 78:16; 79:1-79:5; 79:12-79:17; 79:19-79:21; 79:23-79:25; 80:13-80:18; 80:21-81:7; 81:10-81:14; 82:9-83:4; 83:7-83:19; 83:21-83:22; 83:25-84:11; 85:5-85:9; 85:11; 86:2-86:5; 86:7-86:23; 86:25-87:9; 87:12-87:13; 87:15-87:24; 88:1-88:6; 88:8-88:11; 89:1-89:7; 91:11-91:22; 91:24-91:25; 103:4-103:7; 103:9-103:11; 103:23-104:1; 104:3-104:6; 105:4-105:8; 105:10-105:15; 105:22-106:9; 107:16-109:2; 109:6-110:7; 110:19-110:21; 110:24-111:6; 111:9-111:25; 112:4-112:5; 112:8-112:11; 113:1-113:3; 113:6-113:12; 113:20-113:23; 114:9-114:11; 114:14-114:21; 114:24-115:2; 115:7-115:11; 115:13-115:15; 115:17-115:23; 116:1-116:8; 116:12-117:2; 120:10-120:15; 124:8-124:17; 140:23-141:9; 141:17-142:1; 142:6-142:10; 142:13-143:2; 143:4-143:11; 143:13-143:19; 144:1-144:4; 148:19-149:16; 149:18-149:22; 149:25-150:2; 150:18-150:24; 151:1-151:8; 152:3-152:13; 152:15-152:21; 152:23-152:25; 153:13-153:15; 153:17-154:5; 154:8-154:9; 155:13 - 155:21; 158:18 - 159:4; 160:13 - 161:10; 166:9 - 167:21; 172:9-173:1; 173:21-173:23; 173:25-174:12; 174:14-174:22; 174:24-175:4; 175:7 176:2; 176:5-176:13

PUBLIC VERSION

EXHIBIT B-1
PX8444

CONFIDENTIAL - REDACTED IN ENTIRETY

PUBLIC VERSION

EXHIBIT B-2
PX8649

CONFIDENTIAL - REDACTED IN ENTIRETY

PUBLIC VERSION

EXHIBIT B-3
PX8650

CONFIDENTIAL - REDACTED IN ENTIRETY

PUBLIC VERSION

EXHIBIT B-4
RX2728

CONFIDENTIAL - REDACTED IN ENTIRETY

PUBLIC VERSION

EXHIBIT B-5
RX2729

CONFIDENTIAL - REDACTED IN ENTIRETY

PUBLIC VERSION

EXHIBIT B-6
RX2730

CONFIDENTIAL - REDACTED IN ENTIRETY

PUBLIC VERSION

EXHIBIT B-7
RX2732

CONFIDENTIAL - REDACTED IN ENTIRETY

PUBLIC VERSION

EXHIBIT B-8
RX2735

CONFIDENTIAL - REDACTED IN ENTIRETY

PUBLIC VERSION

EXHIBIT B-9
RX2737

PARTIAL IN CAMERA TREATMENT REQUESTED

From: "Quagliata, Luca" <luca.quagliata@thermofisher.com>
Sent: Tue, 27 Oct 2020 08:42:30 -0700 (PDT)
To: "Hampton, Garret" <garret.hampton@thermofisher.com>
Cc: "Felton, Andrew C." <Andy.Felton@thermofisher.com>; "Herbst, Ira"<Ira.Herbst@thermofisher.com>; "Tanzella, Kelli"<Kelli.Tanzella@thermofisher.com>; "Bennett, Robert"<Rob.Bennett@thermofisher.com>
Subject: Re: EXAS -- Flash / Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt / Outperform

Hi Ira and Team,
Grail: will lunch **Galleri** as a lab developed test (LDT) in 2021 and seek full FDA approval most likely in **early 2023 (multi-cancer early detection).**
Freenome: the PREEMPT CRC clinical study is planned to be finished by July 30 2021 so likely the will be ready in **mid 2022,** for CRC only.
GH: has 3 major studies (plus one more to go) on going with the LUNARs being in mid to advance stages. It is likely they will seek for first approval in **mid 2022**.
EXAS (with Thrive): registration study next year in 2021, they will seek for first approval in **mid 2022**.

Please note that some will go for pan-caner while others for tumour specific indication.

Best
Luca

On 27 Oct 2020, at 16:39, Hampton, Garret <garret.hampton@thermofisher.com> wrote:

What kind of investments would this require?

From: "Felton, Andrew C." <Andy.Felton@thermofisher.com>
Date: Tuesday, October 27, 2020 at 8:38 AM
To: "Hampton, Garret" <garret.hampton@thermofisher.com>, "Herbst, Ira" <Ira.Herbst@thermofisher.com>, "Quagliata, Luca" <luca.quagliata@thermofisher.com>, "Tanzella, Kelli" <Kelli.Tanzella@thermofisher.com>
Cc: "Bennett, Robert" <Rob.Bennett@thermofisher.com>
Subject: RE: EXAS -- Flash / Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt / Outperform

Garret

[redacted]

Andy

Andy Felton Ph.D.
Vice President Product Management
Clinical Sequencing Division
Life Science Solutions Group
Thermo Fisher Scientific
180 Oyster Point Blvd
South San Francisco, CA 94080
M +1 650 534 5364
O +1 650 244 1381
<image001.jpg>

From: Hampton, Garret <garret.hampton@thermofisher.com>
Sent: Tuesday, October 27, 2020 8:35 AM
To: Felton, Andrew C. <Andy.Felton@thermofisher.com>; Herbst, Ira <Ira.Herbst@thermofisher.com>; Quagliata, Luca <luca.quagliata@thermofisher.com>; Tanzella, Kelli <Kelli.Tanzella@thermofisher.com>
Subject: Re: EXAS -- Flash / Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt / Outperform

Feels like there's some consolidation here and probably more to come. I wonder to what extent Thrive was a reaction to GRAIL. Regardless, seems like early detection will be centralized for quite a long time. [redacted]

From: "Felton, Andrew C." <Andy.Felton@thermofisher.com>
Date: Tuesday, October 27, 2020 at 8:28 AM
To: "Herbst, Ira" <Ira.Herbst@thermofisher.com>, "Quagliata, Luca" <luca.quagliata@thermofisher.com>, "Tanzella, Kelli" <Kelli.Tanzella@thermofisher.com>
Cc: "Hampton, Garret" <garret.hampton@thermofisher.com>
Subject: RE: EXAS -- Flash / Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt / Outperform

Ira

From one of the links in the doc

With early screening data frequently showing retrospective results, or prospective case controlled studies including known cancer patients, we believe large prospective, multi-center, registrational trials are ultimately needed in early detection. We see this in colorectal cancer with three targeted assays currently undergoing large 10k+ patient trials with expectation of only ~70 true positives given a ~0.07% incidence rate (LINK to CRC screening deep dive). From a multi-cancer standpoint, we believe this is even more important in terms of validating test performance, given the various incidence and tumor shedding rates across indications.

Andy Felton Ph.D.
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<image002.jpg>

From: Herbst, Ira <Ira.Herbst@thermofisher.com>
Sent: Tuesday, October 27, 2020 7:55 AM
To: Quagliata, Luca <luca.quagliata@thermofisher.com>; Tanzella, Kelli <Kelli.Tanzella@thermofisher.com>
Cc: Hampton, Garret <garret.hampton@thermofisher.com>; Felton, Andrew C. <Andy.Felton@thermofisher.com>
Subject: Fwd: EXAS -- Flash / Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt / Outperform

Luca, Kelli,

I suspect we're going to get some questions from CLT at Friday's STRAP on early detection. Do we have an estimate when any of these companies (Grail, Thrive, Freenome, GH) will submit for FDA approval of their tests? Ballpark estimate - what is the size, duration, and primary endpoint of a trial necessary to demonstrate clinical utility of an early detection test?

Thanks,
Ira

Begin forwarded message:

From: "Herbst, Ira" <ira.herbst@thermofisher.com>
Date: October 27, 2020 at 7:36:58 AM PDT
To: "Hampton, Garret" <garret.hampton@thermofisher.com>, "Felton, Andrew C." <Andy.Felton@thermofisher.com>
Subject: Fwd: EXAS -- Flash / Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt / Outperform

Begin forwarded message:

From: Puneet Souda / SVB Leerink Research <LSCResearch@svbleerink.com>
Date: October 27, 2020 at 6:36:32 AM PDT
To: "Herbst, Ira" <ira.herbst@thermofisher.com>
Subject: EXAS -- Flash / Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt / Outperform
Reply-To: puneet.souda@svbleerink.com

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Image removed by sender. SVB

EXACT SCIENCES
NASDAQ: EXAS; OUTPERFORM
($109.57; Mkt. Cap. $16B)

Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt

Bottom Line: This morning, EXAS announced a strong 3Q20 volume and revenue beat and two acquisitions to further entrench themselves in the liquid biopsy cancer screening market.

EXAS announced the acquisition of blood-based cancer screening company Thrive Earlier Detection for up to $2.15B in cash and stock considerations. The acquisition includes $1.7B payable upon closing, consisting of 65% EXAS common stock and 35% cash, with an additional $450M payable upon the achievement of certain milestones related to Thrive's assay CancerSEEK and is expected to close in 1Q21. EXAS' acquisition of Thrive comes just over one month after Illumina's (ILMN, OP) acquisition of competing, also pre-revenue, liquid biopsy screening company GRAIL for ~$8B, and provides further validation for the liquid biopsy market as a whole, in our view.

Thrive's CancerSEEK assay has presented the only "real-world" prospective multi-cancer liquid biopsy screening data.

Thrive has conducted a first-of-its-kind 10k patient, prospective, interventional screening study in a real world setting, while other presented data in the industry has primarily been on smaller, case-controlled cohorts. **We recently highlighted Thrive's data in depth in a multi-cancer screening deep dive (LINK)**, as well as our key "must-have" features for success in early detection of cancer via liquid biopsy. EXAS plans to combine its methylation technology and markers with Thrive's assay to enhance the sensitivity of the combined assay (at 99%+ specificity lock in multi-cancer) prior to pursuing an FDA registrational trial. We believe this acquisition further catalyzes the entire liquid biopsy market, and view expected commercial synergies upon launch of CancerSEEK given EXAS' large, established sales team and relationships with primary care physicians and offices throughout the country.

Doubling down on methylation as acquisition of Base Genomics to expand EXAS' DNA methylation capabilities.

This morning EXAS also announced the acquisition of Base Genomics, an epigenetics company working to set a new standard in DNA methylation, for $410M net of cash received. Base Genomics allows for the analysis of DNA methylation and mutations in a single sample, with their differentiated technology being highly complementary to EXAS' technology and approach. DNA methylation analysis has proven to be a useful approach in improving sensitivity and tissue of origin identification in early detection assays, though we note that Thrive's CancerSEEK assay does not currently use the technology, and rather pairs their test result with a PET scan to improve performance.

EXAS posts revenue beat on largely in-line base business and stronger than expected COVID-19 testing revenue.

Total revenue was $408M vs. Street expectations of $337M buoyed by a recovering base business and COVID testing revenue of $100M+. Total Screening revenue (Cologuard) was down LSDs versus 3Q19, and up 63% q/q to $215M – moderately ahead of Street's $211M

estimate. Precision Oncology (Genomic Health) generated $92M vs. Street expectations of $86M. COVID testing provided most of the benefit posting $102M in revenue vs. Street expectations of $40M and our $54M. The stronger than expected revenue results aided GM of 77% vs. Street's expectations of 72%.

Share offering in conjunction with acquisition.

EXAS also announced their entry into an agreement to sell ~8.6M shares of common stock to ten institutional investors for a purchase price of $101, totaling $869.2M in net proceeds to support their acquisitions. The offering, which is being made without an underwriter or placement agent, is expected to close on or about October 29, 2020, and the shares were offered pursuant to an automatically effective shelf registration statement previously filed on June 1, 2020.

PUBLIC LINK TO THE DOCUMENT: VIEW DOCUMENT

Image removed by

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EXHIBIT B-11
RX2733

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EXHIBIT B-12
RX2734

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EXHIBIT B-13
RX2736

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EXHIBIT B-14
RX2738

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EXHIBIT B-15
PX7070

PARTIAL IN CAMERA TREATMENT REQUESTED

In the Matter of:

Illumina, Inc. and Grail, Inc.

March 23, 2021
Andrew Felton

Condensed Transcript with Word Index

For The Record, Inc.
(301) 870-8025 - www.ftrinc.net - (800) 921-5555

FEDERAL TRADE COMMISSION

ILLUMINA,)
a corporation,)
and) File No. 201-0144
GRAIL,)
a corporation.)
)

March 23, 2021
Via Zoom

The above-entitled matter came on for investigational hearing, pursuant to subpoena, at 11:05 a.m.

APPEARANCES:

ON BEHALF OF THE FEDERAL TRADE COMMISSION:
JORDAN ANDREW, ESQUIRE
Federal Trade Commission
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ON BEHALF OF THERMO FISHER SCIENTIFIC & THE DEPONENT:
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ALSO PRESENT:
John McAdams, FTC Economist

I N D E X

P R O C E E D I N G S

COURT REPORTER: Does everyone stipulate to the following: No party to the hearing will object to the remote hearing on the grounds that the stenographer may not have the legal authority to swear in the witness?

MR. ANDREW: I agree.

MR. ALEXANDER: I agree.

ANDREW FELTON,

after having been duly sworn remotely by the stenographer, was examined and testified as follows:

EXAMINATION BY COUNSEL FOR THE FTC

BY MR. ANDREW:

Q Good morning, Dr. Felton. Please state your full name for the record.

A Andrew Charles Felton.

Q Who is your current employer?

A Thermo Fisher Scientific.

Q What is your current position at Thermo Fisher Scientific?

A Vice-president, product management.

Q My name is Jordan Andrew, and I'm an attorney at the Federal Trade Commission.

MR. ANDREW: Can everyone else who's

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participating in today's investigational hearing, please, introduce themselves for the record?

MR. ALEXANDER: This is Mark Alexander. I'm with the law firm of Axinn, Veltrop & Harkrider. Axinn represents Thermo Fisher Scientific and Mr. Felton in this proceeding.

MR. MCDONALD: I am John McAdams. I'm an economist at the FTC.

MR. ALEXANDER: And before we begin, on behalf of Thermo Fisher, we would request the transcript be designated confidential to the maximum extent that the laws and rules provide.

MR. ANDREW: Thank you.

BY MR. ANDREW:

Q Unless I state otherwise, I will refer to Thermo Fisher Scientific throughout this investigational hearing as Thermo; I will refer to Illumina, Inc., as Illumina; and I will refer to GRAIL, Inc., as GRAIL. And when I refer to the proposed transaction, proposed acquisition, or proposed merger, I'm referring to Illumina's proposed acquisition of GRAIL.

Does that work for you?

A Yes.

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Q Do you understand that you are here today pursuant to a subpoena from the Federal Trade Commission?

A Yes, I do.

Q You previously testified in an investigational hearing with the FTC, correct?

A Correct.

Q And that was approximately two years ago, correct?

A Yes.

Q That testimony was related to the proposed merger of Illumina and Pacific Biosciences, correct?

A That is correct.

Q To the best of your knowledge, was the testimony that you provided in that investigational hearing accurate?

A Yes. To the best of my knowledge, it was accurate.

Q Since you testified, has anything caused you to believe that any of the testimony you provided in that investigational hearing was not accurate?

A No, it has not.

Q Okay. Well, even though you've

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testified before, I'd like to briefly explain how this hearing will be conducted.

All of my questions and your answers will be recorded by the court reporter. Please understand that you need to speak up and answer my questions orally so that the court reporter can record your answers. She won't be able to record a nod or shake of the head.

To make the questions and answers easier to record, we should do our best not to talk at the same time. If you don't understand one of my questions or you can't hear a question, I'll be happy to clarify it, rephrase it, or do whatever is necessary so that you and I can understand each other. This is particularly important because we are conducting this hearing remotely, and I want to make sure you can hear.

I want to remind you that you're under oath. If at any point you realize that you have answered a question incorrectly or you remember something else that would make your answer more complete, just let me know, and you can add to your earlier answer right there when it's on your mind. If you need a break at any point, let me know, and we can take one. I only ask that you

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don't request a break while a question is pending.

Do you understand these instructions?

A Yes, I do.

Q Since we're conducting this hearing remotely today, I have a few questions regarding the circumstances of your remote appearance for the record.

You are currently accessing Zoom; is that correct?

A I am.

Q Is this platform working for you as far as you can tell?

A This platform seems to be pretty operational.

[redacted]

Q Is there anyone else in the room with you right now?

A No, there is not.

Q Do you have any other programs or applications running or your device such as instant messaging app or e-mail?

A E-mail is running on the device, but I'm not using it.

Q Okay. Do you have any form of communication with your attorney at your disposal?

A No, other than over the phone, which we have no Internet connection on. So no.

Q And to be clear, you are currently using your phone to access Zoom; is that right?

A That is correct.

Q Will you let me know if anyone else tries to communicate with you while I'm asking you questions?

A I will.

Q If for any reason our line of communication breaks down, you have a way to contact your attorney?

A Yes. I can -- I can phone him.

Q Is there any reason why you would not be able to testify fully and accurately today?

A No.

Q What, if anything, did you do to prepare for today's hearing?

A We had a couple of phone calls with the lawyer team, internal and external lawyer team.

Q Other than speaking with your internal and external legal teams, did you discuss the testimony you expect to give today with anyone else?

A No.

Q Other than --

A Sorry. Let me correct. My superior, Garret Hampton.

Q Who is Garret Hampton?

A Garret Hampton is the division president.

Q And he is employed at Thermo as well, correct?

A Correct.

Q Other than documents or data that may have been shown to you by your attorneys, did you review any documents or data to prepare for today's hearing?

A Reviewed some of the market share data we had generated in 2019.

Q Anything else?

A No. That was pretty much it.

Q Okay. Then I'd like to move to some questions about your educational and professional background.

Briefly describe your educational background starting with college.

A Undergrad degree in chemistry from Liverpool John Moores University and a Ph.D. in peptide chemistry from Oxford Brookes University.

Q Do you have any other degrees?

A No, I do not.

Q When did you earn your Ph.D.?

A 1992.

Q Describe your professional experience prior to working at Thermo starting with the first position you had after earning your Ph.D.

A I worked for the government, UK development, health and safety executive for about two years, and then I transferred to Applied Biosystems UK in about 1994. From Applied Biosystems UK, I went to Applied Biosystems U.S. in 1997 and left that role to start at Ion Torrent in 2010. And Ion Torrent was subsequently acquired by Life Technologies, which acquired Applied Biosystems, and have been in that role since 2010.

Q What was your role at Applied Biosystems UK?

A I was a field applications support scientist.

Q What were your responsibilities in that role?

A Primarily supporting peptide and protein products. I also supported DNA synthesis products on our factory production site facility.

Q What was your role at Applied Biosystems U.S.?

A I started as associate product manager in the DNA synthesis team and moved to product management role on sample preparation systems and then to real-time PCR where I became a senior product manager and then to the capillary electrophoresis business --

COURT REPORTER: I'm sorry. To the what business?

THE WITNESS: Capillary electrophoresis.

COURT REPORTER: That's what I didn't hear.

THE WITNESS: No worries.

-- eventually becoming the director of product management for that business. From there, I moved to Ion Torrent Systems.

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BY MR. ANDREW:
Q And again, when did you join Ion Torrent Systems?
A 2010.
Q What was your role at Ion Torrent?
A Senior director, product management.
Q What were your responsibilities in that role?
A Responsible for commercializing of NGS products from Ion Torrent including the systems, reagents, and eventually I also acquired the software function as well but not in the beginning.
Q How long were you in that role?
A I was in that role for about three years and then became the VP of product management -- three to four years. My memory is not 100 percent clear on that date.
Q Was that before or after Ion Torrent was acquired by Life Technologies?
A That was after.
Q How did your role change, if at all, after Life Technologies acquired Ion Torrent?
A Role was essentially the same. No major changes to the function or responsibilities

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of the role.
Q What was your next role?
A Next role was vice-president of product management function which, for a time, also included the marketing activities for Ion Torrent. A few years later, about four years ago, that function was separated out from my role. So we had vice-president of marketing, vice-president of product management, which is the current situation.
Q So you previously had marketing responsibilities?
A Previously had marketing responsibilities for about three years I would estimate.
Q From about what time frame?
A That would probably be from about -- probably about 2015 or '16 to about 2018, '19. My memory is not very exact on those dates.
Q Approximate dates are fine.
A Yeah.
Q What were your responsibilities related to marketing at that time?
A So marketing function for the development of collateral and marketing programs

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reported in to me through a team leader.
Q Do you have any responsibilities related to competitive intelligence?
A Some, although we have a competitive market intelligence function within the business. So prior to the substantiation of that function, market intelligence was also a component of the role in marketing and product management.
Q At that time did you do any direct interfacing with customers?
A Yes. I've always had direct customer interfacing in all roles.
Q Including your current role?
A Including my current role.
Q Did you have in your marketing role any pricing responsibilities?
A Yes. Actually, the marketing role doesn't have direct control of pricing. The product management function in our organization has direct control of pricing responsibilities. We do liaise with a pricing team to help us set pricing, but the product management function in general sets pricing.
Q So you currently have pricing responsibilities then?

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A Correct.
Q What factors do you use to determine how to set prices?
A Number of factors. Cost of the product itself, what we believe the value of the product is to the market. We have usually a pricing team. We do some pricing analysis to understand what the correct pricing for that product is based on the goals of the product launch itself.
Q Do you keep track of other competitors in the marketplace as part of your responsibilities?
A Yes, we do.
Q When did you become vice-president of product management?
A To the best of my recollection, around 2016 or '17. My memory isn't very clear on that.
Q And that is still your title today, correct?
A Correct.
Q Are you a member of any committees or working groups at Thermo?
A Can you be more specific, Jordan, about what you mean by "committees" or "working

groups"?
Q Are there any teams that you are a part of that have regularly scheduled or even ad hoc meetings?
A There are multiple teams for which I have regularly scheduled ad hoc meetings. I'll try to give you some examples.
So we have our functional meetings with, for example, our marketing team. We have regular team meetings with other divisions to discuss whether they have interest or activity in the next-generation sequencing space. Most of these are internal to the Thermo Fisher. I rarely participate in external working groups. I couldn't recall any at this point.
Q What internal divisions within Thermo would you talk to about their interest in NGS?
A Human identification team, which is our forensic science business, our molecular biology division, food safety group, and our transplant diagnostic division. We also talk regularly to our teams in the genetic sciences division across the real-time capillary electrophoresis and microarray businesses.
Q Do you currently have any other

responsibilities related to your employment at Thermo that we have not discussed?
A No. I think you've covered it.
Q Moving on, I'd like to get to some questions about Thermo's sequencing and next-generation sequencing business.
At a high level, describe Thermo's sequencing business.
A Thermo Fisher's sequencing business comprises of a number of instrument systems, reagents, software, and assay components, primarily targeted at the oncology market with subsidiary market presence in the reproductive-health space and the research space, as well as some presence in our applied markets by which we would term those to be things like the human-identification market, the agribusiness market, the food-safety market.
Q Does Thermo have sequencing technologies beyond next-generation sequencing?
A Next-generation sequencing technologies in the form of the capillary electrophoresis sequencing business. This is what are referred to as kind of first-generation sequencing technology.

Q May I refer to next-generation sequencing as NGS for the remainder of the hearing?
A Yes, you can.
Q In general, what is the difference between NGS and the other sequencing technologies that Thermo has?
A The major difference between next-generation sequencing and capillary electrophoresis, which I'm hoping I can refer to as CE from this point forward, is that next-generation sequencing is a so-called massively parallel sequencing operation.
What do we mean by that?
The first-generation technologies provide single reads of about 600 to 1,000 base pairs at a time. So one capillary, one lane. One capillary equals to one (audio distortion) whereas massively parallel sequencing systems can provide millions to hundreds of millions to billions of reads in parallel all simultaneously, however, they are typically shorter in the technologies that are predominant in the market.
(Reporter clarification.)
THE WITNESS: Let me try to repeat

that.
So one capillary equals one lane which equals one read of about 600 base pairs. The difference between the CE sequence, capillary electrophoresis -- I'm going to shorthand CE for capillary electrophoresis -- is that next-generation sequencing provides massively parallel numbers of reads from millions to hundreds of millions to potentially billions of reads in parallel, although they are shorter typically in the predominant technology in the marketplace than the CE reads.
MR. ANDREW: Was that all right, Tammy?
COURT REPORTER: Yes.
BY MR. ANDREW:
Q You also mentioned that Thermo has a microarray business, correct?
A Correct.
Q At a high level, what is the difference between Thermo's NGS business and its microarray business?
A The microarray technology provides for so-called hypothesis-based experiments primarily for gene expression, genotyping, and copy. By

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that we mean, you have to know something about the sequences that you're trying to interrogate to place them onto the array to be detected; whereas, next-generation sequencing is a so-called hypothesis-free technology in which you do not have to understand the sequences that you are trying to interrogate. You just sequence them directly.

Q Generally, are microarrays and NGS used for different types of applications?

A There are some overlaps in the applications that they can perform, but there are some differences as well. I'll give you an example of the ones that are similar.

So gene expression measurement by microarray, which is the predominant use case, can also be done by a sequencing where a technology called RNA-Seq where you're counting the individual reads to generate the similar expression data.

Genotyping is also possible on next-generation sequencing as is copy number. So they share some applications in parallel, the primary difference being the depth and specificity of the answers that you can generate

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by next-generation sequencing is much larger than by gene expression.

Q How does the throughput of next-generation sequencing compare to microarrays?

A That's one of the major differentiators. Particularly on the very high throughput NGS platforms, you can do multiple experiments in parallel, for example, on gene expression; whereas, a single array will give you an answer. There are technologies that would give you 96 or, you know, smaller, maybe up to 384 expression answers at a time. But in principal, next-generation sequencing can have a much higher throughput.

Q Focusing then on NGS, who are Thermo's primary competitors in NGS?

A So our primary competitors are Illumina, Pacific Biosciences, Oxford Nanopore, BGI, NGI. And then we have competitors in the reagent space. Those are platform competitors I just mentioned.

We also have competitors in the reagent space. They would be, for example, Agilent, Roche, ArcherDX, and a number of others

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we've ascribed -- there are a large number of smaller reagent competitors.

Q Focusing on the instrument competitors for a moment, which of those competitors that you named do you consider to be Thermo's closest competitor?

A Closest competitor is Illumina. Sorry. A lot of echo back to me. Closest competitor is Illumina.

Q Why do you say that?

A Illumina has a broadly similar technology in it's so-called termed short-read sequencing and has the most -- the largest presence in the marketplace in terms of platform and market share.

Q You mentioned also Pacific Biosciences and Oxford Nanopore. Are those long-read sequencing companies?

A Correct. They are both termed long-read sequencing technologies.

Q Are platforms that utilize long-read sequencing currently used for clinical oncology applications?

A In very little amount. I would say not -- it is not that predominant. It is not

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even their minority market. It's a very small usage.

Q Why is that?

A Fundamentally, you do not need long reads to access the oncology market. The predominant material used in the ED to sequence is formalin-fixed paraffin-embedded tissue and that material typically fragments the DNA to a range of 175 base pairs-ish but can be slightly longer. But it would be extremely inefficient to use very long reads compared to short-read technologies.

Q How would the cost of using long-read technologies for clinical oncology applications compare to the cost of using short-read instruments?

A It would tend to be much higher because you typically have smaller numbers of reads of longer reads in the long-read technologies. So the other read lengths might be 2KB, 2,000 bases, to tens of kilobases in length, but they tend to be much fewer reads; whereas, the converse is true for short-read technology where you have many millions to billions of reads, but they are typically in the range of 200

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to 400 base pairs, so your cost per read and naturally your cost per gigobase of sequence would tend to be much lower than for a long-read technology.

Q To be clear, when you said the cost would be higher, you were referring to the cost of long-read sequencing would be higher?

A The cost of long-read sequencing would be higher.

Q For which applications does Thermo compete with Pac Bio?

A Primarily the only area we would really overlap is in whole genome sequences for smaller bacterial virus targets and then some overlap in the human genetic disease arena.

Q Are those clinical applications?

A Yes, they can be. So for an example, microbial barrier whole genome sequencing, currently we are both engaged in sequencing SARS-CoV genomes, which is a clinical application in the sense that you need to derive sequences from patients who have the disease to understand what -- what variant -- what variants of concern might be in those genomes.

Q For which applications do you compete with Oxford Nanopore?

A Basically the same as I just described for Pacific Biosciences.

Q Is BGI a competitor to Thermo in the United States?

A Not currently. Our understanding is they're currently not selling much, if any, platform capability within the U.S.

[redacted]

Q And when you say "systems," you're referring to NGS instruments?

A Correct.

Q Is the figure you just gave me a global market share?

A Correct.

[redacted]

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[redacted]

Q And that figure is by revenue, correct?

A By revenue.

Q How is Illumina's market share changed over the past five years?

A I would say it may have gone down a little bit or very -- or stayed the same. There have been additions from BGI, but they are over a smaller magnitude. Qiagen had a small percentage of share for a time, but the predominant effect has probably been from the long-read technology competitors of Oxford and Pacific Biosciences.

[redacted]

[redacted]

Q Why do you believe that is?

A The technology is now widely spread throughout the scientific and clinical communities, and therefore -- and they were the first player -- NGS player to establish a major foothold in the market. So their technology is now so widely available through academic and research segments that most scientists coming up are familiar with that technology and, therefore, would continue to use that technology platform.

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Q Why would scientists continue to use a technology platform that they are familiar with?
A So if you have generated research data sets on a single platform, it's generally preferable that you continue to use the same platform for comparability over time, and therefore, changing technologies becomes more difficulty unless there are very compelling reasons to do so.
Q To expand on that, why would it be difficult to change technologies then?
A For comparability of data sets. You want to ensure that your data from one technology platform is as comparable as possible. Introducing new technologies can lead to difficulty in interpreting between the two data sets.
Q I'd like to move on and talk about the NGS instruments that Thermo sells today. What are the NGS instruments that Thermo sells?
A We currently sell our PGM Dx platform that is our IVD-approved version of our first generation technology. We sell a proton platform which is our second-generation technology but primarily only to our China market. And we --

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the two predominant platforms we sell are the GeneStudio series and the latest generation platform, the Genexus system.
Q Collectively, does Thermo refer to these as their Ion Torrent instruments?
A Correct. They go to market under the brand Ion Torrent.
Q How are the Ion Torrent instruments different from each other?
A The primary difference from each other in throughput and level of automation for the workflow that is required to operate them.
Q How do the instruments compare in terms of throughput?
A So the PGM platform has a maximum of five million reads per run. The proton platform has a maximum read capability of 60 to 80 million reads per run. The GeneStudio series platform has a maximum of 100 to 130 million reads per run. The Genexus system's current output range is also in the 50 to 80 million read range, but it is a fully automated workflow, including laboratory preparation, as well as the clinical application, and the sequencing steps.
Q Can you explain the unit of

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measurement that you used to describe throughput, the reads per run?
A Sure.
So read, as I've described earlier in the deposition, is a single contiguous length of DNA sequence from, in our case, a chip. So each well on a chip can generate a read, and we typically generate those reads in the range of 200 to 400 base pairs per sequence. So we're generating 60 to 80 million 200 to 400 base-pair sequencers per run.
Q Are there any other metrics that you believe are important in comparing NGS instruments?
A So the other metrics that are typically used are turnaround time and gigabases of sequence. So turnaround time, how long does it take to generate the sequence information, and how much overall sequence information is provided. The overall sequencing information and gigabases is a combination of the number of reads times the length of the read.
Q Why is turnaround time important?
A Turnaround time is important in some market segments, in particularly the clinical

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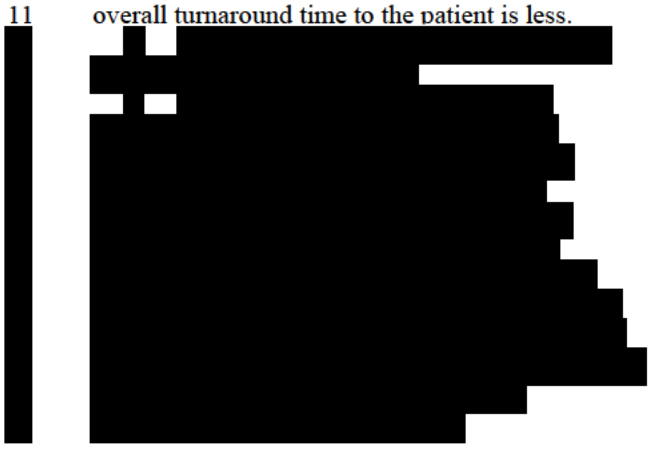
market segment, particularly in oncology, as there are turnaround time requirements to generate data for answers from samples in the oncology space.
So there are, for example, 10-day turnaround time requirements to generate an answer for the patient. Sequencing is one component of a number of molecular tests that would be done on a patient's tumor sample, so the faster any individual component is derived, the overall turnaround time to the patient is less.



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Q How is the PMG Dx different than the -- I'm sorry. Let me start again.
How is the PGM Dx different than the PGM platform?
A PGM Dx platform is the IVD-approved -- U.S. IVD-approved and Europe IVD-approved version of the PGM platform. We no longer offer for sale the original PGM non-IVD-approved platform.
Q What does it mean to be IVD approved?
A In our case we have applied for and been issued a Class III premarket approval notification in combination with our Oncomine Dx target test, which is an oncology-based assay for companion diagnostic testing in oncology. Companion diagnostic testing means the answers that the system can give can directly influence patient therapies for particular markers. So if a variant is present for a particular marker and we have a confirming diagnosis claim associated with that, the physician can prescribe that particular therapy based on that result.
Q The PMA approval you just described is an approval granted by the U.S. FDA; is that correct?
A That is correct.

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[redacted]
Q You said that PMA approval process takes about three years; is that correct?
A That's correct.
[redacted]

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[redacted]
Q Generally, what is required to obtain FDA approval for an NGS instrument?
A Is your question, Jordan, a Class III PMA approval or just any approval of the FDA?
Q The Class III PMA approval, please.
A So you have to register the system. It is not just the instrument. So a Class III approval includes the instrument, the software, the reagents, and the assay components. There is extensive analytical validation of the assay and

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the system together as well as guard banding. And that means you assess the detection, the sensitivity and specificity and detection capability of every variant, every mutation the panel is intended to assess, and then you perform a clinical validation on clinically relevant samples for the sample types you wish to make claims for. So in our case, that would be both formalin-fixed and paraffin-embedded tissue and
[redacted]

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[redacted]

Q You previously said the most recent Thermo instrument to be commercialized was the Genexus; is that right?

A That's correct.

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[redacted]

Q Did Thermo's prior experience developing and commercializing NGS instruments help to speed up the development time for the Genexus?

A Yes, for sure. We build on the foundation of each instrument platform, prior generation, to craft the next generation of

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systems, so the learnings from the GeneStudio platform was implemented into the Genexus system.

Q How long would it take a new entrant to develop and commercialize an NGS instrument?

A That's a hard question to answer. In general, from what we have seen, most companies are spending three to five years to generate a new technology, but it's a very general answer. It depends on how difficult the underlying technology is.

Q And how much do you think a new entrant would need to spend in order to develop and commercialize an NGS instrument?

A It would be a very speculative answer, Jordan, but hundreds of millions of dollars.

Q Why do you believe a new entrant would require more -- more expenditures to develop an NGS instrument than Thermo?

A They fundamentally have to develop new technologies that are -- that would provide enough differentiation for them to believe they would gain significant market share. So typically building a new technology from scratch is more difficult and more expensive than iterating an existing technology.

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Q Would it take a new entrant longer to develop and commercialize an NGS instrument that would be competitive with Illumina's NGS instruments?

A Yes. I would -- I would say in general that is probably true because the -- the general output of the highest throughput instruments is much higher than the Thermo-based technology platform.

Q You're talking about the output of the Illumina instruments, correct?

A Correct.

Q At a high level, how do Thermo's NGS instruments compare with Illumina's NGS instruments?

A So we compare on a couple different metrics, a couple of which we talked about. So throughput in terms of reads per run and turnaround time and then overall automation of the workflow. In terms of throughput, our largest capacity chip provides for 100 to 130 million reads per run; whereas, the Illumina's highest throughput instrument provides for a capability of 10 billion reads per run, so at least a couple of orders of magnitude higher

output per run.
However, that comes with a cost of turnaround time to the result. Typically that can be two to five days, depending on which instrument configuration; whereas, our sequencing turnaround time is typically on the order of a few hours.
Q The 10 billion reads per run throughput that you just described, is that for Illumina's NovaSeq platform?
A That's correct.
Q Are there any other metrics across which you compare Thermo's NGS instruments with Illumina's?
A Throughput turnaround time, workflow automation, and cost per read or cost per gigabases are the primary ways we compare.
Q Based on those metrics, are there certain applications for which Illumina instruments were better suited than Thermo instruments?
A Yes. So overall, the very high throughput instruments are much more suited to a number of different applications, including human whole genome sequencing and/or high throughput

exome sequencing, exome being the protein-coating part of the genome. They are also suited to high throughput centralized applications such as noninvasive prenatal testing and potentially another application in oncology that run highly centralized high-throughput applications.
Q What do you mean by "highly centralized"?
A So the way samples are aggregated into a central facility versus in a distributed setting, for example, in every hospital or smaller collection of smaller hospitals.
Q Why are there certain applications that are highly centralized?
A There are certain -- in general, if the economics and the workflow and the collection of samples is suited to a centralized facility, then typically that is an economically better way to run the samples. It may come at the cost of turnaround time of results to the patient. So in our view of the world, for example, the general therapy selection usage of next-generation sequencing is better suited to a distributed setting because that provides for the ability to get the answer to the patients quicker.

However, it may not be the -- you know, the most economic way of doing it if you could aggregate all the samples centrally into a single facility. In general, it's a tradeoff between the two components between how fast you get the answer to the patient and how economic the answer is to the system.
Q Okay. We've been going for a little over an hour. How about a 10-minute break? Would that work for you?
A That would be great. Thanks.
Q Okay. Let's go off the record then.
(A brief recess was taken.)
BY MR. ANDREW:
Q A bit earlier we were talking about oncology applications. Which of Thermo's NGS instruments are currently used in oncology applications?
A They all are to some extent. With the latest generation system, the Genexus, was really designed to be the most applicable to that application. But GeneStudio perhaps less so on the proton platform, but PGM Dx and somewhat PGM as well all have some usage in oncology applications.

Q How is the Genexus most applicable to oncology applications?
A It's most applicable because the primary requirements of the oncology routine testing market, by which we mean the pathology labs who are providing results to oncologists, have requirements for both rapid turnaround time and high levels of automation for the platform, both of which are the values that the -- the value propositions that Genexus provides. So we can provide an end-to-end system from fully automating a laboratory preparation to the clinical reporting in less than 24 hours per run.
It also has the ability to run in smaller batch sizes and be economic, and that matches the rate at which samples typically come in to the pathology laboratory. So they're, obviously, coming in at varying amounts, a relatively smaller number per day, and the system is designed to work with- -- without affecting the economics of the result by a large amount.
So turnaround time, economic while doing small batches, and very low amounts of hands-on time. It's about 10 minutes to set up the entire system.

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Q Describe the different oncology applications that Thermo NGS instruments are used for.

A So the primary application that our oncology systems are used for is therapy selection, and that is typically for patients who are in the latter stages of cancer, either Stage III or Stage IV metastatic settings where the therapy that is relevant to the patient has to be determined based on the mutations that are carried in the tumor itself, so either in a solid tumor setting or a hematological cancer setting. You need to make those therapy decisions.

For late-stage patients, the turnaround time is critical. I'll give you an example. For late-stage lung cancer patients, their -- they may only have an average of 16 weeks of life remaining, so there are some very critical turnaround-time decisions to be made about what the patients will be treated with for those settings.

So primarily late-stage therapy decision, and we're also looking at recurrence monitoring, that is once the patient has been treated, what is the likelihood of recurrence of

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that cancer in that setting. What we are not working on is the primarily early-stage cancer detection, the so-called Stage I and II settings.

Q Why are Thermo NGS instruments well suited for therapy-selection tests?

A Primarily for the reasons we just discussed, which is turnaround time is critical and you do not require a high volume or high amount of sequencing. You can, again, rate your answer with a relatively targeted panel that doesn't require exceptional amounts of sequencing and do it in a way that's matched to the arrival of the samples and within the cost boundaries that are typically seen in that setting.

Q What is a targeted panel?

A Targeted panel is one where you know a priority, the regions of the genome that you wish to interrogate where mutations are likely to be present.

Q And what types of tests are targeted panels typically used in?

A Oncology settings, but they are also used in human genetic disease research for inherited conditions as well. They can also be used in other settings such as human

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identification to determine snips that might categorize eye color or hair color, for example. You could also use them to generate whole genome sequence for viruses and bacteria.

And I gave an example of that, is we currently have a targeted panel that generates a whole genome sequence of SARS-CoV-2. We've also done that for a number of other virus targets as well. You can do -- you can also do it for detection of certain bacterial targets. For example, we have a bacteria panel that detects a number of different bacteria. So while targeted is often used to describe a way of contracting the region of the human genome that you are interested in, targeted panels can also do whole genome sequencing, which is a bit of a concept to grasp. But they can do whole genome sequencing for smaller -- smaller organisms.

Q In the oncology setting, how do you know where to focus your targeted panel?

A There are a number of research studies over the past 10, 20 years that have -- have identified particular gene targets of being so-called drivers of cancer if those mutations are present. The TCGA data set was an example of

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that. It was a research study of tens of thousands of cancer exomes and microarray gene-expression experiments, and they have identified about 5- to 600 genes which are implicated as being predictive or being likely to be mutated in a cancer setting.

So that list is readily available in the literature. There are often new entities that crop up, but in general, the total is considered to be between 5- and 600 genes.

Q Can Thermo NGS instruments detect methylation patterns?

A Yes, they can, primarily in the form of targeted methylation panels.

[redacted]

[redacted]

BY MR. ANDREW:

Q Does Thermo have bioinformatics capabilities related to methylation?

A Yes. We have some simple ways to -- to understand when methylation states occur. We do not have complex analysis tools for methylation states.

Q What is a liquid biopsy test?

A A liquid biopsy test is generally considered to be a liquid sample, and in -- while whole blood is a liquid sample, it is not generally defined as a liquid biopsy. A liquid biopsy is generally defined as a replacement for a solid-tumor biopsy by taking a blood sample and looking at the plasma-derived circulating cell-free nucleic acid that comes from the cells within the tumor breaking down and shedding their DNA into the peripheral circulation.

Q And what are liquid biopsy tests typically used to determine?

A They're used to determine -- in the context of next-generation sequencing, there's

two general-usage cases. One is to detect mutations within that DNA in the same ways you would detect for a solid tumor or hematological panel and also to determine methylation states of the DNA itself.

Q Are Thermo NGS instruments used for liquid biopsy applications?

A Yes, they are.

Q Earlier you mentioned therapy selection as well as early-stage cancer-screening tests. Are you aware of companies developing multi-cancer early-detection screening tests?

A Yes. We are aware of a number of companies in that space.

Q And can I refer to these as MCED tests?

A You have to define MC -- oh, so multi-cancer early detection, okay. Sure, yes. I get the acronym. Yes, you can.

Q Thank you. It makes it much easier. Is this the type of test currently being developed by GRAIL?

A Yes. That's our understanding.

Q How have you become aware of companies developing these tests?

A We've had some contact with some companies in the space in the past. [redacted] We're obviously well aware of GRAIL, and we've been following Exact Sciences and other groups in this area for a while now.

Q Describe these MCED tests at a high level.

A The GRAIL and Freenome approaches, as we understand them, are predicated on predicting the methylation state -- status of the DNA to understand if the early signs of cancer are present in the patient's liquid biopsy sample.

Q How are NGS instruments used with these tests?

A The NGS instruments are used to sequence the DNA to determine the methylation status of the individual markers in the DNA. Those individual markers are some that bioinformatically analyze the way you say a signature, if you will, of pattern indicative of

the presence of early-stage cancer.

Q Are Thermo NGS instruments currently used for MCED tests?

A No, generally not.

Q Why not?

A In general, because the -- the implementation of such a test is likely favored to a very high throughput system in a centralized facility, and our systems are generally suited to the implementation of the test in a distributed setting with smaller amounts of patient samples.

Q In order to be used for MCED tests, what attributes does an NGS instrument need to have?

A In general, we would say at the high throughput platform such that you could screen through many thousands of patient samples per day or per week or tens of thousands per week because population screening for early cancer is likely to be a very sample-intensive solution. So higher throughput, centralized low-cost platform, low cost per sample is likely to be the major requirement for that setting.

Q What do you mean by "population sequencing"?

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A So screening is inherently a euphemism for assessing the status in a significant fraction of the population. So if you're screening, for example, newborn screening assesses the range of mutations that are present in newborns to understand if they have inherited conditions. That is a very large inherent population relative to -- and for cancer, obviously, you're screening a significant fraction, they would hope, of the adult population to assess whether they are at risk of having a cancer.

Whereas, the systems that Ion Torrent provides are generally much better suited to the population of patients who's progressed to a late-stage cancer setting, so the number of patients is much smaller relative to the number of patients you are screening in a population-screening experiment or study.

Q Are MCED tests done using targeted panels?

A It's our understanding they can be, but there are -- there are other methods as well. You can assess the whole genome at relatively lower levels of import. We understand that both

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methods are practiced.

Q Are larger panels required for MCED tests than, for example, for their selection test?

A I guess that isn't well understood by us because we're not in that area of market. In general, my opinion on that is there -- the panels that we -- the panels that are being used today for therapy selection can be much larger.

So we have a panel up to 500 genes. Illumina has a panel up to 500 genes. In principal, you may be able to use a panel much smaller for targeting a number of methylation states, but we are not -- we don't have a great understanding of that in the market, as we have no studies or any practical knowledge or use in it.

Q Are Illumina's NGS instruments used for MCED tests?

A Yes. It is our understanding they are.

Q And do you believe that Illumina NGS instruments are more suited for MCED tests than Thermo NGS instruments?

A They're higher throughput systems, so

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they are.

Q Which systems are you talking about?

A The HiSeq and NovaSeq platforms.

Q Does Thermo have any NGS instruments that are comparable in throughput to the HiSeq or NovaSeq?

A No, we do not.

[redacted]

Q Is the NextSeq lower throughput than the HiSeq?

A Correct, up to about 1 billion reads per run.

[redacted]

MR. ALEXANDER: Objection -- object to

[redacted]

BY MR. ANDREW:

Q And let me rephrase my question then.

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[redacted]

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generate equivalent number of reads.

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Q For MCED test developers, who are their other NGS options in the United States besides Illumina?

A There are only the current providers which are ourselves, Pacific Biosciences, and Oxford Nanopore. So the three technology platforms are really not suited to that kind of

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testing.
Q You said Pacific Biosciences platform is not suited to MCED tests?
A Correct, and neither is Oxford Nanopore.
Q How likely do you think MCED test developers are to switch to an NGS platform other than Illumina?
A It's not impossible, but it's very difficult once you generated your data sets to show that you can detect that. Typically those data sets require many tens to hundreds of thousands of patient samples to show that you can detect it sensitively and specifically. And you would have to do some level of equivalence testing to show the new technology could recapitulate the data you generated on that original data set, which is not an insubstantial amount of work in and of itself.
So while it's not impossible, it is difficult and somewhat expensive proposition to switch technology platforms.
Q Is there any benefit for MCED test developers that want to use Illumina NGS platforms if other MCED test developers are also

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using Illumina platforms?
A That's hard to say, Jordan. I think the only advantage would be, for example, if in discussing with the regulatory authorities who had seen one technology based on a particular NGS, one MCED technology based on a particular underlying NGS, and they would not have to relearn the differences between the first technology and whatever the second technology was. But I'm not sure how much of an advantage that would really be.
Q Speaking about the MCED test developers themselves, is there a first-mover advantage in the MCED space?
A Just like in every other technology implementation, the first mover generally gains the most market share.
Q What do you think the benefit would be of being the first MCED test to market?
A You're likely to gain the highest market share for that test and any other subsequent tests that were done parallel in that space.
Q Are there any other benefits?
A Other than likely generating the most

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revenue, I can't think of one right now.
Q Is it important for MCED tests to obtain FDA approval?
A It's not entirely clear to me what the FDA approval pathway would be for screening assays. I think it's probable that the FDA would be involved, but we are not sure that you fundamentally need to do that. A centralized test can be run under a so-called CAP clear guideline, the College of American Pathologists, Clinical Laboratory Improvement Act. And provided they have clinical utility and evidence to generate that the test is relevant, specific, and does improve patient, they may not need FDA testing in the U.S. market. They could go direct to insurers and get reimbursed without FDA approval.
Q Do you think FDA approval would help MCED test developers obtain payer reimbursement?
A It's generally considered to help payer reimbursement, but it doesn't appear to be required in every situation.
Q If an MCED test developer were to seek FDA approval, would it have to identify the NGS instrument that the assay is run on?

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A I believe it would.
Q So how difficult, then, would it be for an MCED test developer to switch NGS instruments after it received FDA approval on a particular instrument?
A It's a very hypothetical question, but I'll give you my best answer. It is difficult because you have to generate equivalence data to show that the answers that you generate of the second technology are exactly the same as the first technology. And the FDA may require -- may require a lot of data to generate that evidence. So it is not -- it is not an exact answer. It depends on what the FDA's view of the differences in the technology -- the line of technology are.
Q In order to get FDA approval for an MCED test, would you need to first run clinical trials?
A Yes, almost certainly.
Q How large would these clinical trials need to be for an MCED test?
A Our expectation is based on what we hear from the companies in the space is that the trials are very large, on the order of 100,000 patients.

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Q How long do clinical trials of that size take to complete?
A Anywhere from I would guess two to five years, depending on what indication you are looking at and how many patients you can accrue.
Q Going back to my hypothetical about switching instruments post-FDA approval, if you had to produce equivalence data to the FDA, would you have to run a clinical trial of that size, or could you do something smaller?
A A lot depends on what the FDA's view on differences are. It's very hard to answer that without understanding what the FDA's position would be. The FDA may take a position that the technology is fundamentally different. You may need to repeat everything you did in your original trial.
Q I want to switch gears for a minute and finish up with a few different topics. What is Sanger sequencing?
A Sanger sequencing is the process of generating sequence information typically today using a capillary electrophoresis space sequencer. It's -- the underlying technology is typically known as terminator -- dye-terminator

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database sequencing chemistry. So you have fluorescent bases which are attached individually to the growing sequence, and those fragments are read out in length order in the capillary. That fluorescent signal from each of the progressively shorter or longer bases is then stitched together as a single typically 600-base sequence fragment.
Q Is Sanger sequencing a good alternative to NGS for MCED tests?
A In our opinion, that would be highly unlikely. The amount of sequencing that you would be generating would not be nearly enough, and the overall cost in time per result would be not applicable.
Q Because it would just take too much time?
A It would take too much time, cost too much, and would not be scalable enough to deal with the very large number of samples that you would be trying to interrogate.
Q What is PCR?
A PCR is polymerase chain reaction. It's the process of making copies of a template DNA using the enzyme Taq polymerase. You take one copy of DNA, double strand DNA. You separate

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the two strands. You anneal a small sequence of the Taq polymerase and then rebuild the second strand. So you can generate multiple copies and consider it photocopying DNA and generate as many copies in principal as you wish from that original template.
Q Is PCR a good alternative to NGS for MCED tests?
A For similar reasons, the same -- entirely unlikely to be scalable or have enough data points generated in a reasonable amount of time, and therefore, the economics and the scalability of the answer is likely highly unsuited for that environment.
Q Would it cost a lot more to run MCED tests on PCR as opposed to NGS?
A Almost certainly.
Q Do you have an idea of how much more?
A No, but orders of magnitude is likely.
Q Aside from Sanger and PCR, are there any other technologies that you believe would be good alternatives to NGS for MCED tests?
A Theoretically microarray could potentially generate methylation-status data, I believe. But again, for similar reasons, it's

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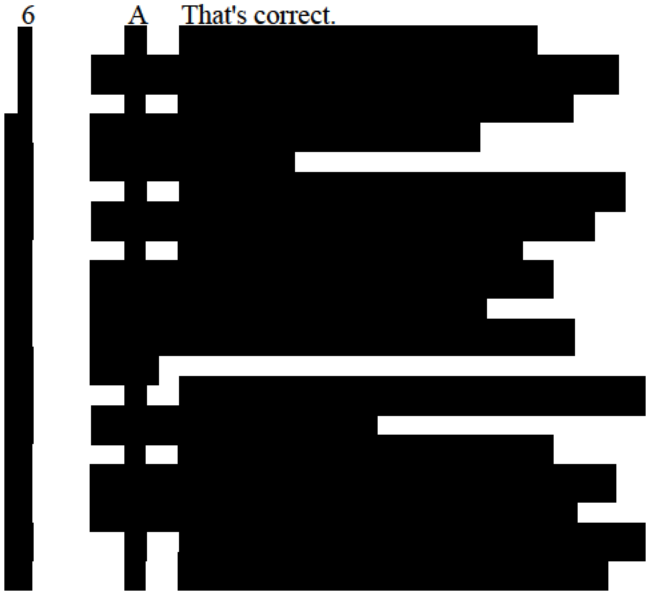
unlikely that that would be the technology that you would implement in the routine setting for reasons of scale and economics as well.
Q Thermo has microarray technology; is that correct?
A That's correct.



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[redacted]

Q In other words, Thermo and Illumina are playing in two different segments of the oncology space?

A So the GRAIL Thermo -- the GRAIL Illumina combination would be playing in a different space than Thermo. So we are playing in the late-stage cancer setting. The GRAIL Illumina combination would be playing in the early cancer. The Illumina does also play in the therapy selection space and is one of our competitors in that area.

Q But GRAIL is not a company focused on

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therapy selection, correct?

A Correct.

[redacted]

[redacted]

Q Do you believe that Illumina's acquisition of GRAIL will have an effect on innovation in the MCED testing space?

A No, I don't believe so.

Q Okay. That's the last of my questions. Why don't we take a short break, maybe five minutes, Andy, and let me talk with my colleague and just make sure there's nothing more I have to ask, okay?

A Okay. No problem. Thank you.

Q Okay.

(A brief recess was taken.)

MR. ANDREW: That's all the questions I have today, Andy. Thank you very much for your time.

THE WITNESS: Thank you. I appreciate it.

(Whereupon, the investigational hearing concluded at 1:14 p.m.)

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ACKNOWLEDGMENT OF DEPONENT

I, Andrew Felton, do hereby acknowledge I have read and examined the foregoing pages of testimony, and the same is a true, correct and complete transcription of the testimony given by me, and any changes and/or corrections, if any, appear in the attached errata sheet signed by me.

_____ _____

Date Andrew Felton

CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC

I, Tammy S. Newton, the officer before whom the foregoing proceedings was taken, do hereby certify that the foregoing transcript is a true and correct record of the proceedings; that said proceedings were taken by me stenographically and thereafter reduced to typewriting under my supervision; and that I am neither counsel for, related to, nor employed by any of the parties to this case and have no interest, financial or otherwise, in its outcome.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this 30th day of March, 2021.

My commission expires:
3/05/2022

s/Tammy S. Newton
Notary Public in and for the
State of Maryland

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Deposition of:

Andrew C. Felton , Ph.D.

June 2, 2021

In the Matter of:

Illumina, Inc. and GRAIL, Inc. (In the Matter of)

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UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION
OFFICE OF ADMINISTRATIVE LAW JUDGES

_____

In the Matter of

ILLUMINA, INC., a corporation,

and Docket No. 9401

GRAIL, INC., a corporation.

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REMOTE VIDEOCONFERENCE DEPOSITION of
ANDREW C. FELTON, Ph.D.
Wednesday, June 2, 2021
San Francisco, California

Reporter: Michael D. O'Connor, RMR, CRC, CRR
Job No. 4596003

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CONFIDENTIAL

Wednesday, June 2, 2021
8:09 PDT

REMOTE VIDEOCONFERENCE DEPOSITION of ANDREW C. FELTON, Ph.D., held remotely in San Francisco, California, pursuant to notice, before Michael D. O'Connor, RMR, CRC, CRR, and Notary Public

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ALSO PRESENT (attending remotely):
Paul Rafferty, Concierge
Alexus Ortiz, Videographer

THE VIDEOGRAPHER: Good morning. We are going on the record at 8:09 a.m. on June 2, 2021.

Please note that the microphones are sensitive and may pick up whispering, private conversations, and cellular interference. Please turn off all cellphones or place them away from the microphones as they can interfere with the deposition audio.

Audio and video recording will continue to take place unless all parties agree to go off the record.

This is media unit one of the video-recorded deposition of Andrew C Felton, Ph.D., taken by counsel for Plaintiff in the matter of Federal Trade Commission versus Illumina, Inc., et al., filed in the United States District Court, Southern District of California, Case Number 321-cv-00800(CAB)(BGS).

This deposition is being recorded remotely via Virtual Veritext

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technologies, with the witness located in San Francisco, California.

My name is Alexus Oriz from the Veritext Legal Solutions and I'm the videographer. The court reporter is Michael O'Connor, from the firm Veritext Legal Solutions.

I'm not related to any party in this action, nor am I financially interested in the outcome.

Counsel and all present in the room and everyone attending remotely will now state their appearances and affiliations for the record. If there are any objections to proceeding, please state them at the time of your appearance, beginning with the noticing attorney.

MR. ANDREW: Hi. This is Jordan Andrew. I represent the Federal Trade Commission.

MR. GONEN: This is David Gonen. I'm also with the Federal Trade Commission.

MS. RATHBUN: This is Anna Rathbun

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from Latham & Watkins on behalf of Defendant, GRAIL, and I'm joined by my colleague, Alexandra Van Dine.

MR. HUTH: This is Karl Huth of Huth Reynolds LLP on behalf of Defendant, Illumina, Inc.

MR. HARKRIDER: Hi. This is John Harkrider from Axinn representing Thermo Fisher.

THE WITNESS: This is Andy Felton, Thermo Fisher Scientific.

* * *

ANDREW C. FELTON, Ph.D.,

having been duly sworn by the Notary Public, was examined and testified as follows:

EXAMINATION

BY MR. ANDREW:

Q. Good morning, Andy.

A. Good morning.

Q. Please state your full name for the record.

A. Andrew Charles Felton.

Q. Who is your current employer?

A. Thermo Fisher Scientific.

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Q. What is your current position at Thermo Fisher Scientific?

A. Vice president product management, platforms and research.

Q. Thank you. My name is Jordan Andrew and I'm an attorney at the Federal Trade Commission. Unless I state otherwise, today I will refer to Thermo Fisher Scientific as "Thermo." I will refer to Illumina, Inc. as "Illumina." And I'll refer to GRAIL, Inc. as "GRAIL."

And when I refer to the "proposed transaction," "proposed acquisition" or "proposed merger," I'm referring to Illumina's proposed acquisition of GRAIL.

Does that work for you?

A. That's fine.

Q. Do you understand that you are testifying here today pursuant to a subpoena?

A. Yes, I do.

Q. I'd like to briefly go over how this hearing is going to be conducted. All of my questions and your answers are recorded by the court reporter. Please understand that you need to speak up and answer my questions orally

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so that the court reporter can record your answers.

He won't be able to record a nod or shake of your head.

To make sure that the questions and answers are easy to record, we should do our best not to both speak at the same time.

If you don't understand one of my questions or you can't hear one of my questions, I will be happy to clarify it, rephrase it, or do whatever is necessary so that you and I understand each other.

This is particularly important, because we're conducting the hearing remotely, and I want to be sure that you can hear me.

I want to remind you that you're under oath. If at any point you realize that you've answered a question incorrectly, or you remember something else that would make your answer more complete, just let me know and you can add to your earlier answer right then while it's on your mind.

If you need a break at any point, just let me know, and we can take one. I only ask that you don't request a break with a

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question pending.
Do you understand everything that I've just told you?
A. Yes, I do.
Q. Since we're conducting this deposition remotely, I have a few questions regarding the circumstances of your remote appearance that I'd like to get on the record.
Is your Zoom platform currently working technically?
A. Yes, it is.
Q. Do you have the Exhibit Share platform set up and running?
A. Yes, I do.
Q. What's the full address of the location where you're appearing today?
A. 180 Oyster Point Boulevard, South San Francisco, California.
Q. Is there anyone else currently in the room with you?
A. No, there is not.
Q. Do you have any other programs or applications running on your device, like a chat platform?
A. No. Just let me check. No.

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Q. And do you understand that you are not to communicate with anyone else during the deposition?
A. I do.
Q. Will you let me know if anyone tries to communicate with you while I'm asking you questions?
A. Yes, I will.
Q. Is there any reason why you would not be able to testify fully and accurately today?
A. No, there is not.
Q. What, if anything, did you do to prepare for today's hearing?
A. I had two calls with our attorneys, one yesterday and one approximately a week ago.
Q. Did you review any documents in preparation for this hearing?
A. Review --
MR. HARKRIDER: Just let me interject for a second. I'm just going to instruct the witness not to answer to the extent it reveals any client-attorney communications. But,

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otherwise, you can answer the question.
A. I reviewed my transcript from the prior testimony.
Q. Other than discussions with your in-house attorneys or outside counsel, did you discuss the testimony that you expect to give today with anyone else?
A. No.
Q. You provided testimony to the FTC in an investigational hearing on March 23rd of this year; is that correct?
A. Correct.
Q. Okay. If you look at the Exhibit Share application, I'd like to show you an exhibit marked PX7070.
(Document marked as Felton Exhibit PX7070 for identification)
Q. It should be in the Marked Exhibit folder now.
A. I see it.
Q. Please take a moment to review PX7070, and let me know when you're ready.
A. I'm ready.
Q. Do you recognize PX7070?
A. Yes, I do.

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Q. What do you recognize it to be?
A. My testimony from the prior meeting on 3/23/21.
Q. So this does appear to be a copy of the investigational hearing transcript that you had with the Federal Trade Commission?
A. Correct.
Q. And you said you had a chance to review this transcript prior to this hearing?
A. I did.
Q. To the best of your knowledge, was everything that you testified about in the investigational hearing, a transcript in PX7070, accurate at the time of your testimony?
A. Yes, it was accurate at the time of my testimony.
Q. And to the best of your knowledge, is everything that you testified about in this transcript PX7070 still accurate today?
A. Yes, it's still accurate today.
Q. Okay. I'd like to go through some specific excerpts from the transcript now. If you wouldn't mind scrolling to Page 30 of PX7070, and just let me know when you're there.
MS. RATHBUN: Jordan, do you mean

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the minuscript Page 30 or the PDF Page 30?
MR. ANDREW: That's a good question. I'm referring to the minuscript Page 30. So it would be Page 30 in the upper right-hand corner of the page, of the page with the four pages on it.
A. Yes, the four blocks in the top right-hand marker. Yes. I have that.
Q. Right. So, in this case, Page 30 is actually in the bottom left-hand corner of the fuller page.
A. Correct.
Q. Okay. I'd like to direct your attention to Page 30, line 8 of the transcript, to the question that begins:
"How are the Ion Torrent instruments different from each other?"
Do you see that?
A. I do see that.
Q. Please review from the beginning of this question to the end of the answer at Page 30, line 24, and let me know when you're ready.

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A. I'm ready.
Q. Have you had a chance to review this portion of the transcript?
A. Yes, I have.
Q. Were your answers in this portion of the transcript accurate at the time you provided testimony?
MS. RATHBUN: Objection to form and foundation. I'm also going to object to the extent the FTC plans to just read in parts of the investigational hearing into the deposition. In this case, Defendants weren't able to attend the investigational hearings and were unable to make any objections to questions on that record.
So, you know, we should have an opportunity to make objections to any questions that appear on the investigational hearing transcript, and so we'll reserve our right to object to all of those to the extent they're just read into the record instead of reasking the question today.

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MR. HUTH: Join in the objection.
Q. All right. So I'll reask my question, Dr. Felton.
Have you had a chance to review the portion of the transcript that begins Page 30, line 8 and ends Page 30, line 24?
A. Yes, I have.
Q. Were your answers in this portion of the transcript accurate at the time you provided testimony?
MS. RATHBUN: Same objection.
A. Yes, they were.
Q. And are your answers in this portion of the transcript still accurate today?
MS. RATHBUN: Same objection.
A. Yes, they are.
Q. Is the GeneStudio Thermo's highest throughput sequencer?
MS. RATHBUN: Objection to form and foundation.
A. Yes, it is.
Q. For applications requiring high throughput sequencing, would Thermo generally use the GeneStudio?
A. Yes, for high throughput

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sequencing, we would generally recommend the GeneStudio platform.
Q. Okay. Now I'd like to direct your attention to Page 35 of the minuscript.
A. Okay.
Q. And the question at Page 35, line 4, through the answer on Page 35, line 15. If you could just review that portion of the transcript, and let me know when you're ready.
A. Yes.
Q. Have you had a chance to review that portion of the transcript?
A. I have.
Q. Was the testimony that you provided at the time accurate?
MS. RATHBUN: Objection to form. Same objection as before.
A. Yes, it was.
Q. And is that portion of the transcript still accurate today?
MS. RATHBUN: Same objection.
A. Yes, it is.
[redacted]

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MS. RATHBUN: Object to form.

[redacted]

MS. RATHBUN: Objection to form.

[redacted]

Q. Thank you. Now I'd like to direct your attention to Page 36 of the transcript, and the question that begins on Page 36, line 24.

Can you please review from there through Page 37, line 21, and let me know when you're ready.

A. Yes, I'm ready.

Q. Have you had a chance to review this portion of the transcript?

A. I have.

Q. Was the testimony that you

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provided accurate at the time of the hearing?

MS. RATHBUN: Object to form.

Same objection as before.

A. Yes, it was.

Q. And is that testimony still accurate today?

MS. RATHBUN: Same objections.

A. Yes, it's still accurate today.

[redacted]

MS. RATHBUN: Object to form.

[redacted]

Q. Okay. Then I'd like to direct your attention to Page 40. If you could please review the portion of the transcript that

Page 24

begins at Page 40, line 13, and runs through Page 41, line 7, and let me know when you're ready.

A. I've read the indicated area.

Q. Okay. Have you had a chance to review this portion of the transcript?

A. Yes, I have.

Q. Was the testimony that you provided accurate at the time of the hearing?

MS. RATHBUN: Objection. Same objections as before.

A. Yes, it was.

Q. And is that testimony still accurate today?

MS. RATHBUN: Same objection.

A. Yes, it is.

Q. In this portion of the transcript, when you referenced Illumina's -- I'm sorry, let me start again.

In this portion of the transcript when you referenced Illumina's highest throughput instrument, which instrument were you referring to?

MS. RATHBUN: Objection to form.

A. The NovaSeq 6000 platform.

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Q. Do you know whether it's possible to run two flow cells at once on the NovaSeq 6000 platform?

A. I do not.

Q. And is it your understanding that NovaSeq can produce up to 10 billion reads per run?

A. Correct. 10 billion single-ended reads. So the metric for comparison is single-ended reads, not paired ended.

Q. Do you know how many paired-ended reads the NovaSeq can -- how many reads per run?

A. Up to 20 billion paired reads.

Q. In the statistics that you provide in this portion of the transcript, are you referring to single-ended reads or paired-end reads?

A. I'm referring to single-ended reads.

Q. Okay. Thank you.

And is the 10 billion reads that you referred to for the NovaSeq, is that per run or per flow cell?

A. I'm not clear on that point.

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Originally I had believed it was per run.
Q. Okay. That's fine.
If you could then turn your attention to Page 52 of the transcript, and to the question that begins on Page 52, line 2, through Page 52, line 11. If you could just review that portion of the transcript, and let me know when you're ready.
A. I am ready.
Q. Have you had a chance to review that portion of the transcript?
A. I have.
Q. And is the testimony in that portion of the transcript, was that accurate at the time of the hearing?
MS. RATHBUN: Same objections.
MR. HARKRIDER: Object to form.
A. It was.
Q. And is that testimony still accurate today?
MS. RATHBUN: Same objection.
MR. HARKRIDER: Object to form.
A. It is.
Q. You mentioned that Thermo systems are generally suited to settings with smaller

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amount of patient samples; is that correct?
MS. RATHBUN: Misstates testimony. Objection to form. Same objections about the transcript, the IH transcript.
A. I'm sorry, Jordan, can you please repeat the question for me?
[redacted]
MS. RATHBUN: Object to form.
[redacted]
Q. What is your understanding of the number of patient samples that would be required to be sequenced for multi-cancer early detection tests?
MS. RATHBUN: Objection to form and foundation.

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A. Our understanding of that test environment is it's likely to require a very large number of patient samples to be sequenced, as you are doing what is called population-based screening.
So the test itself requires or is likely to require -- test environment is likely to require a large number of patient samples to be sequenced at any one time.
Q. Do you expect that multi-cancer early detection tests will primarily be run centralized facilities for the foreseeable future?
MS. RATHBUN: Object to form.
A. Yes. It's our understanding that they are likely to be run in centralized environments in the near future.
Q. And why do you believe that?
A. Aggregating the number of patients and the kind of test that the multi-cancer early detection is generally would require a large number of patients to be sequenced simultaneously.
So aggregating patients in a centralized environment is likely to be the

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most efficient way to operate that test.
[redacted]
MS. RATHBUN: Objection to form. Foundation.
[redacted]
Q. Okay. Then if I could direct your attention to Page 55 of the transcript. Specifically Page 55, line 25. If you could just review Page 55, line 25 through Page 57, line 1, and let me know when you're ready.
A. Yes, I've read that.
Q. And you've had a chance to review this portion of the transcript?
A. Yes, I have.
Q. Was the testimony in the transcript accurate at the time of the hearing?
MS. RATHBUN: Same objection as before.
A. Yes, it was.
Q. And is that testimony still

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accurate today?
MS. RATHBUN: Same objection.
A. Yes, it is.
[redacted]
MS. RATHBUN: Objection to form.
[redacted]
MS. RATHBUN: Object to form.
[redacted]
MS. RATHBUN: Object to form.
[redacted]
MS. RATHBUN: Objection to form
and foundation.
[redacted]
MS. RATHBUN: Objection to form.

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Foundation as well.
[redacted]
MS. RATHBUN: Objection to form.
Foundation.
[redacted]
Q. Okay. Thank you.
Then if I could direct your attention a little farther down Page 57 -- well, just to the next line.
So if you could please review Page 57, line 2, to Page 57, line 21, and let me know when you're ready.
A. I have read that section.
[redacted]
[redacted]
MS. RATHBUN: Objection to form and foundation.
[redacted].
Q. And for the Thermo instruments that you were referring to, were you talking about the GeneStudio?
MS. RATHBUN: Objection to form.
A. Correct, we are referring to the GeneStudio.
Q. Do you know the approximate run time of the NovaSeq if the NovaSeq is running at maximum throughput?
A. I believe it's 48 hours.
Q. And then, do you know if that run time is for a single flow cell?
MS. RATHBUN: Objection to form.
Foundation.
A. I do not have the answer to that.
Q. And what is the run time for a GeneStudio running at maximum throughput?
A. The sequencing process is two-and-a-half hours per run. But the full time for the workflow requires approximately 24 hours per run.

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Q. Even though the GeneStudio has a shorter run time than the NovaSeq, would you still have to run multiple GeneStudios simultaneously to generate output equivalent to a single NovaSeq?
MR. HARKRIDER: Objection to form.
MS. RATHBUN: Objection.
A. Yes, that's correct, you would have to run multiple units simultaneously to generate the equivalent output in the same time period.
Q. And is your best estimate for the number of GeneStudios that would have to be run simultaneously to produce the same output as a single NovaSeq, is it still about 100?
MS. RATHBUN: Object to form.
A. That was the estimate I gave, yes.
Q. And is that the estimate that you still believe is accurate today?
A. If I could just do some math. Yes.
Q. How did you calculate that?
A. 100 million reads multiplied by 100 instruments.
Q. And so the 100 million reads is

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referring to the number of reads on the GeneStudio; is that right?
A. Correct.
[redacted]
MS. RATHBUN: Object to form.
Misstates the testimony.
[redacted]
Q. Okay. Thanks.
If I could then have you turn to Page 59, line 24. And if you could review Page 59, line 24 through Page 60, line 7, and let me

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know when you're ready.
A. Yes, I've read that.
Q. Have you had a chance to review that portion of the transcript?
A. Yes, I have.
Q. Was that testimony accurate at the time of the hearing?
MS. RATHBUN: Same objection.
A. Yes, it was.
Q. And is that testimony still accurate today?
MS. RATHBUN: Same objection.
A. Yes, it is.
[redacted]
MS. RATHBUN: Objection to form.
Misstates testimony. And same objections regarding the IH transcript.
[redacted]

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[redacted]
MR. HARKRIDER: Objection to form.
[redacted]
Q. Okay. Thank you.
Then if you could turn to Page 67, line 7. If you could please review Page 67, line 7 through Page 68, line 3, and let me know when you're ready.
A. Yes, I'm ready.
Q. Have you had a chance to review that portion of the transcript?
A. Yes, I have.
Q. Was the testimony from this portion of the transcript accurate at the time of the hearing?
A. Yes, it was.
Q. And is that testimony still accurate today?
MS. RATHBUN: Objection to form.
Same objections.
A. Yes, it is.
Q. Is PCR well suited for multi-cancer early detection tests?

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MS. RATHBUN: Objection to form and foundation.
A. Generally, we would consider the answer to be no, for reasons of economics.
Q. What are the reasons of economics you're referring to?
A. Not able to generate sufficiently large number of data points at scale to make the test economic.
Q. Are there any other reasons why you believe PCR is not well suited for multi-cancer early detection tests?
A. That's the primary reason. There are other reasons that the equipment, scale, there are some other workflow-based reasons that would make it more challenging to implement a PCR-based work flow. The primary one would be scale and economics.
Q. How are the number of data points generated by PCR compared to the number of data points generated by NGS?
A. So PCR, the implementation I'm considering when we discussed PCR is either the detection of single nucleotide variants or other methylation states, and generally they

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have the ability to do very low numbers of those per unit amount of time or unit reaction. So it would be extremely challenging to scale that technology given the number of data points that are likely to be required for a multi-cancer early detection.
Q. Is PCR lower throughput than NGS?
MS. RATHBUN: Object to form.
A. Correct. Lower throughput.
Q. Is PCR generally used to detect unknown variants?
MS. RATHBUN: Object to form.
A. Generally not.
Q. Why not?
A. It requires the design of a primer, and therefore, a known sequence a priori to understand which variants you're detecting.
Q. What type of applications are PCR best suited for?
A. Best suited for small amounts of genotype. So discriminating single nucleotide polymorphisms or small numbers of gene expression measurements.
Q. Is PCR well suited for liquid

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biopsy?
A. In general, no. There is a version of PCR called digital PCR, which is more suitable. But general PCR is not considered to be widely used in that space, I would say.
Q. Why is that?
A. Again, for reasons of, you know, the number of data points that you require and the scale at which you can generate those data points. So throughput.
Q. Would digital PCR be well suited for multi-cancer early detection test application?
MS. RATHBUN: Objection to form and foundation.
A. Generally at this time, it's not considered to be very useful. I don't have a wide grasp of all use cases of that technology. But my understanding of the market is it's not widely used in that area.
Q. Are microarrays well suited for multi-cancer early detection tests?
MS. RATHBUN: Objection to form and foundation.

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A. Generally, no, is our view.
Q. Why is that?
A. Although they have the right number of data points and can generate a large number of data points, their throughput is relatively low compared to the highest throughput gene sequencing platforms.
Q. So microarrays have a lower throughput than NGS?
MS. RATHBUN: Objection to form.
A. In general, yes.
Q. What types of applications are microarrays best suited for?
A. Gene expression measurement and genotyping are considered the primary applications.
Q. Okay. If I could then direct your attention to Page 70, line 22. And if you could please review Page 70, line 22 through Page 71, line 5, and let me know when you're ready.
A. Sorry, which line?
Q. So that would be Page 70, line 22 to Page 71, line 5.
A. I'm ready.

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Q. Okay. Have you had a chance to review this portion of the transcript?
A. Yes, I have.
Q. Was the testimony accurate at the time of the hearing?
MS. RATHBUN: Objection.
A. Yes, it was.
Q. And is that testimony still accurate today?
MS. RATHBUN: Same objections.
A. Yes, it is.
[redacted]
MS. RATHBUN: Objection to form.
[redacted]
MS. RATHBUN: Objection to form.
[redacted]

[redacted]
Q. Okay.
MR. ANDREW: I'd like to take a short break. We have been going for about an hour now. Could we just have ten minutes; would that be all right, Dr. Felton?
THE WITNESS: Yes, that's great. Thank you.
MR. ANDREW: Off the record.
THE VIDEOGRAPHER: Does everyone consent to going off the record or does anyone object to going off the record?
MS. RATHBUN: No.
MR. HARKRIDER: No objection.
THE VIDEOGRAPHER: This marks the end of media number one. The time is 9:02 a m. We're off the record.
(Recess taken at 9:02 a m. and reconvening at 9:15 a m.)
THE VIDEOGRAPHER: This marks the beginning of media number two. The time is 9:15 a m. We are on the record.
BY MR. ANDREW:
Q. Thank you, Andy. That's all the

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questions I have for right now. I'm going to reserve the rest of my time.
MS. RATHBUN: Great. All right.
EXAMINATION
BY MS. RATHBUN:
Q. Dr. Felton, thanks again for being here today. My name is Anna Rathbun. As I mentioned earlier, I'm from Latham & Watkins and I represent GRAIL in this litigation.
A. Nice to meet you.
Q. Nice to meet you as well. So all of the rules that Mr. Andrew went through at the beginning apply to my questions as well.
Is that all right with you?
A. Yes, it's all right.
Q. Okay. Dr. Felton, can you please describe Thermo Fisher's sequencing business for us at a high level?
A. The sequencing business consists of platforms, reagents, software, and application tools that comprise what we call the Ion Torrent brand. And primarily that consists of the platforms that we described earlier in the testimony, the Genexus platform, the GeneStudio platform, and the PGM platform.

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Q. Does Thermo Fisher also have Ion Proton system?
A. Yes, we do.
Q. Thermo Fisher also has non-NGS technologies that it develops; isn't that right?
A. That is correct.
Q. Microarray technologies is one of those technologies; is that right?
A. That is correct.
Q. Can you explain, just for the record, the difference between microarray technologies and next-generation sequencing technologies?
A. Yes. Let me state that I'm not in the microarray business, and thus, part of the business that we are in does not have any technical development relationship with the microarray business.
But at a high level, microarrays have a series of DNA primers attached to a surface which it can be used to interrogate single-nucleotide variants or measure gene expression across typically thousands to tens of thousands to millions of markers at a time.

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Q. Thank you. Are you familiar with the term "liquid biopsy test"?
A. Yes, I am.
Q. What is a liquid biopsy test?
A. Generally considered to be a biological sample in a liquid form. So that's either a blood sample, a blood plasma sample, or a cerebrospinal fluid sample; a liquid sample as opposed to a solid sample, like a tissue biopsy.
Q. And liquid biopsy tests are one application of NGS technology; is that right?
A. They are.
Q. And when Thermo is referencing liquid biopsy that involve blood, does it refer to them at heme tests?
A. Generally we differentiate between heme and liquid biopsy. Heme refers to whole blood testing for blood-borne cancers. Whereas, liquid biopsies generally refer to for plasma-based testing for the presence of solid tumors.
Q. And Thermo Fisher's sequencing instruments can be used for liquid biopsy applications?

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A. Correct.
Q. And Thermo Fisher's sequencing instruments can be used for heme applications, correct?
A. Correct.
Q. Thermo Fisher's sequencers can be used to determine methylation patterns in circulating self-read DNA, correct?
A. So we can interrogate the methylation status, the methylation status of self-read DNA; that's correct.
Q. Now, Dr. Felton, previously today you used the term MCED or multi-cancer early detection. Do you remember that?
A. Yes, I do.
Q. And what do you understand multi-cancer early detection tests, or MCED, to mean?
A. Generally our understanding of that is that it's a test designed to assess the presence of a cancer at an early stage, measured on a standard Stage 1 to 4 -- so it would be Stages 1 and 2 -- circulating in a patient's body, and it would be regardless of the tumor of origin status. So that's the

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multi-cancer part of the multi-cancer early detection.
Q. Can you explain the "regardless of the tumor of origin status" part? What do you mean by that?
A. Whether it's a lung or a liver or another kind of solid organ cancer.
Q. Is it your understanding that a multi-cancer early detection test detects the tissue of origin for the cancer tumor?
MR. ANDREW: Object to form.
A. I don't know to that level of detail.
Q. To your knowledge, which companies are currently developing MCED tests?
A. To my knowledge, GRAIL, Freenome, Exact Sciences.
Q. So when you used the term "MCED tests," are you referring to those companies' tests as you understand them?
MR. ANDREW: Object to form.
A. Yes, in general.
[redacted]

[redacted]
MR. ANDREW: Objection. Compound.
[redacted]
Q. But Thermo Fisher sells reagents, primers, and other sequencing consumables, to clinical oncology test developers?
MR. ANDREW: Objection. Compound.
A. Yes. Thermo Fisher Scientific has a general reagent business and sells primers, reagents, and other materials, to all scientific developers, including early cancer detection.
[redacted]
Q. Do you know whether those companies make other clinical oncology tests as well?
MR. ANDREW: Objection.
A. No. Exact Sciences makes other clinical oncology tests. I do not know about GRAIL or Freenome.

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Q. What other clinical oncology tests does Exact Sciences make?
A. They have some oncology tests through their acquisition of Genomic Health, and they also have early detection via fecal blood testing.
Q. Are you familiar with MRD tests?
A. I'm familiar with the acronym MRD, if by that you mean measurable or residual disease.
Q. Yes, what's a measurable residual disease test?
A. Measurable residual disease test measures the presence of residual mutations in the circulating blood or plasma.
Q. Who are the -- sorry, strike that.
Which companies have MRD tests, to your knowledge?
A. The ones that I'm aware of are Natera. That's the one I can think of off the top of my head.
Q. Are you familiar with therapy selection tests?
A. Yes, I am.
Q. What are therapy selection tests?

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A. Therapy selection tests are designed to guide the implementation of patient therapies, in particular for cancer. So the mutations discovered in the test are directly related to the pharmaceutical therapy which is to be delivered to the patient.
Q. Which companies have therapy selection tests?
A. Ourselves and Illumina have the approved therapy selection tests. So FDA approved tests.
Q. Do other companies have therapy selection tests that are not FDA approved?
A. There are a number of tests that are implemented as laboratory developed, self-validated under CAP CLIA regulation in the U.S. and the equivalence in Europe and around the world. There are many.
Q. About how many, do you think there are?
A. At least greater than ten.
Q. And going back to our discussion about MRD tests earlier, and you mentioned Natera as a company that had MRD tests.
Were you referring to an

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FDA-approved MRD test there?
A. No. I was just referring to any MRD test.
Q. Okay. What's the importance of having FDA approval for Thermo Fisher's therapy selection tests?
A. FDA approval actually directly links the therapy from the pharmaceutical company to the patient testing, and allows the direct usage of the test for that environment, as well as the marketing of the assay for that usage.
Q. How does it affect the marketing of the assay for that usage?
MR. ANDREW: Objection. Form.
A. If it is not FDA approved for that usage, you cannot discuss the use of that test in a patient environment or as a direct therapy selection tool by regulatory rule.
[redacted].
Q. So I assume that -- well, strike that. I shouldn't assume.

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Does Thermo Fisher use its own sequencers for its therapy selection tests?
A. Yes, it does.
Q. And could developers of MRD tests use Thermo Fisher's sequencers for those tests?
MR. ANDREW: Object to form.
A. By "those sequencers," are you referring to the FDA-approved platform?
Q. No. Could developers of MRD tests use any of Thermo Fisher's sequencers for those tests?
MR. ANDREW: Object to form.
A. Yes, technically they could.
Q. Now, going back to the multi-cancer early detection test developers, are you aware that some MCED test developers use other technologies in addition to NGS sequencing for their tests?
MR. ANDREW: Object to form.
Calls for speculation.
A. I'm aware that other technologies are used in that environment.
Q. And which technologies are you aware of that are used in the MCED test environment?

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A. The one that I'm aware of, particularly around the Freenome test, which uses I believe a protein-based marker testing, but I do not know any details.
Q. Sitting here today, would you agree that we don't know which company's test, GRAIL, Exact Sciences or Freenome's tests, will be the most successful multi-cancer early detection test?
MR. ANDREW: Objection. Leading. Compound. Calls for speculation.
A. It's certainly true that we do not know who will be the most successful test.
Q. And we don't know if there's some other tests in development right now that will be even more successful than those three tests; isn't that right?
MR. ANDREW: Objection. Leading. Calls for speculation.
A. That I would agree that that is speculation. We do not know.
Q. We don't know which test, MCED test, will be preferred by doctors, do we?
MR. ANDREW: Objection. Leading, speculative.

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A. We do not.
Q. We don't know which tests, MCED tests, will be preferred by patients, do we?
MR. ANDREW: Objection. Leading. Calls for speculation.
A. Again, speculatively, but we don't know.
MS. RATHBUN: Just to address the leading objection. So, Mr. Andrew, it's my understanding Mr. Felton is on the FTC's witness list for the proceeding; is that correct?
MR. ANDREW: Mr. Felton appeared on the FTC's preliminary witness list. He's a third party.
MS. RATHBUN: Does the FTC consider or plan to call Mr. Felton at the proceeding?
MR. ANDREW: We have made -- I wouldn't be able to tell you that right now.
MS. RATHBUN: Okay. Well, obviously you can continue to make whatever objections you like, but we, given Mr. Felton is on the FTC's witness list, will continue to ask him questions in the way that we think appropriate for an adverse witness.

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MR. ANDREW: Okay. However, I will point out that neither Illumina nor GRAIL has established that Thermo or Dr. Felton is an adverse witness.
MS. RATHBUN: We can agree to disagree on that.
BY MS. RATHBUN:
Q. So, Dr. Felton, we don't know now which approach to detecting cancer early will be the best approach in terms of whether it's through an NGS-based technology or a protein-based technology or some other type of technology; isn't that right?
MR. ANDREW: Objection. Leading. Compound.
A. I do not know which is the best technology that will come to commercial success, correct.
Q. Okay.
MS. RATHBUN: I would like to ask the technician to please mark as Felton Exhibit 1 what is Tab 3 in exhibit

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share, please.
(Document marked as Felton Exhibit 1 for identification)
Q. Dr. Felton, do you see what's been marked as Felton Exhibit 1?
A. Yes, I see Exhibit 0001, Tab 3.
Q. Perfect.
MS. RATHBUN: For the record, this is a document Bates stamped Thermo-GRAIL_01662776.
Q. Dr. Felton, do you recognize this document?
A. Yes, I do.
Q. What is this document?
A. It's an e-mail between myself and my supervisor, Garret Hampton.
Q. Could you take a look at the bottom of the first page of Exhibit 1, your e-mail dated October 27, 2020, at 8:28 a.m.
Do you see that?
A. 8:28 or 8:38?
Q. I'm looking at the 8:28. It's right on the bottom of the page.
A. Yes.
Q. In that e-mail, first full

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paragraph, that first sentence you write:
"With early screening data frequently showing retrospective results, or prospective case controlled studies including known cancer patients, we believe large prospective multi-center registrational trials are ultimately needed in early detection."
Do you see that?
A. Yes, I do.
Q. What did you mean by that?
A. So I didn't write that sentence. That was a copy from another source.
Q. I see. Do you agree with that sentence?
A. Yes.
Q. And why do you agree with that sentence?
A. Multi-cancer early detection population screening levels is likely to require large clinical trials to generate both the clinical utility and clinical validity and evidence to support widespread usage.
Q. And is it, in your view -- has any multi-cancer early detection test obtained the

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validity and evidence to support widespread usage to date?
MR. ANDREW: Objection. Form.
A. I actually do not know in detail whether anyone achieved that status at this time.
Q. Do you know how long prospective multi-center registrational trials typically last?
MR. ANDREW: Objection. Speculation.
A. No.
Q. Do you know how expensive prospective multi-center registrational trials are?
MR. ANDREW: Objection.
A. Not in detail, no.
Q. Do you know if any MCED test developers have conducted prospective multi-center registrational trials?
A. I do not.
Q. Now, scrolling up from your e-mail that we just looked at, Garret Hampton responds on the chain. Who is Garret Hampton?
A. Garret Hampton is the division

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president of the clinical sequencing division.
Q. What are the responsibilities of the clinical sequencing division? What does that division do?
A. Clinical sequencing division is responsible for the development and commercialization of products for next-generation sequencing under the Ion Torrent brand.
[redacted]
Do you see that?
A. I'm sorry, is that the top of the e-mail or the bottom?
Q. It's just the very last clause, I think.
A. Yes, I see that.
[redacted]
MR. ANDREW: Objection. Form.
[redacted]
[redacted]
Do you see that?
A. Yes, I see that.
Q. Why did you decide -- strike that.
[redacted]
MR. ANDREW: Object to form.
[redacted]

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[redacted]
MR. ANDREW: Object to form.
[redacted]
MR. ANDREW: Object to form.
[redacted]

Q. The multi-cancer early detection space is an evolving space, isn't it?
A. Yes, I'm sure it is.
Q. Do you expect that companies developing multi-cancer early detection tests

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are constantly innovating those tests?
MR. ANDREW: Object to form.
A. Innovation is generally considered to be a part of all scientific technologies, so yes.
Q. Can Thermo's NGS sequencing platforms sequence 22 genes at 58 amplicons?
MR. ANDREW: Object to form.
A. Can you clarify the question, please, Anna? I'm not sure I understand it.
Q. Yeah. I'm just trying to understand if a test developer needed to interrogate 22 genes at 58 amplicons, whether they would be able to do it on a Thermo Fisher sequencer?
MR. ANDREW: Object to form.
Q. I may not be saying it correctly as a non-scientist.
A. That's okay. Do you mean 22 genes and 58 amplicons or 22 genes with 58 amplicons?
Q. Let's take both, because I'm not quite sure what I mean, honestly.
So can Thermo Fisher's sequencing platforms sequence 22 genes and 58 amplicons?
MR. ANDREW: Object to form.

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A. Yes. That would be possible.
Q. Can Thermo Fisher's sequencers sequence 22 genes with 58 amplicons?
MR. ANDREW: Object to form.
A. That is highly unlikely.
Q. Can Thermo Fisher's sequencing platforms sequence 16 genes and 61 amplicons?
MR. ANDREW: Object to form.
A. Yes, it could.
MS. RATHBUN: Can we please mark as Exhibit 2 -- well, actually, let me hold off on that for now. I'll come back to that.
Q. Can Thermo Fisher's NGS platforms perform a DNA methylation analysis?
A. Yes, it can.
Q. Can Thermo NGS platforms perform aneuploidy analysis?
A. Yes, it can.
Q. Did I pronounce that correctly?
A. You did.
Q. Okay. Good. Thank you.
Can Thermo Fisher's NGS platforms do fragmentation analysis?
A. Yes, they can.

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MS. RATHBUN: Can we mark as Felton Exhibit 2 Tab 4, please.
(Document marked as Felton Exhibit 2 for identification)
Q. Dr. Felton, do you see that?
A. Yes, I do.
Q. Dr. Felton, have you seen this document, exhibit -- marked as Exhibit 2 before?
A. I don't recall it.
Q. If you'd look at the bottom of the first page, do you see it was published in 2021 on behalf of the European Society For Medical Oncology?
A. Yes, I see that.
Q. And do you see that this article or letter to the editor is titled "Prevalence to ctDNA in early screen-detected breast cancers using highly sensitive and specific dual molecular barcoded personalized mutation assays"; do you see that?
A. Yes, I see that.
Q. Did what is ctDNA?
A. ctDNA is circulating tumor-derived DNA.

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Q. If you look in the middle of the first paragraph, there's a sentence that begins, "We used a newly developed sequencing technology."

Do you see that?

A. I see that.

Q. I will just read the full sentence.

"We used a newly developed sequencing technology (Ion AmpliSeq HD; Thermo Fisher Scientific, Waltham, Massachusetts) that uses dual unique molecular identifiers or barcodes to cluster 'families' of the same molecule ctDNA detection."

Do you see that?

A. I see it.

Q. What is Ion AmpliSeq?

A. AmpliSeq is a highly multiplied PCR approach to measure specific targets within the human genome.

Q. So if you look at the last paragraph on the first page of Exhibit 2, it says:

"In conclusion, ctDNA was detected

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in both stage 1 and stage 2 screen-detected BC using the personalized highly sensitive and specific assays. This approach was more successful than other studies looking at early-stage disease with plasma markers."

A. Yes, I see that.

Q. And then it goes on to say:

"To our knowledge, this is the first report detailing ctDNA detection in a true BC screening setting using any ctDNA technology."

Do you see that?

A. I see that.

Q. So Exhibit 2 indicates that Thermo's Ion AmpliSeq HD can be used in early screen detection of breast cancers, correct?

MR. ANDREW: Objection. The witness has said he's not familiar with the document, nor did he write it. Lacks foundation.

A. The authors of the article state that.

Q. And so -- strike that.

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Dr. Felton, would you agree that Thermo Fisher's sequencer -- strike that.

[redacted]

MR. ANDREW: Objection.

[redacted]

MR. ANDREW: Object to form. Speculation.

[redacted]

Q. But from what we've discussed already about Thermo Fisher's sequencers being able to detect methylation patterns, from being able to perform fragmentation analysis, an

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aneuploidy analysis, Thermo Fisher's sequencers are capable of conducting all of those analyses, correct?

MR. ANDREW: Objection. Form.

A. Thermo Fisher's systems are capable of conducting those analysis. Whether they are economic or scalable enough is a different question.

Q. Could Thermo Fisher's sequencers be economic or scalable enough if an MCED test developer was choosing to pursue a decentralized strategy as opposed to a centralized strategy?

MR. ANDREW: Objection. Compound. Calls for speculation.

A. It's possible that would choose to be the case, but we don't believe the market is going to evolve that way in the near-term.

Q. Do you know how the market will evolve in the long term?

A. No, we do not.

MS. RATHBUN: Let's please mark as Felton Exhibit 3 Tab 5.

(Document marked as Felton Exhibit 3 for identification)

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Q. So this exhibit, Felton No. 3, is Bates stamped Thermo-GRAIL_01155694.
Do you see that?
A. Yes, I do.
Q. Do you recognize this document?
A. Yes, I do.
Q. What is this document?
A. It's a clinical next-generation sequencing division strategic planning outline from October of 2020.
Q. And it uses the term "STRAP" on the first page. What does "STRAP" mean?
A. STRAP is strategic planner.
Q. Were you involved in creating this presentation?
A. Yes, I was.
Q. Let's go to slide 4 that ends in Bates stamp 01155697. Let me know when you're there.
A. Yes.

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Do you see that?
A. Yes.
Q. What is clinical oncology?
A. Clinical oncology in our definition is the routine use of next-generation sequencing to generate patient results as opposed to research results.
MR. ANDREW: Object to form.

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Do you see that?
A. Yes, I see that.
Q. Would MCED tests fit within Thermo Fisher's definition of clinical oncology?
A. MCED would fit in the definition of clinical oncology, yes.
A. Yes, I see that.
Do you see that?
A. Yes, I see that.
MR. ANDREW: Object to form.

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[redacted]

Do you see that?
A. Yes, I do.
[redacted]
MR. ANDREW: Object to form.
[redacted]

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MR. ANDREW: Object to form.
[redacted]
Q. If we could turn to slide 7. The first section of this slide 7 in Exhibit 3 says "Business Performance and Outlook."
Do you see that?
A. Yes, I do.
Q. The first bullet there says:
[redacted]

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Do you see that?
A. Yes, I do.
[redacted]
MR. ANDREW: Object to form.
[redacted]
Do you see that?
A. I do.
[redacted]

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Do you see that?
A. Yes, I do.
[redacted]
Do you see that?
A. Yes, I do.
Q. Can you explain that bullet to me? What does this mean?
A. The customer segments that we have been successful in have been in the routine clinical oncology setting, and therefore, we have been acquiring and retaining more customers in that segment rather than in the research segment, because the platforms we have are better suited to that market segment than a purely research-based segment.
Q. The bullet underneath that says:

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"Recently launched Genexus platform is the next step in this journey and on roadmap to become leader in IVD Oncology."

Do you see that?

A. Yes, I do.

Q. What is IVD oncology?

A. IVD oncology refers to regulated tests that are approved by regulatory bodies around the world. So the U.S. FDA; EU, European Union; China; Japan. In vitro diagnostic is the acronym.

[redacted]

MR. ANDREW: Object to form.

[redacted]

Q. Now let's turn to page -- let's turn to slide 11, please.

Do you see slide 11, Bates ending in 704, entitled "Summary of Key Trends"?

A. Yes, I do.

Q. And on the left-hand side there's a column, and I'd like you to take a look at the row that says "Technology/Innovation."

A. Okay.

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[redacted]

Do you see that?

A. Yes, I do.

Q. Over in the right-hand column it says "Business Response."

Do you see that?

A. Yes, I do.

[redacted]

A. Yes, I do.

[redacted]

MR. ANDREW: Object to form.

[redacted]

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Q. Dr. Felton, does Thermo Fisher believe that today -- sorry.

Sitting here today, does Thermo Fisher believe that the market for multi-cancer early detection tests will be larger than all other clinical oncology tests combined?

MR. ANDREW: Objection. Calls for speculation.

A. We do not know that. We speculate it's going to be a large market, but we don't know that it's going to overtake all other markets.

[redacted]

MR. ANDREW: Objection. Calls for speculation. Leading.

[redacted]

[redacted]

MR. ANDREW: Objection. Leading. Calls for speculation.

[redacted]

Q. Is Thermo Fisher concerned that -- well, strike that.

Let's look at slide 25, Bates number ending in 718.

Do you see slide 25?

A. Yes, I do.

Q. And this slide is called "Expand to Applied: Where We Should Play (sic)."

Do you see that?

A. Yes, I do.

Q. Can you explain this slide to me?

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A. Yes. This slide is an assessment of market segments by size. The size relates -- the size of the circle relates to the overall size of the market, and the axes refer to the degree of differentiation of our products in that market segment; on the Y axis and on the X axis, how much development is required related to our technology platforms.

[redacted]

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[redacted]

MR. ANDREW: Objection. Mischaracterizes the testimony.

[redacted]

Q. Let's look at slide 26. It ends in 719. [redacted]

Do you see that?

A. Yes.

[redacted]

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[redacted]

A. Correct.

MR. ANDREW: Objection to form.

Q. And just for the record, what is NIPT testing?

A. NIPT testing refers to non-invasive prenatal testing of pregnant women via detection of circulating tumor-derived DNA in the blood.

Q. How many competitors does Thermo Fisher have in the NIPT testing space?

A. Multiple. I don't know the exact number.

Q. Is it more than ten?

MR. ANDREW: Object to form.

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A. I would guess around that number.

Q. Okay. And is one of those competitors Illumina?

A. Yes, it is.

[redacted]

MR. ANDREW: Objection. Leading.

[redacted].

MR. HARKRIDER: We have been going I think for I think a little bit over an hour. Do you think we can take a break slightly before 1:30?

MS. RATHBUN: Yes. I just have a few more slides and then we'll be done with this document and we can take a break.

MR. HARKRIDER: Okay, good.

BY MS. RATHBUN:

Q. Let's look at Page 31 which ends in 724. This slide is entitled "Financial Summary."

Do you see that?

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A. Yes, I do.

A. Yes, I do.

MR. ANDREW: Objection. Form.

Do you see that?

A. Yes, I do.

MR. ANDREW: Objection. Leading.

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MR. ANDREW: Objection. Leading.

Q. Let's look at Page 64. Scroll down and I'll give you the Bates. The Bates ending in 759.

Do you see that slide, Dr. Felton?

A. Yes.

Q. And this slide is titled "NGS Market Growth By Competitor (2015-2019)."

Did I read that correctly?

A. Yes, I see that.

Q. And if you look on the right-hand side of this slide, it says, "Share Gain (Loss)."

Do you see that?

A. Yes, I do.

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MS. RATHBUN: All right. I think this is a good time to take a break.

MR. HARKRIDER: Do you know how much longer you're going to be going after lunch?

MS. RATHBUN: I think I might have an hour. Probably not so much, but I'd like to leave myself that.

MR. HARKRIDER: Okay, great. So why don't we come back at --

THE VIDEOGRAPHER: Do you folks want to go off the record?

MR. HARKRIDER: Yes. Sure. Will 2:15 give you enough time, Andy, or do you need until 2:30?

THE WITNESS: Yes.

MR. HARKRIDER: Okay. Great. Why don't we come back at 2:15 if that works

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for everyone.
THE WITNESS: That's 11:15 California time, right?
MR. HARKRIDER: 2:15 is 11:15, right.
THE VIDEOGRAPHER: Does anybody object to going off the record now?
MR. ANDREW: No.
MS. RATHBUN: No.
THE VIDEOGRAPHER: This is the end of media number two. The time is 10:28 a m. We are off the record.
(Luncheon recess taken at 10:28 a m.)

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A F T E R N O O N S E S S I O N
(Whereupon proceedings resumed at 11:16 a m.; appearances same as noted)
THE VIDEOGRAPHER: This marks the beginning of media number three. The time is 11:16 a.m. We are on the record.
BY MS. RATHBUN:
Q. Thank you. Dr. Felton, welcome back.
[redacted]
MR. ANDREW: Objection to form.
[redacted]

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Q. Why has Thermo Fisher been able to increase its market share in the clinical oncology segment?
MR. ANDREW: Objection. Form.
A. Our belief is that we have developed systems, software and reagents that are applicable for routine use. Each case is in clinical oncology, and we have, therefore, attracted and retained customers at a higher rate.
Q. What do you mean "applicable for routine use"?
A. Routine use we define as patient-based reporting of routine testing results, primarily for those in the therapy selection space.
Q. Why do you think Thermo Fisher has been better than Illumina at attracting and retaining customers at a higher rate in the clinical oncology segment?
MR. ANDREW: Objection. Mischaracterizes the testimony.
A. So we believe that we have been successful in that space given the features that we have developed, both in the assays and

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requiring small amounts or minimal amounts of sample, the turnaround time to the result, and the simple work flows that we employ.
Q. What types of features has Thermo Fisher developed that have made it successful in the clinical oncology space?
A. There are a number of things related to the platform itself. So the platforms have minimal hands-on time.
So, in particular, the library prep part of the NGS workflow has a low hands-on time and can be easily augmented. The systems themselves hands-on time is low, and we also automate the process of generating results for the users in that clinical oncology routine pathology setting.
[redacted]
MR. ANDREW: Objection. Form.
[redacted]

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[redacted]

MR. ANDREW: Objection to form.

[redacted]

Q. Are there any other companies developing sequencers who are trying to come onto the market currently?

MR. ANDREW: Objection. Form.

A. We are aware of a number of companies who are trying to develop sequencing platforms in the market, yes.

Q. Which companies are those?

A. I think I've got three examples. Omniome, Ultima and Apton BioSystems.

Q. And how long -- sorry, let me start over.

When do you anticipate Omniome's

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platform will enter the market?

MR. ANDREW: Objection. Calls for speculation.

A. I don't know the answer to that question.

Q. Do you think it will be over the next one, two, three years?

MR. ANDREW: Objection. Calls for speculation.

A. My guess would be likely in the next three years, but I don't know in detail.

Q. What about Ultima's platform, when do you believe they will come to market?

MR. ANDREW: Objection. Calls for speculation.

A. I don't know the answer to that one.

Q. Do you believe it will be within the next one to three years?

MR. ANDREW: Same objection.

A. Again, likely, but unknown to us.

Q. What about Apton, how long before Apton's platform enters if market, do you think?

MR. ANDREW: Objection. Calls for

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speculation.

A. I don't know.

Q. Would it be within the next one to three years?

MR. ANDREW: Same objection.

A. Same answer. Likely, but we don't know in detail.

Q. Do you view Omniome, Ultima and Apton as potential competitors to Thermo Fisher in the NGS instrument market?

MR. ANDREW: Objection. Compound.

A. Yes, should they be successful in commercializing a platform, they would be a competitor.

Q. All three of them would be competitors if they're successful in commercializing; is that right?

A. Correct.

Q. Do you view Omniome, Ultima and Apton as potential competitors to Illumina in the NGS instrument market?

MR. ANDREW: Objection. Compound.

A. Yes, provided they would go to commercial release, then we would view them as being competitors.

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Q. In your view, is a company only a competitor after it achieves a commercial release of a product?

MR. ANDREW: Objection. Form.

A. That's a difficult one to answer. They can still be a competitor without anything on the market. But from a commercial sense, they're not really competing unless they have a product to sell.

Q. Okay.

MS. RATHBUN: Can we please mark as Exhibit 4 Tab 7.

(Document marked as Felton Exhibit 4 for identification)

A. Yes, I see it.

Q. For the record, this is Bates stamped Thermo-GRAIL_00183972.

Dr. Felton, do you recognize this document?

A. I'd like to take a minute to look through it, please.

Q. Sure. Go ahead.

A. I recognize some of it. I don't recall the whole document.

Q. Do you know if you had any part in

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creating this document?
A. There are some pieces that I know I created.
Q. Okay. Which pieces did you create, just generally?
A. The slide, Page 6 and 7, I know, were created by me.
Q. Take a look at slide 8 ending in Bates 979.
A. Yes, I see that.
Q. Can you explain to me what the slide shows?
A. It shows the NGS sequencing market really divided into two distinct spaces, one being focused on so-called targeted sequencing that deals with small and midsized gene panels. And then the second part of the market focused on large gene panels, whole genome sequencing, whole exome sequencing and the like, currently dominated by Illumina and BGI with some other players potentially coming to the market.
Q. So what is a targeted panel?
A. A targeted panel is an assay designed to interrogate a restricted set of genes or a portion of the genome.

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Q. And targeted panels can be used in clinical oncology applications, correct?
A. Correct.
Q. So, for example, a company developing multi-cancer early detection test knew which set of genes or portion of the genome it wanted to interrogate, it could use a targeted panel for that, couldn't it?
MR. ANDREW: Objection. Calls for speculation.
A. If the answer could be defined within a targeted portion of the genome, then, yes, that's true.
Q. Would you agree that as test developers learn more about which markers in the blood are most relevant for multi-cancer early detection tests, they can move towards targeted panels?
MR. ANDREW: Objection to form.
A. Not having a great deal of knowledge of how that market defines what a large panel is, I don't know the answer to that.
Q. But if the multi-cancer early detection test, again, knew which set of genes

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it wanted to focus on, it could target those genes in its panel, correct?
MR. ANDREW: Objection.
A. That is correct.
Q. So if multi-cancer early detection test developers used more targeted panels, then they could fall within the sequencers on the left-hand side of this slide; is that right?
MR. ANDREW: Objection. Form.
A. So technically if they had interrogated a small region of the genome, yes, they could use the sequencers on that side to determine that answer. That still would not potentially make it an economic or viable solution, depending on how many patient samples need to be interrogated at one time.
Q. And so, if fewer patient samples needed to be interrogated at one time for an MCED test, would that make it more likely that an MCED test developer or -- sorry, let me start that again.
If fewer patient samples needed to be interrogated at one time for an MCED test, would that make it more likely that Thermo Fisher sequencers could be used to run

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the MCED tests?
MR. ANDREW: Objection. Calls for speculation.
A. Speculating that it would be able to use a small number of patient samples, that is technically possible, but that's not the way we believe the market will evolve.
Q. Do you think that it will be important for MCED test developers to eventually decentralize their tests and make them closer to the patients?
MR. ANDREW: Objection. Form.
A. We do not know the answer to that.
Q. Do you think that would be a good thing?
MR. ANDREW: Objection. Form.
A. Cancer tests closer to the patient are generally a good thing. That is our view on all types of cancer testing in the market.
Q. But right now it's too early to know which way the market will develop; is that right?
A. That is correct.
Q. Now, we have been talking about high throughput sequencers and how high

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throughput sequencers may or may not be more appropriate for running tests that have more patients, correct?

A. Yes, we have been talking about that.

Q. If you could turn to slide 3 on Exhibit 4 in Bates ending 974.

A. Sorry, apologies. Slide 3?

Q. Yeah, slide 3 --

A. Page 3?

Q. 3, yeah. The title is "Competitors market share by technology: NGS research & clinical."

Do you see that?

A. Yes, I see that.

Q. Now, if you look on the right-hand side, the bottom corner, it Says "key factors moderating growth include."

Do you see that?

A. Yes.

Q. And the first bullet there says:

"Excess capacity on the existing installed base with approximately 1/3 of labs running their instruments at only 20 to 50 percent full capacity (mostly

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for Illumina)."

Do you see that?

A. Yes, I see that.

[redacted]

MR. ANDREW: Objection. Form.

[redacted]

Q. Why is that a factor moderating the growth of -- let me strike that.

Is that a factor that moderates the growth of Illumina's market share?

MR. ANDREW: Objection. Form.

A. It would be a factor that would moderate any company's growth share, because presumably it's directly linked to utilization of the platform. When the platform is 100 percent utilized, you then need to purchase more platforms.

[redacted]

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[redacted]

MR. ANDREW: Objection to form.

[redacted]

Q. Is it important for Thermo Fisher's commercial strategy that its platforms are sort of right sized for its customers?

MR. ANDREW: Objection to form.

A. Can you clarify that question for me? I just want to make sure I understand it.

Q. Sure. Well, is it economically efficient for a customer using Illumina's sequencers to be running those sequencers at 50 percent capacity?

MR. ANDREW: Objection. Form.

A. So the capacity utilization question is a function of both the actual number of samples or the assays that the customer has, and the manpower they have to run the system, depending on how many times they can turn it over during a given period of time.

So its dependent on both elements,

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whether it's the staff are available to run it multiple times per unit time and the capacity can be filled up.

[redacted]

MR. ANDREW: Objection. Form.

[redacted]

Q. And Thermo Fisher also has a range of platforms with different outputs; is that right?

A. That is true, but the range of outputs is much less than the range of Illumina's outputs.

[redacted]

Page 106

Q. Okay.
MS. RATHBUN: Could we mark as Exhibit 5 Tab 8, please.
(Document marked as Felton Exhibit 5 for identification)
Q. Do you see Exhibit 5?
A. Yes, I do.
Q. This is Bates stamped Thermo-GRAIL_00036643, and it is a presentation titled "CSD - Strategy and Bus Dev Review" dated March 20, 2020; is that right?
A. That is correct.
Q. Are you familiar with this document?
A. Yes, I am.
Q. Did you help create this document?

Page 107

A. No, I didn't.
Q. How are you familiar with this document?
A. From review of the document with the authors.
Q. I'd like to turn to Page 20. Let me get there and I'll give you the Bates number. The Bates ending in 662.
A. Yes, I see the page.
Q. And this slide is called "NGS Platform Companies: Closed and Late Stage Deals," correct?
A. Yes, it is.
Q. Can you describe this slide for me?

Page 108

Page 109

Q. Let's look at Page 24, which ends in Bates 666.
A. Yes, I see it.

Page 110

[redacted]

How are ISPs used in the NGS sequencing workflow?

A. Ionosphere particles, the ISPs, are used to attach DNA fragments that are subject to clonal magnification and then sequencing.

Q. I'd like to direct your attention to slide 28.

A. Yes, I see that.

Q. The title, just for the court reporter, this is 670 is the Bates number.

[redacted]

Is that right?

A. That's correct.

[redacted]

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Q. If you could scroll back up to the Page 26, and that's the page ending in 668.

A. Yes, I see that.

[redacted]

Do you see that?

A. Mm-hmm.

[redacted]

Q. And do you see in the sort of second paragraph there it says:

"NGS system with goal of high S/N (to enable higher accuracy, lower cost)."

A. Yes.

Q. What does "S/N" mean?

A. Signal-to-noise ratio.

Q. Why does a high signal-to-noise ratio enable higher accuracy and lower cost?

A. Accuracy is a function of noise in the sequencing signal. So lower noise means higher accuracy, and therefore, less sequencing to get the same quality of sequencing read.

[redacted]

Do you see that?"

A. Yes, I see it.

[redacted]

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[redacted]

Do you see that?

A. Yes, I see that.

[redacted]

MS. RATHBUN: All right. Let's mark as Exhibit 6, Tab 9, please.

(Document marked as Felton Exhibit 6 for identification)

Q. I have it. Do you have it?

A. Yes.

Q. This is Bates stamped

[redacted]

Do you see that?

A. Yes, I do.

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Q. Are you familiar with this presentation?
A. Yes, I believe so.
Q. Let's look at Page 3 of this document, ending in the Bates 371?
A. Yes, I see.
Q. The second section on this slide -- well, so let me back up.

[redacted]

Do you see that?
A. Yes.

[redacted]

Do you see that?
A. Yes, I do.

[redacted]

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[redacted]

Do you see that?
A. Yes, I do.
Q. What does that mean?

[redacted]

Page 117

[redacted]

Do you see that?
A. Yes, I do.
Q. What is "SSF"?
A. SSF is South San Francisco.

[redacted]

Q. Okay. Thank you.

[redacted]

MR. ANDREW: Objection. Form.

[redacted]

MR. ANDREW: Objection. Calls for speculation.

[redacted]

MS. RATHBUN: Okay. Let's go ahead and mark as Exhibit 7 Tab 12, please.
(Document marked as Felton Exhibit 7 for identification)
MS. RATHBUN: For the record, this is a presentation produced natively with the Bates stamp Thermo-GRAIL_00308779. It's titled, "Partnering Strategy; March 2020."
Q. Do you see that?
A. Yes, I do.
Q. Are you familiar with this presentation?
A. Yes, I am.
Q. Did you help create this presentation?
A. Yes, I did.

[redacted]

Do you see that?
A. Yes, I do.

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MR. ANDREW: Objection to form.

Do you see that?

A. Yes, I do.

MR. ANDREW: Objection to form.

Do you see that?

A. Yes, I do.

MR. ANDREW: Objection. Form.

Do you see that?

Page 120

A. Yes, I do.

Q. And since the transaction between GRAIL and Illumina was announced, have companies developing NGS instruments received funding?

MR. ANDREW: Objection. Form.

A. Is your question have any NGS development instruments companies received funding?

Q. Since the acquisition was announced, yes.

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A. Yes, they have.

Q. Which companies have received funding since the transaction was announced?

A. I don't know in detail, but I assume that it's true that funding has been going to companies.

Q. Why do you assume that it's true that funding has been going to companies developing NGS platforms?

A. Our belief is that the market views the technology landscape is still being in development, and therefore, there's still opportunity for investment and new technologies.

Q. Are you aware of the company GenapSys?

A. Yes, I am.

Q. And GenapSys is developing an NGS platform; is that right?

MR. ANDREW: Objection. Form.

A. They are developing an NGS platform, yes.

Q. Are you aware that last week GenapSys raised $70 million in its Series D financing round?

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MR. ANDREW: Objection. Form.
A. No, I actually wasn't. I was on vacation last week, so I missed that.
Q. Lucky you. Now you know.
Are you aware of a company called Singular Genomics?
A. Yes, I'm aware of that.
Q. And Singular Genomics is also developing an NGS platform; is that right?
A. I believe so.
Q. And this week Singular Genomics raised over a quarter-of-a-billion dollars in its IPO; is that right?
MR. ANDREW: Objection to form.
A. I was not aware of that.
Q. Now, based on your experience, investors invest when they think a product will become valuable, right?
MR. ANDREW: Objection. Form.
A. I would speculate investors invest in things that they can get a return on their money for, yes.
Q. Thermo Fisher has obtained premarket access approval for its PMG Dx platform, right?

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A. That would be PGM Dx platform.
Q. PGM, thank you.
If I used PMA as a shorthand for premarket access approval, do you understand what I mean?
A. Yes. If by that you mean Class 3 FDA premarket approval, yes.
Q. And Thermo Fisher developed the first NGS-based multi-market companion diagnostic test for the oncology market, correct?
MR. ANDREW: Objection to form.
A. Thermo Fisher developed the first FDA-approved multi-market companion diagnostic for the NGS market, correct.
Q. But there are no MCED tests that have received PMA approval, correct?
A. Not to my knowledge.
Q. And it's not entirely clear to you what the FDA approval path would be for MCED tests, is it?
MR. ANDREW: Objection. Leading. Foundation.
A. So we are not aware of what FDA's view is on the approval process for

Page 124

multi-cancer early detection-based tests.
Q. Are you aware if the FDA has any approval process for multi-cancer early detection-based tests?
MR. ANDREW: Objection. Speculation.
A. Actually, no, I'm not.
[redacted]
Q. Dr. Felton, are you familiar with Strata Oncology?
A. Yes, I am.
Q. And what's Strata Oncology?
A. Strata Oncology is a small, I guess you would class them as a clinical reference lab, who executes oncology testing in a centralized facility.

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Q. What type of oncology tests does Strata Oncology have?
A. They primarily utilize a 300 to 500 gene panel for solid tumor testing.
[redacted]
MS. RATHBUN: Can we please mark as Exhibit 8 Tab 8. Let me make sure. We might have already marked Tab 8. Okay. Sorry.
Q. Can you look at Exhibit 5, please. Slide 12, which is the Bates ending in 654.
[redacted]
Do you see that?
A. Yes, I do.
[redacted]
Q. Turning to the next slide,
[redacted]

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Do you see that?
A. Yes.

Do you see that?
A. Yes.
Q. What is "CPI"?
A. I actually don't know what the acronym stands for, but the intent is the current inflation rate.

MR. ANDREW: Objection. Form.

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MR. ANDREW: Objection. Form.

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MR. ANDREW: Objection. Form.

Do you see that?
A. I do.

MR. ANDREW: Objection. Form.

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22 Do you see that?
23 A. Yes, I see that.

17 MR. ANDREW: Objection. Form.

23 MR. ANDREW: Objection to form.
24 Objection; calls for a legal conclusion.

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7 MR. ANDREW: Objection. Form.

12 MS. RATHBUN: Let's go to slide

16 Q. Do you see that?
17 A. Yes.

21 Do you see that?
22 A. Yes, I do.

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Do you see that?
A. Yes, I do.

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Do you see that?
A. Yes, I do.

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MR. ANDREW: Objection. Form.

Do you see that?
A. Yes, I do.

[redacted]

Do you see that?
A. Yes, I do.

[redacted]

MR. ANDREW: Objection. Form.

[redacted]

MR. ANDREW: Objection. Form.

[redacted]

MS. RATHBUN: We have been going for a little bit over an hour, but I just have one more section to go. Do you want to take a quick break now or maybe we can take a break after I'm done?
THE WITNESS: I can keep going.
MS. RATHBUN: Okay. Great. Is that all right with everybody else?
BY MS. RATHBUN:
Q. All right. So I'd like to mark as Exhibit 8, Tab 15, please.
(Document marked as Felton Exhibit 8 for identification)
Q. Let me know when you have it, Dr. Felton.
A. Yes. I have it now.
MS. RATHBUN: This is an e-mail Bates stamped Thermo-GRAIL_00265386.

Q. Dr. Felton, do you recognize this e-mail chain?
A. I don't specifically remember it.
Yes, I've got knowledge of the recipients of the e-mail, but I just don't remember it in great detail.
Q. Okay. Well, let's look at the second to last page first. There's an e-mail from David Schodin, dated March 31, 2018, to Harvey, Kevin.
Kevin Harvey rather. Sorry. Who is Kevin Harvey?
A. I actually don't recall.
Q. Do you see he has a Thermo Fisher e-mail address?
A. Yes, I do.
Q. Do you know who David Schodin is?
A. I don't know that either. I don't know.
Q. Do you see on the cc line he has a Natera e-mail address?
A. Yes, I do.

[redacted]

[redacted]

MR. ANDREW: Objection. Form.
A. That's correct.
Q. Then scrolling up to the next e-mail in time, it's from Abhay Kumar to you on April 6, 2018.
Do you see that one?
A. Yes, I do.

[redacted]

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[redacted]
MR. ANDREW: Objection.
Foundation.
A. Sorry, Anna, can you please repeat that?
[redacted]
MR. ANDREW: Objection. Lacks foundation. Calls for speculation.
[redacted]
[redacted]
MR. ANDREW: Objection. Form.
[redacted]
MR. ANDREW: Objection. Form.
[redacted]
Q. Thermo Fisher would be open to entering into discussions about how test developers could reconfigure their assays to run on Thermo Fisher's platforms, correct?
MR. ANDREW: Objection. Leading. Calls for speculation.

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[redacted]
Q. Dr. Felton, you don't think that Illumina's acquisition of GRAIL will impact innovation in the MCED testing space, do you?
MR. ANDREW: Objection. Form.
A. We believe that we continue innovation in the MCED testing space.
Q. Why is that?
A. It's a large potential market, and there are a number of players who wish to enter it.
Q. And so, those players will continue to innovate in order to enter the market in economical ways, correct?
MR. ANDREW: Objection. Form.
A. We assume they would have to innovate to enter in an economical way.
Q. You do not believe that the transaction between Illumina and GRAIL will make it harder for Thermo Fisher to enter the MCED space, correct?
MR. ANDREW: Objection. Form.

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A. No, I don't believe it would make it any harder or easier for us.
MS. RATHBUN: All right. I think we can go off the record.
THE VIDEOGRAPHER: Does anybody object to going off the record? This marks the end of media number three. The time is 12:38 p.m. We are off the record.
(Recess taken at 12:38 p.m. and reconvening at 1:01 p m.)
THE VIDEOGRAPHER: This marks the beginning of media number four. The time is 1:01 p m. We're on the record.
EXAMINATION
BY MR. ANDREW:
Q. Hello again, Dr. Felton. I just had some more questions to ask you.
If you could please, I'd like to refer you back to Exhibit 1 that GRAIL's counsel introduced.
A. Yes, I have it up.
Q. So this is an e-mail, and I believe you were asked some questions about the e-mail exchange between you and Ira Herbst and

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Garret Hampton, among others; is that right?
A. That's correct.
Q. So if you look at Page 1 of Exhibit 1, and that's Bates numbers ending 776. About midway down the page, there's an e-mail from Garret Hampton to you that was sent at 8:35 a m. on Tuesday, October 27th.
Do you see that?
A. Yes.
Q. In that e-mail, Garret Hampton writes, the third sentence reads:
"Regardless, seems like early detection will be centralized for quite a long time."
What's your understanding of what Garret Hampton meant by that?
A. My understanding of that was he was referring to the early detection market is likely to use a centralized testing model as opposed to a decentralized testing model for a long period of time to come.
Q. And do you agree with that statement?
A. Yes, I agree with that statement.
Q. For how long do you think early

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detection is likely to use a centralized model?
MS. RATHBUN: Objection to form. Calls for speculation.
A. In our opinion, at least the next probably five years.
Q. And why is that?
A. The platforms that most of the centralized test developers are utilizing are better suited to a centralized test market, and the marketing conditions are such that it's more advantageous for them to operate in a centralized testing environment.
Q. Why do you think it will take five years for that to change?
MS. RATHBUN: Objection to form. Calls for speculation.
A. Our guess would be that it's going to take time for the various technologies to come to the market and for it to evolve to a point where it's suitable for deployment at a decentralized setting.
Q. And would a multi-cancer early detection test require FDA approval to be deployed in a decentralized setting?
MS. RATHBUN: Objection to form.

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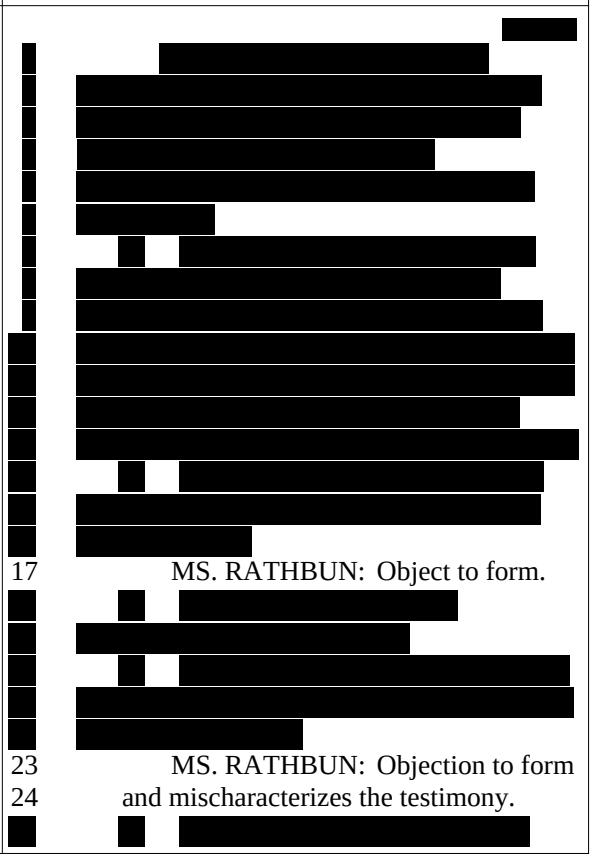
Calls for speculation.
A. Our assumption is that it would, just like any other cancer testing, decentralized would require FDA approval of some kind. Although we don't know exactly what that would look like.
Q. And just to be clear, when Garret Hampton uses "early detection" in this e-mail, your understanding is that he's referring to multi-cancer early detection; is that right?
MS. RATHBUN: Objection. Calls for speculation. Lack of foundation.
A. Yes. My assumption is he's referring to early cancer detection, multi-cancer early detection.
Q. And that's what you're referring to now as well, right?
A. Yes. Correct.



MS. RATHBUN: Object to form.

MS. RATHBUN: Objection to form and mischaracterizes the testimony.

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[redacted]

Q. Okay. And then your -- oh, I'm sorry, just to clarify. I think you said earlier that Garret Hampton is your supervisor; is that right?

MS. RATHBUN: Object to form.

A. That's correct.

Q. And so do you report directly to Garret Hampton?

A. I do.

Q. What is his title?

A. Division president/clinical sequencing division.

Q. In the e-mail above in which you respond to Garret Hampton, and that's from 8:38 a.m. that same day, it reads:

[redacted]

MS. RATHBUN: Objection to form.

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[redacted]

Q. Okay. Thanks. You can set Exhibit 1 aside.

Now I wanted to go back and look at Exhibit 3 that was introduced by counsel for GRAIL. So if you could just open that up, please.

A. Yes, it's open.

Q. So if you could just scroll down to slide 25, please.

A. Yes, I have that.

Q. Okay. Do you see slide 25?

For the court reporter, that's Bates numbers ending 718.

So before I refer specifically to the slide, I believe you were asked some questions earlier about Thermo's plans to expand its offerings in the clinical oncology

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testing segment; is that right?

A. Yes, I was.

[redacted]

MS. RATHBUN: Object to form.

[redacted]

MS. RATHBUN: Object to form.

[redacted]

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Q. What is heme oncology?

A. Heme oncology is the development of tests for hematological cancers, including leukemias and lymphomas.

Q. If I could then refer you to slide 25 in Exhibit 3, below the chart there is some language in bold which reads:

"We are playing in segments that are aligned with our sequencing capabilities."

Do you see that?

A. Yes, I do.

[redacted]

MS. RATHBUN: Object to form.

[redacted]

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[redacted]

MS. RATHBUN: Objection to the form. Foundation.

[redacted]

aside.

I have some questions now related to the sequencing platforms that you were asked about earlier. I believe you mentioned five different sequencing platforms that are currently in development; Omniome, Element, Apton, Ultima and GenapSys. Is that the list?

A. I think those are the ones we discussed, yes.

Q. I'd like to go through each of them in turn. I can start with Ultima.

Are you familiar with Ultima's current development status?

A. No, not in detail.

Q. Do you know Ultima's projected timeline for a commercial launch of its

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sequencing platform?

A. No, we do not. I do not.

Q. Do you know whether Ultima has placed any prototype instruments with potential customers?

A. I do not.

Q. Do you know whether Ultima is hitting its technical development milestones currently?

A. I do not. We can only infer from their purchase of materials from us, but we do not know in detail.

[redacted]

Q. Do you know whether Ultima has run into any technical hurdles in development of its NGS platform?

A. I can assume there are always

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technical hurdles in the developing of a sequencing platform. I don't know of specific hurdles that they have encountered.

Q. To date, do you know what accuracy Ultima has been able to achieve on its NGS platform?

A. I don't.

Q. And are you aware of the reads per run that Ultima has been able to achieve on its NGS platform?

A. No. I'm aware that they have a 500 gigabase, I believe, target, but I don't know how many reads they are anticipating.

Q. Do you know whether they have been able to hit that target or not?

A. I do not.

Q. Okay. So the next company that you mentioned or that you spoke about with GRAIL's counsel is Omniome. Are you familiar with Omniome's current development status?

A. I'm more familiar than I am with Ultima.

Q. What can you tell me about Omniome's current development status?

MS. RATHBUN: Objection to form.

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A. I believe they are targeting in the approximately two-year timeframe to come to market commercialized, and that they potentially have some early collaborations with customers on the ground.

Q. And so is that two years from now?

MS. RATHBUN: Objection to form.

A. Yes. Approximately.

Q. For Omniome, do you know if they have placed any prototype instruments with potential customers?

A. I don't know for sure. I believe they may have some collaborations, but I don't know if that involves placing of instruments with customers or not.

Q. Do you know whether Omniome is hitting its technical development milestones?

A. I do not.

Q. Do you know whether Omniome has run into any technical hurdles in development of its instrument?

A. Again, the same answer, Jordan. I assume all technical developments of this nature include hurdles that have to be overcome. I don't know specifically which ones

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that Omniome has encountered that were significantly challenging to them.

Q. Do you know whether Ultima has encountered any delays in its development timeline?

A. I believe they have, but I don't know in detail.

Q. What makes you say that you believe that they have?

A. They have had some significant changes in management over the last year or so, which makes us believe that they're probably not hitting their timelines.

Q. Are you aware of whether they actually revised their timeline?

MS. RATHBUN: Objection.

A. I am not.

[redacted]

Q. Okay. The next company that I wanted to run through these questions for is Element.

Are you familiar with Element's current development status?

A. No, I'm not.

Q. Do you know Element's projected timeline for commercial launch of its sequencing platform?

A. No, I do not.

Q. And do you know whether Element has placed any prototype instruments with potential customers?

A. I do not.

Q. Do you know whether Element has been able to hit its technical development milestones?

A. I don't.

Q. Do you know of any specific technical difficulties that Element has had in development of its instrument?

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A. No, I do not.

Q. Do you know what accuracy Element has been able to achieve to date on its instrument?

A. No, I do not.

Q. And do you know any of the technical specifications related to Element's NGS platform?

A. No, I don't recollect any of them.

Q. Okay. Next is Aptum or Apton. I'm sorry. Is it A-p-t-o-n?

A. Yes. Apton.

[redacted]

[redacted]

Q. Do you know any of the technical specifications related to Apton's NGS sequencing platform?

A. Not in detail, no.

Q. Do you know whether Apton has encountered any delays in its development timeline?

A. I'm sure they have, but I don't know what they are in detail.

Q. And do you know what accuracy Apton has been able to achieve on its NGS platform?

A. No.

Q. Okay. Then I believe the last company is GenapSys. Are you familiar with

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GenapSys' current development status?
A. Yes. GenapSys is a commercialized platform.
Q. Okay. Do you know the technical specifications on GenapSys' platform?
A. Yes. They have talked about a 1 million, if I recollect correctly, a 1 million, 16 million read chip, potentially up to, if I recollect correctly, something like a 48 million read chip that is all we've publicly heard about.
Q. Is the GenapSys platform an NGS platform?
A. Yes, it is.
Q. Sorry, I see that we might be running into the time that you need to jump to your call. So maybe we can take that break now.
A. That would be great. Thank you very much.
THE VIDEOGRAPHER: Does anyone object to going off the record?
Okay. This marks the end of media number four. The time is 1:26 p m. We are off the record.

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(Recess taken at 1:26 p.m. and reconvening at 2:02 p.m.)
THE VIDEOGRAPHER: This marks the beginning of media number five. The time is 2:02 p.m. We are on the record.
BY MR. ANDREW:
Q. Okay. Dr. Felton, I just have a few more questions for you. If you could please bring up Exhibit 4 that was introduced by GRAIL's counsel, and go to slide 7. That's Bates numbers ending 978.
A. Yes, I have that.
Q. You created this slide; is that correct?
A. No, I didn't personally create this slide.
Q. Okay. Do you know what this supplied shows?
A. Yes. It attempts to show the difference between targeted sequencing and whole genome or large panel sequencing, and the company is involved in each segment.
Q. Do you know who did create the slide?
A. I believe this was for software

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roadmap discussion, so I'm not clear who developed the slide. It's one of our software team leads.
Q. Did you review this slide?
A. Yes.
Q. The columns from left to right show the different types of assays or tests that Thermo does; is that right?
MS. RATHBUN: Objection. Form.
A. I'm sorry, Jordan, by columns you mean?
Q. Let me rephrase it. At the top of the chart there are various columns. One is labeled "Solid Tumor," the next is "Liquid Biopsy, Small and Mid Size Panels."
Do you see that?
A. I apologize. I was looking at the wrong slide. That's why I was confused. So I am now on slide 7. This slide I did create. I apologize.
Q. Okay. I thought you had said that previously.
Can you tell me what this slide shows, please?
A. This slide attempts to show

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different segments of the conical oncology market space and the kinds of assays that might be run on oncology on each of the different columns, and on the Y axis is the number of reads a particular assay requires in that space. And there are some examples of assays within the body of the chart itself.
Q. Okay. So the different columns are basically different segments; is that right?
A. Different types of tests, which somewhat equate to market segments, but not entirely.
Q. And do the number of reads required generally go up as you move left to right in this chart?
A. Yes. Generally they move up as you go from left to right.
Q. And then there are a few dotted horizontal lines on the chart. Can you tell me what those represent?
A. Yes. There are a few dotted lines, and they represent the limits of the technology that we have on the Ion platform is one of them. There are also the limits as we

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understand them today, for example, for Illumina's NovaSeq platform as well as the MGI platform. So they indicate where technology platforms limits of supportable read numbers are within the space.

Q. MGI, is that a BGI platform?

A. MGI, that's a BGI platform; that's correct.

[redacted]

Q. What did you mean with that statement, "Above this line Economics per sample are difficult for Ion Torrent"?

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A. The price per sample we would have to charge, and the numbers of samples we could run on a particular chip make the economics very difficult for labs to be able to operate in that space.

So as the size of the assay increases, you can put less patient samples on a chip, and consequently that assay costs more money.

At some point the economics don't become -- become unfeasible for the lab to operate in the range, based on the typical reimbursement that they get per sample.

Q. And so, on this chart, that limit is actually below 100 million reads?

MS. RATHBUN: Object to form.

A. Yes, that's what we're showing. It is somewhat below 100 million reads, and the example on the far left of the comprehensive panel would be it's right on the border of what's economically feasible, we believe.

Q. Where would the Genexus platform fit on this chart?

A. Genexus platform currently generates in the range of 50 to 80 million

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reads per run. [redacted]

Q. The second column at the top reads

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"Liquid Biopsy Small and Mid Size Panels."

Do you see that?

A. Yes, I do.

Q. What are liquid biopsy small and midsize panels?

MS. RATHBUN: Object to form.

A. Liquid biopsy panel is a panel designed to interrogate circulating tumor or self-read derived DNA or RNA.

Our definition of small and midsize is in the 100 gene or less range, typically in the 50 gene for us. Liquid biopsy panels require much more sequencing depth than a typical cancer panel.

Q. Would multi-cancer early detection tests fall under the category of small and midsized liquid biopsy panels?

MS. RATHBUN: Objection to form and foundation. Calls for speculation.

A. We are not 100 percent clear. We're not clear on what form they will eventually take. We believe it's likely they will be somewhat more targeted than, for example, what we would classify as a large gene panel, but we are not clear what is the current

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landscape of tests and how much genomic footprint they cover.
Q. Are multi-cancer early detection tests listed anywhere on this chart?
A. No, they are not.
Q. Where would multi-cancer early detection tests fall on this chart if they were on there?
MS. RATHBUN: Object to form, foundation, and calls for speculation.
A. So that's somewhat hard to anticipate, I think. They would fall potentially in that 10 to 100 million read range, but we are not clear on what the technology requires for the number of reads on a multi-cancer early detection platform, and that's for an individual sample.
So at scale, you have to think about running hundreds to thousands of those samples, so your read requirement scales by hundreds or thousands to generate the right economics in a centralized testing facility.
Q. Do you know where the Galleri test that GRAIL is developing would fall?
MS. RATHBUN: Objection to form.

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Foundation. Calls for speculation.
A. No, I do not.
Q. And, practically, do you expect multi-cancer early detection tests to be done at scale?
MS. RATHBUN: Object to form. Calls for speculation.
A. It's our belief that it's likely to be done in a centralized facility at scale given the requirement to screen large numbers of patients.
Q. If you could just scroll down, then, to the next slide, slide 8.
A. Yes.
Q. We had discussed this particular slide previously. Based on your understanding of multi-cancer early detection tests, where do you believe those would fit on this chart?
MS. RATHBUN: Object to form. Foundation. Calls for speculation.
A. Our belief would be that we more likely would be on the left-hand side of this, the vertical line that's shown, the vertical dotted line, rather than the right-hand side.
Q. What types of tests are on the

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right side of this dotted line?
A. What we would classify as large gene panels, whole genome sequencing, whole exome sequencing, or transcriptome sequencing.
Q. But again, the Ion Torrent instrument is on the left side of this chart; is that right?
A. Correct.
[redacted]

[redacted]

Q. And so, when you said that multi-cancer early detection tests would fall on the left side of the chart, do you mean as a technical concept?
A. Yes. I think there were a few technical concepts that we are aware of in this space: One is to use targeted panels, and the other one are to use low coverage whole genome, which would fall on the right-hand side.
We do not know which one will be the predominant use case in the market.
Q. So which of the platforms listed in this chart here do you think would be economical to deploy multi-cancer early detection tests in a centralized environment?
MS. RATHBUN: Objection to form. Foundation. Calls for speculation.
A. The only ones that we believe would be relevant would be Illumina and BGI.
[redacted]
MS. RATHBUN: Objection to form.
[redacted]

[redacted]

MS. RATHBUN: Object to form.

[redacted]

MS. RATHBUN: Object to form.

[redacted]

MS. RATHBUN: Object to form.
Foundation. Calls for speculation.

[redacted]

[redacted]

MS. RATHBUN: Objection to form.
Foundation. Calls for speculation.

[redacted]

MR. ANDREW: Okay. Thank you. That's all the questions that I have.
MS. RATHBUN: Shall we go off the record for just two minutes so I can confer with Defendants, and then we'll see if we have anything more for you, Dr. Felton.
THE WITNESS: Sure. No problem.
MR. ANDREW: And just for the record, I will reserve my time in case there is any additional questions from the other side.

THE VIDEOGRAPHER: Is everyone ready to go off the record now?
MR. HARKRIDER: Yes. Off the record.
THE VIDEOGRAPHER: This marks the end of media number five. The time is 2:23 p.m. We are off the record.
(Recess taken at 2:23 p.m. and reconvening at 2:27 p.m.)
THE VIDEOGRAPHER: This marks the beginning of media number six. The time is 2:27 p m. We are on the record.
MS. RATHBUN: Thank you, Dr. Felton, for your time. The Defendants have no further questions.
THE WITNESS: Thank you. I appreciate it.
MR. ANDREW: And thank you for your time from the FTC side as well. No further questions.
THE WITNESS: Appreciate it.
THE VIDEOGRAPHER: Before we conclude, Michael, did you want to get orders on the record?
MR. HARKRIDER: We would like a

copy.
THE VIDEOGRAPHER: Would you also like a copy of the video?
MR. HARKRIDER: Sure. Why not.
THE VIDEOGRAPHER: Standard is fine for that. You don't need it expedited; is that correct?
MR. HARKRIDER: No, that's correct.
THE VIDEOGRAPHER: Thank you. And for the other individuals, Ms. Van Dine, did you want a copy of the video?
MS. VAN DINE: I defer to Anna on that one.
MS. RATHBUN: Yes, we'll take a copy please.
THE VIDEOGRAPHER: So Ms. Rathbun, standard order is fine?
MS. RATHBUN: Yes.
THE VIDEOGRAPHER: And I'll put no order for Ms. Van Dine individually.
Mr. Huth, did you want a copy of the video?
MR. HUTH: I don't do a lot of these depositions. I'm happy to go with

whatever the standing order is.
Anna, do you know if we have been requesting separate copies of the video?
MS. RATHBUN: I don't think so. I think one should be fine, so we can take that.
MR. HUTH: One should be fine for Defendants.
MS. RATHBUN: Right. Yeah, Alexus, we only need one. I don't need a separate one.
THE VIDEOGRAPHER: Thank you. And Mr. Andrew, standard is fine for your video.
MR. ANDREW: Standard is fine. I don't know what we have been ordering. Whatever the standing order is that we have with you guys, I'll just go with that. I don't want to get in trouble here.
THE VIDEOGRAPHER: Okay. Anything else before we go off or is everyone ready to conclude?
MS. RATHBUN: The Defendants are ready to conclude.

MR. ANDREW: As are we.
THE VIDEOGRAPHER: Thank you. We are off the record at 2:29 p m. and this concludes today's testimony given by Andrew C. Felton, Ph.D. The total number of media units used was six, and will be retained by Veritext Legal Solutions.
(Time Noted: 2:29 p.m.)

CERTIFICATE

I, Michael O'Connor, Registered Merit Reporter/Certified Realtime Reporter, do hereby certify:
That ANDREW C. FELTON, Ph.D., the witness whose testimony is hereinbefore set forth, was duly sworn by me and that such testimony is a true and accurate record of my stenotype notes taken in the foregoing matter to the best of my knowledge, skill and ability.
IN WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal this 2nd day of June 2021.

Michael O'Connor
MICHAEL O'CONNOR, RMR, CRR, CRC
Notary Public

My Commission expires:
November 22, 2022

John Harkrider, Esquire
jharkrider@axinn.com

RE: Federal Trade Commission v. Illumina/Grail
6/2/2021, Andrew C. Felton , Ph.D. (#4596003)
The above-referenced transcript is available for review.

Within the applicable timeframe, the witness should read the testimony to verify its accuracy. If there are any changes, the witness should note those with the reason, on the attached Errata Sheet.

The witness should sign the Acknowledgment of Deponent and Errata and return to the deposing attorney. Copies should be sent to all counsel, and to Veritext at cs-midatlantic@veritext.com

Return completed errata within 30 days from receipt of testimony.

If the witness fails to do so within the time allotted, the transcript may be used as if signed.

Yours,
Veritext Legal Solutions

Federal Trade Commission v. Illumina/Grail
Andrew C. Felton , Ph.D. (#4596003)

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Andrew C. Felton , Ph.D. Date

Federal Trade Commission v. Illumina/Grail
Andrew C. Felton , Ph.D. (#4596003)

ACKNOWLEDGEMENT OF DEPONENT

I, Andrew C. Felton , Ph.D., do hereby declare that I have read the foregoing transcript, I have made any corrections, additions, or changes I deemed necessary as noted above to be appended hereto, and that the same is a true, correct and complete transcript of the testimony given by me.

_____ _____
Andrew C. Felton , Ph.D. Date
*If notary is required

SUBSCRIBED AND SWORN TO BEFORE ME THIS
_____ DAY OF _____, 20___.

_____
NOTARY PUBLIC

b

Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

DISCLAIMER: THE FOREGOING FEDERAL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS
COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

Veritext Legal Solutions is committed to maintaining the confidentiality of client and witness information, in accordance with the regulations promulgated under the Health Insurance Portability and Accountability Act (HIPAA), as amended with respect to protected health information and the Gramm-Leach-Bliley Act, as amended, with respect to Personally Identifiable Information (PII). Physical transcripts and exhibits are managed under strict facility and personnel access controls. Electronic files of documents are stored in encrypted form and are transmitted in an encrypted fashion to authenticated parties who are permitted to access the material. Our data is hosted in a Tier 4 SSAE 16 certified facility.

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Public

PUBLIC VERSION

EXHIBIT C
Proposed Order

UNITED STATES OF AMERICA
FEDERAL TRADE COMMISSION
OFFICE OF ADMINISTRATIVE LAW JUDGES

In the Matter of **Illumina, Inc.,** **a corporation,** **and** **GRAIL, Inc.,** **a corporation,** **Respondents.**	Docket No. 9401

[PROPOSED] ORDER

Upon consideration of non-party Thermo Fisher Inc.'s ("Thermo Fisher") Motion for *In Camera* Treatment, and finding good cause, it is HEREBY ORDERED that the following documents or portions of documents are to be provided *in camera* treatment for a period of ten years from the date of this Order:

Exhibit	Description	*In Camera* Treatment
PX8444	November 25, 2019 Presentation: Turing dPCR Market Opportunity Assessment	Full
PX8649	March 17, 2021 Cover email from Ira Herbst to Andrew Felton re Recent strategic planning documents. Attachments included in the exhibit are Valhalla CEO discussion 11222020 final.pptx; NIPT scenarios v10 2021.01.27.pptx; 2020 CSD STRAP v23 2020.10.28.pptx; and 2020 CSD STRAP vPre-Read for CLT.pptx	Full (Except for PX8649-017, PX8649-021, PX8649-024, and PX8649-236, which receive indefinite treatment due to R&D sensitivity)
PX8650	March 18, 2019 cover email from Peter Vuong to Andrew Felton re Offcite_Roadmapping.pptx	Full (Except for PX8650-011 to PX8650-016, which receive indefinite treatment due to R&D sensitivity.)

	Attachment included in the exhibit is March 2019 Presentation: A Look into the Future	
RX2728	March 20, 2020 Presentation: CSD - Strategy and Bus Dev Review	Full
RX2729	March 2019 Presentation: A Look into the Future	Full (Except for RX2729-9 to RX2729-14, which receive indefinite treatment due to R&D sensitivity.)
RX2730	April 10, 2018 Email from Suresh Pisharody to Joydeep Goswami re Re: Interested in speaking	Full
RX2732	October 9, 2019 Presentation: IVD Strategy	Full
RX2735	October 30, 20 Presentation: Clinical Next-Generation Sequencing Division STRAP 2020	Full
RX2737	October 27, 2020 Email from Luca Quagliata to Garret Hampton et al re RE: EXAS -- Flash I Acquisition of Thrive Enhances EXAS' Leading Position in Cancer Screening Mkt I Outperform	Partial

It is further HEREBY ORDERED that the following documents or portions of documents are to be provided *in camera* treatment indefinitely:

Exhibit	**Description**	***In Camera* Treatment**
PX8649	March 17, 2021 Cover email from Ira Herbst to Andrew Felton re Recent strategic planning documents. Attachments included in the exhibit are Valhalla CEO discussion 11222020 final.pptx; NIPT scenarios v10 2021.01.27.pptx; 2020 CSD STRAP v23 2020.10.28.pptx; and 2020 CSD STRAP vPre-Read for CLT.pptx	Partial (PX8649-017; PX8649-021; PX8649-024; PX8649-236) (Note: Full *in camera* treatment for 10 years non-R&D materials in this document. See "Strategic" Table.)

PX8650	Mar. 18, 2019 cover email from Peter Vuong to Andrew Felton re Offcite_Roadmapping.pptx Attachments in the exhibit include March 2019 Presentation: A Look into the Future	Partial (PX8650-011 to PX8650-016) (Note: Full *in camera* treatment for 10 years non-R&D materials in this document. See "Strategic" Table.)
RX2729	March 2019 Presentation: A Look into the Future	Partial (RX2729-9 to RX2729-14) (Note: Full *in camera* treatment for 10 years non-R&D materials in this document. See "Strategic" Table.)
RX2731	March 2020 Presentation: Partnering Strategy; March 2020	Full
RX2733	August 13, 2020 Presentation: [redacted]	Full
RX2734	February 12, 2021 Presentation: Project Starship - Equity Investment Overview	Full
RX2736	April 12, 2021 Term Sheet-Commercial Agreement between Thermo Fisher and Strata	Full
RX2738	April 30, 2020 Thermo Fisher Supply Agreement with Strata	Full

It is further HEREBY ORDERED that the following excerpts from the Declaration and transcripts of the deposition and investigative hearing of Andrew Felton, PX07070 and PX07097/RX3823, are to be provided *in camera* treatment indefinitely:

Mar. 23, 2021 Andrew Felton Investigative Hearing (PX7070) R&D Testimony Cite	**June 2, 2021 Andrew Felton Deposition (PX7097/RX3823) R&D Testimony Cite**	**Declaration Cite** *(Page & paragraph number)*
8:16-8:19; 36:10-37:21; 38:1-38:3; 38:14- 38:18; 55:8-55:12; 55:17-55:20; 55:22-55:23; 56:1-57:1	21:23-21:25; 22:2-22:5; 22:7-22:13; 30:4-30:7; 30:9-30:22; 30:24-31:8; 31:10-31:17; 31:20-31:24; 32:2-	Paragraph 10 limited portions

	32:10; 32:13-32:14; 93:17-93:20; 93:22-94:7; 94:9-94:12; 117:21-117:23; 118:1-118:3; 118:5-118:21; 118:24-119:1; 119:3-119:10; 119:13-119:16; 119:18-119:24; 120:2-120:9; 125:5-125:8; 125:15-125:16; 125:19-125:22; 125:24-126:1; 126:4-126:13; 126:20-126:22; 126:24-127:24; 128:1-128:6; 128:8-129:8; 129:10-129:20; 129:23-130:21; 130:24-131:16; 131:18-131:22; 131:25-132:6; 132:8-132:11; 132:13-132:15; 132:18-133:20; 133:23-134:3; 134:6-135:12; 135:14-136:12; 136:15-137:20; 137:23-138:9; 138:12-138:15; 138:17-139:3; 139:5-139:6 ; 168:1 -168:24	Paragraph 13 limited portions

Finally, it is further HEREBY ORDERED that the following excerpts from the transcripts of the deposition and investigative hearing of Andrew Felton, PX07070 and PX07097/RX3823, are to be provided *in camera* treatment for a period of 5 years from the date of this Order:

Mar. 23, 2021 Andrew Felton Investigative Hearing Transcript (PX7070):	**June 2, 2021 Andrew Felton Deposition (PX7097/RX3823) Testimony Cite**
26:9-26:15; 26:22-27:12; 27:25-28:15; 32:12-32:25; 34:1-34:21; 34:25-35:15; 38:5-38:9; 48:15-49:3; 51:3-51:8; 57:2-60:18; 68:7-69:13; 70:3-71:5	23:9-23:11; 23:13-23:22; 27:7-27:9; 27:11-27:19; 29:2-29:5; 29:8-29:10; 32:23-33:1; 33:4; 35:4-35:6; 35:9-35:21; 36:14-36:19; 36:23-37:2; 37:4-37:5; 42:12-42:15; 42:17-42:21; 42:23-43:1; 48:23-49:2; 49:4; 49:14-49:18; 52:20-52:23; 60:10-60:15; 60:22-60:23; 60:25-61:14; 61:18-61:20; 61:22-62:6; 62:8-62:16; 62:18-62:20; 68:3-68:6; 68:8-68:17; 68:20-68:21; 70:21-70:25; 71:8-71:11; 71:13-71:25; 72:3-72:7; 72:12-72:14; 72:16-72:21; 72:24-73:12; 73:14-74:4; 74:7-74:14; 74:16-74:25; 75:2-75:16; 75:23-75:25; 76:3-76:5; 76:7-76:14; 76:17-76:25; 77:3-77:12; 78:13-78:14; 78:16; 79:1-79:5; 79:12-79:17; 79:19-79:21; 79:23-79:25; 80:13-80:18;

	80:21-81:7; 81:10-81:14; 82:9-83:4; 83:7-83:19; 83:21-83:22; 83:25-84:11; 85:5-85:9; 85:11; 86:2-86:5; 86:7-86:23; 86:25-87:9; 87:12-87:13; 87:15-87:24; 88:1-88:6; 88:8-88:11; 89:1-89:7; 91:11-91:22; 91:24-91:25; 103:4-103:7; 103:9-103:11; 103:23-104:1; 104:3-104:6; 105:4-105:8; 105:10-105:15; 105:22-106:9; 107:16-109:2; 109:6-110:7; 110:19-110:21; 110:24-111:6; 111:9-111:25; 112:4-112:5; 112:8-112:11; 113:1-113:3; 113:6-113:12; 113:20-113:23; 114:9-114:11; 114:14-114:21; 114:24-115:2; 115:7-115:11; 115:13-115:15; 115:17-115:23; 116:1-116:8; 116:12-117:2; 115:9-115:11; 120:10-120:15; 124:8-124:17; 140:23-141:9; 141:17-142:1; 142:6-142:10; 142:13-143:2; 143:4-143:11; 143:13-143:19; 144:1-144:4; 148:19-149:16; 149:18-149:22; 149:25-150:2; 150:18-150:24; 151:1-151:8; 152:3-152:13; 152:15-152:21; 152:23-152:25; 153:13-153:15; 153:17-154:5; 154:8-154:9; 155:13 - 155:21; 158:18 - 159:4; 160:13 - 161:10; 166:9 - 167:21; 172:9-173:1; 173:21-173:23; 173:25-174:12; 174:14-174:22; 174:24-175:4; 175:7 176:2; 176:5-176:13

ORDERED:

_____
The Honorable D. Michael Chappell
Chief Administrative Law Judge

Date: _____