ARROWHEAD RESEARCH CORP
Form 10-K
December 14, 2007
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UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, DC 20549

FORM 10-K

(Mark One)

x **ANNUAL REPORT UNDER SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended September 30, 2007.

¨ **TRANSITION REPORT UNDER SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from to

Commission file number 000-21898

ARROWHEAD RESEARCH CORPORATION

(Exact name of registrant as specified in its charter)

Delaware	**46-0408024**
(State of incorporation)	**(I.R.S. Employer Identification No.)**

201 S. Lake Avenue, Suite 703

Pasadena, California 91101

(626) 304-3400

(Address and telephone number of principal executive offices)

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

Title of each class	Name of each exchange on which registered
Common Stock, $0.001 par value	**The NASDAQ Global Market**

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

None

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

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

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

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

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, or a non-accelerated filer. See definition of accelerated filer and large accelerated filer in Rule 12b-2 of the Exchange Act.

Large accelerated filer ¨	Accelerated filer x	Non-accelerated filer ¨

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

Issuer s revenue for its most recent fiscal year: $1,208,022.

The aggregate market value of issuer s outstanding Common Stock held by non-affiliates was approximately $149,788,033 based upon the bid price of issuer s Common Stock on March 30, 2007.

As of December 11, 2007, 38,610,420 shares of the issuer s Common Stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant s definitive proxy statement, expected to be filed with the Commission no later than January 28, 2008, for the registrant s 2008 Annual Meeting of Stockholders to be held March 13, 2008, are incorporated by reference into Part III of this report.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains certain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934, and we intend that such forward-looking statements be subject to the safe harbors created thereby. For this purpose, any statements contained in this Annual Report on Form 10-K except for historical information may be deemed to be forward-looking statements. Without limiting the generality of the foregoing, words such as may, will, expect, believe, anticipate, intend, could, estimate, or continue or the negative or other variations thereof or comparable terminology are intended to identify forward-looking statements. In addition, any statements that refer to projections of our future financial performance, trends in our businesses, or other characterizations of future events or circumstances are forward-looking statements.

The forward-looking statements included herein are based on current expectations of our management based on available information and involve a number of risks and uncertainties, all of which are difficult or impossible to predict accurately and many of which are beyond our control. As such, our actual results may differ significantly from those expressed in any forward-looking statements. Factors that may cause or contribute to such differences include, but are not limited to, those discussed in more detail in Item 1 (Business) and Item 1A (Risk Factors) of Part I and Item 7 (Management s Discussion and Analysis of Financial Condition and Results of Operations) of Part II of this Annual Report on Form 10-K. Readers should carefully review these risks, as well as the additional risks described in other documents we file from time to time with the Securities and Exchange Commission. In light of the significant risks and uncertainties inherent in the forward-looking information included herein, the inclusion of such information should not be regarded as a representation by us or any other person that such results will be achieved, and readers are cautioned not to place undue reliance on such forward-looking information. Except as may be required by law, we undertake no obligation to revise the forward-looking statements contained herein to reflect events or circumstances after the date hereof or to reflect the occurrence of unanticipated events.

WHERE YOU CAN FIND MORE INFORMATION

As a public company, we are required to file annual, quarterly, and current reports, proxy statements and other information with the SEC. You may read and copy any of our materials on file with the SEC at the SEC s Public Reference Room at 100 F Street, N.E., Washington, DC 20549, as well as at the SEC s regional office at 5757 Wilshire Boulevard, Suite 500, Los Angeles, California 90036. Our filings are available to the public at the SEC s website at www.sec.gov. Please call the SEC at 1-800-732-0330 for further information on the Public Reference Room. We also provide copies of our Forms 8-K, 10-K, 10-Q, Proxy Statements and Annual Reports at no charge to investors upon request and make electronic copies of our most recently filed reports available through our website at www.arrowres.com as soon as reasonably practicable after filing such material with the SEC.

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PART I

ITEM 1. BUSINESS

Description of Business.

Unless otherwise noted, (1) the term Arrowhead Research refers to Arrowhead Research Corporation, a Delaware corporation formerly known as InterActive Group, Inc., (2) the terms Arrowhead, the Company, we, us, and our, refer to the ongoing business operations of Arrowhead Research and its Subsidiaries, whether conducted through Arrowhead Research or a subsidiary of the company Arrowhead Research, (3) the term ARC refers to Arrowhead Research Corporation, a privately-held California corporation with which Arrowhead Research consummated a stock exchange transaction in January 2004, and (4) the term Common Stock refers to Arrowhead Research s Common Stock and the term stockholder(s) refers to the holders of Common Stock or securities exercisable for Common Stock.

The Company was originally incorporated in South Dakota in 1989, and was reincorporated in Delaware in 2000 under the name InterActive, Inc. (InterActive). On January 12, 2004, InterActive consummated a stock exchange transaction with the owners of ARC, a privately-held California corporation. This transaction is referred to as the Share Exchange. Upon consummation of the Share Exchange, the owners of ARC acquired approximately 89% of the Common Stock of the Company. InterActive changed its name to Arrowhead Research Corporation and ARC was subsequently dissolved. The Company s principal executive offices are located at 201 South Lake Avenue, Suite 703, Pasadena, California 91101, and its telephone number is (626) 304-3400. As of September 30, 2007, Arrowhead Research Corporation had 12 full-time employees at the corporate office and 46 full-time employees at its Subsidiary companies.

Overview

Arrowhead Research Corporation is a development stage nanotechnology company commercializing new technologies in the areas of life sciences, electronics, and energy. Arrowhead s mission is to build value through the identification, development and commercialization of nanotechnology-related products and applications. The Company works closely with universities to source early stage deals and to generate rights to intellectual property covering promising new nanotechnologies. Arrowhead takes a portfolio approach by operating multiple subsidiaries which allows the pursuit of multiple opportunities and diversifies risk. Currently, Arrowhead operates five majority owned Subsidiaries (the Subsidiaries) focused on developing and commercializing nanotechnology products and applications and has funded a number of prototype development efforts in leading university labs in exchange for the exclusive right to license the technology developed in such labs.

Nanotechnology

Nanotechnology involves the investigation and design of materials and devices at the atomic and molecular levels. The engineering of materials and devices at the nanoscale is expected to unleash fundamental paradigm shifts in a range of different industries. Large multinational corporations are investing heavily in commercialization efforts and the federal government has funded an aggregate of $8 billion for nanoscale science and engineering projects since 2001. Already, nanomaterials are being used to make stain resistant and wrinkle free clothing, lighter and stronger baseball bats, and more durable epoxies and paints. Although nanotechnology is likely to impact virtually every industry ranging from textiles to aerospace, we believe that the most far-reaching impacts of nanoscience will be in life sciences/pharmaceuticals, electronics, and energy.

Nanotechnology is contributing to advancements in life sciences, including applications in drug development and delivery, diagnostics, stem cell therapeutics, and personalized medicine. Recent breakthroughs in life sciences such as the sequencing of the human genome, the discovery of RNA interference (RNAi), and advances in stem cell techniques are enabling new understanding of diseases and approaches to treatments. Nanotechnology involves engineering on a molecular level.Biological processes happen at the molecular scale. Nanotechnology combines the traditional disciplines of chemistry, materials science, physics, and biology and enables the manipulation of matter in powerful new ways. Using the knowledge from all of these disciplines,

medicines and diagnostic agents are being designed to interact with cells and tissues with a high degree of specificity and functionality.

The electronics industry is leveraging nanomaterials in devices that are faster, cheaper, more flexible, and consume less energy. Electronic materials and devices used over the past several decades have reached their performance limits. Additionally, because traditional electronic materials such as indium tin oxide, copper, aluminum, and silicon are mined, supplies of these materials are finite and subject to shortages. Nanomaterials are likely to be used to enhance the performance of traditional electronic products and to address technological challenges encountered by existing electronics manufacturers.

In energy, nanotechnology is enabling the manufacture of new kinds of solar cells, fuel cells, batteries, and super capacitors. Existing solar cells based on crystalline silicon are bulky and expensive. If successfully developed, solar cells incorporating nanomaterials could be cheaper, lighter and more flexible. Similarly, nanomaterials could yield new light emitting diodes (LEDs) that are brighter and consume less power than existing sources of lighting. Nanostructured materials promise to give rise to new batteries that last longer, have more energy, and are a fraction of the size of conventional batteries.

Sponsored Research

Arrowhead is taking advantage of a key trend in technology innovation. More and more in recent years, fueled by government and private funding, major new discoveries and product inventions are happening at universities rather than in the research and development divisions of large corporations. Universities are patenting and licensing these inventions through technology transfer offices, and academic researchers have become interested in commercialization of their work.

In exchange for the exclusive right to license the technology developed in sponsored laboratories, Arrowhead has worked with some of the most outstanding academic institutions in the country, including the California Institute of Technology (Caltech), Stanford University, Duke University and the University of Florida, in critical areas such as stem cell research, carbon electronics, and molecular diagnostics. By funding university research, Arrowhead has the ability to ascertain the probability of technical success at relatively low research cost and, if warranted, continue cost effective development at the university by leveraging the existing resources available to scientists at universities, such as laboratories and equipment, as well as operating in an atmosphere that encourages the exchange of ideas. Moreover, the cultivation of relationships in the academic community provides an additional window into other promising technologies.

Majority-owned Subsidiaries

Arrowhead owns majority interest in its Subsidiaries, securing substantial participation in any success. Each subsidiary is staffed with its own technical and business team that focuses on its specific technology and markets, while Arrowhead provides financial, strategic, and administrative resources. The Company s five majority owned Subsidiaries are focused on developing and commercializing a variety of nanotechnology products and applications, including anti-cancer drugs, RNAi therapeutics, carbon-based electronics, fullerene anti-oxidants and compound semiconductor materials. In the near term, Arrowhead expects to add to its portfolio through selective acquisition and formation of new companies.

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As of September 30, 2007, Arrowhead held a majority of the outstanding, voting stock of the following five operating subsidiaries (the Subsidiaries):

Subsidiary	% Ownership*	Technology/Product Focus
Insert Therapeutics, Inc. *acquired June 4, 2004*	64.2%	Nano-engineered drug delivery system in clinical trials with first anti-cancer compound
Calando Pharmaceuticals, Inc. *founded February 22, 2005*	69.8%	Nano-engineered RNAi therapeutics
Unidym, Inc. (formerly NanoPolaris) *founded April 4, 2005*	60.1%	Developing strategic opportunities for the commercialization of nanotube-based products
Tego Biosciences Corporation *acquired April 20, 2007*	100.0%	Development of protective products based on the anti-oxidant properties of buckministerfullerenes
Aonex Technologies, Inc. *founded April 20, 2004*	80.0%	Semiconductor nanomaterials with initial emphasis on high efficiency solar cells

(*) Each Subsidiary maintains a stock option plan to help motivate and retain employees. In addition, Insert has outstanding warrants, primarily issued in connection with a financing transaction completed in October 2006. As of September 30, 2007, assuming all options in each Subsidiary plan were awarded and exercised and all warrants were exercised, the Company would own approximately 57.0% of Insert, 63.9% of Calando, 42.1% of Unidym, 59.5% of Tego and 50.0% of Aonex.

Arrowhead has entered into a funding agreement to provide future additional capital to Calando. The agreement gives Arrowhead the right to provide additional capital to Calando or to forfeit a specified portion of its interest in lieu of additional future funding. In deciding whether to make an additional capital contribution, the Company looks at such factors as progress toward a milestone and what the management is doing and how management is doing with their spending plan. The Company works closely with the subsidiaries senior management and the decision regarding funding milestones is made well in advance of the milestone date or event. Should Calando meet their milestones and the Company decides not to fund further, the Company would still own a majority of the outstanding voting securities of Calando.

The following table summarizes the terms and status of these additional capital contributions:

Subsidiary	Total Capital Assuming all Contributions Made	Future Capital Contributions	Time for Additional Capital Contributions
Calando Pharmaceuticals, Inc.	$ 14,000,000	$ 6,000,000	12 months(1)

(1) Under its Agreement to Provide Additional Capital with Calando, Arrowhead has the right to provide Calando up to $6,000,000 in additional capital based upon the achievement of certain development milestones. The first milestone payment of $3,000,000 is projected to be due during the first quarter of fiscal 2008. The last of these milestone payments for $3,000,000 is projected to be due during the fourth quarter of fiscal 2008.

Detail Subsidiary Discussions

At September 30, 2007, Insert Therapeutics, Inc. and Calando Pharmaceuticals, Inc. were separate subsidiaries. On October 31, 2007, Arrowhead announced that Mr. Larry Stambaugh was hired as President and Chief Executive Officer of both subsidiaries and that a merger between the two subsidiaries is being pursued. Mr. Stambaugh was also elected to the Board of Directors of each Insert and

Calando. For purposes of this 10K, each subsidiary will be discussed separately.

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Insert Therapeutics, Inc.

General

Insert has licensed a proprietary drug delivery platform technology based on a nano-engineered class of linear cyclodextrin-containing polymers from Caltech and has further developed the technology into Cyclosert , a proprietary drug delivery system. Cyclodextrins (a cyclic sugar molecule) have been used with great success for drug delivery; principally acting to solubilize drugs that otherwise would not dissolve. In polymeric form, cyclodextrins have been shown to be non-toxic and non-immunogenic. By enabling the manipulation of particle size and other characteristics of cyclodextrin, Insert has been able to improve drug properties and performance. The Cyclosert delivery platform has been designed to be used with a variety of drug molecules and targeting agents.

Numerous new drugs attack molecules that are on the surface of cells. Many known molecular targets inside the cell remain undrugable because drugs that could attack these targets cannot successfully cross the cell membrane or be taken up by the cell s natural mechanisms. By actively inserting a drug payload into cells, Cyclosert is designed to provide therapeutic treatment focused on previously unreachable targets. The linkage between Cyclosert and the drug payload can be modified to trigger release of the drug at the appropriate time and in the desired location.

Insert s lead anti-cancer drug candidate (IT-101) is a combination of Cyclosert and the potent anti-cancer drug, camptothecin. Camptothecin is an anti-cancer agent that has never been commercialized successfully due its poor solubility, unfavorable pharmacokinetics, and unintended interactions with elements found in human blood. Despite serious side effects, analogs of camptothecin that have been modified primarily to improve their solubility are widely marketed as therapeutics for colorectal, ovarian, and lung cancers. The combination of camptothecin with the Cyclosert polymer has been shown to improve solubility, and to increase circulation time in the body allowing a disproportionate amount of the drug to accumulate in tumors due to the leaky nature of tumor vasculature. Perhaps most importantly, camptothecin is joined to the polymer in a way that facilitates the release of active camptothecin inside the cell. This provides an advantage over the currently marketed analogs, which begin to chemically transform into a form inactive against cancer but still highly toxic almost immediately upon entering the bloodstream.

Insert filed its Investigational New Drug (IND) application for IT-101 with the Food & Drug Administration in February 2006, and commenced its first human clinical trials at City of Hope Cancer Center in July 2006. The National Cancer Institute (NCI) has designated City of Hope as a Comprehensive Cancer Center which indicates that this institution has undergone a rigorous peer review process, and has been found to be worthy of this high level of recognition shared by only a few institutions nationwide. The clinical trial is designed to assess the safety, toxicity, maximum tolerated dose and pharmacokinetics of IT-101, with secondary endpoints to assess tumoral response and anti-tumor activity. It is open to patients with non-resectable solid tumors who have failed existing standard therapies and who meet other specified criteria. The clinical trial is ongoing.

Additional information about Insert Therapeutics, Inc. can be found on its website, www.insertt.com.

The Oncology Market

Cancer is characterized by rapid, uncontrolled cell division resulting in the growth of an abnormal mass of cells generally referred to as a malignant tumor. Cancerous tumors can arise in almost any tissue or organ, and cancer cells, if not eradicated, can spread, or metastasize, throughout the body. As these tumors grow, they cause damage to the surrounding tissue and organs and commonly result in death if left untreated. Cancer is believed to occur as a result of a number of hereditary and environmental factors. According to the American Cancer Society, cancer is the second leading cause of death in the United States and accounts for approximately one in every four deaths. Between 500,000 and 600,000 Americans die of cancer each year. The National Institutes of Health estimated the direct medical cost of cancer to be in excess of $74 billion per year.

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IT-101

Insert s lead product, IT-101, is a chemotherapy drug candidate. Camptothecin, the active ingredient in IT-101, is a member of the topoisomerase I class of chemotherapy drugs. Topoisomerase inhibiters interfere with DNA synthesis and eventually lead to cell death. There are currently two marketed hydrophilic (water-soluable) camptothecin analogs that are based on chemical modifications to the native camptothecin molecule. Irinotecan, which is marketed under the name Camptosar®, is indicated for treatment of colorectal cancer. Topotecan, which is marketed under the name Hycamtin®, is indicated for treatment of ovarian and non-small cell lung cancers. These drugs generate annual worldwide sales estimated to be in excess of $1.1 billion. IT-101, if approved, would address a portion of this market depending on the approved indication(s). Camptothecins are among the most important classes of anti-cancer drugs introduced in recent years. However, the marketed camptothecin analogs pose substantial challenges in terms of efficacy, tolerability and difficulty of use. Insert s objective with IT-101 is to provide a product that has enhanced tolerability and anti-tumor activity compared with the approved products.

Insert commenced Phase I clinical trials to evaluate the safety, toxicity and pharmacokinetics of IT-101 at the City of Hope National Cancer Center in Duarte, California, in July 2006. Secondary endpoints to be evaluated include anti-tumor activity. Insert expects that the trial will be completed in 2008.

In October 2007, Insert s lead anti-cancer compound, IT-101, was featured in a public television documentary series produced by Thirteen/WNET New York and the California Institute of Technology (Caltech). The documentary chronicles the early research on IT-101 by Dr. Mark Davis, the Founder of Insert Therapeutics and Professor of Chemical Engineering at Caltech. The show also follows the progress of the first patient in the IT-101 clinical trial.

Research and Preclinical Development

Insert has invested in the research and development of new product candidates, including those that could extend the application of its proprietary drug delivery technology, Cyclosert . Research and development efforts on these pipeline candidates are preliminary, and there is no assurance that any of these compounds will be successful or will progress to clinical trials. Advancing these development candidates into human clinical trials is dependent on several factors, including technological feasibility and commercial opportunity as well as the availability of financial resources. It is difficult to evaluate the potential markets for these product candidates as the areas of potential application are diverse and specific applications are yet to be determined.

In addition to internal research and development efforts, we may consider acquisitions of other products, development candidates or technologies to expand Insert s pipeline and capabilities.

When developing new products, we may consider a variety of factors, including:

- Potential pricing and gross margins
- Existing and potential market size
- High barriers to entry
- Patent expiration dates
- Manufacturing capabilities and access to raw materials
- Potential development and competitive challenges

How a potential product will fit within our existing array of products under development, and what synergies may exist

Collaboration and Licensing Arrangements

Insert is internally focused on using its technology to develop and commercialize proprietary conjugates of Cyclosert with select small-molecule drugs and peptides, initially in the oncology area. With its ability to deliver a wide range of therapeutic payloads, ranging from small molecules to proteins and peptides, Insert s Cyclosert technology platform has applications well beyond Insert s capacity to develop internally. Consequently, research and development collaborations with pharmaceutical and biotech companies to deploy our technology with other therapeutics are continually sought, whether for the purpose of extending the life cycle of currently-marketed drugs, or to resolve delivery challenges of new chemical entities.

One investigational drug that Insert Therapeutics investigated in collaboration with German-based R&D Biopharmaceuticals, uses the Cyclosert system to deliver a potent anticancer agent called tubulysin A. Tubulysin A is a naturally occurring substance produced by myxobacteria. It is highly active against many types of cancer cells, targeting the cellular structures called microtubules, which play a crucial role in cell division. Used by itself, tubulysin A is an effective anti-tumor agent, but it is also highly toxic. By combining it with the Cyclosert transport system, researchers are aiming to make it non-toxic while preserving its anti-tumor activity. In vitro studies showed the tubulysin-Cyclosert conjugate to be effective against multiple human cancer cell lines. The conjugate was found to be stable and 100 times more water soluble than the free drug. Water solubility is essential for efficient delivery of drugs through the bloodstream. Tubulysin A is already better than many comparable agents in this respect, and preclinical studies have shown significant improvement in solubility when tubulysin-A is combined with Cyclosert.

In trials on animals, the tubulysin-Cyclosert conjugate was well tolerated, in contrast to tubulysin A alone, which was highly toxic and caused 50% mortality. The conjugate was also compared to vinblastine, an agent with a similar mechanism of action to tubulysin A. Vinblastine was found to be significantly less effective as an anti-tumor agent.

Manufacturing

Insert currently uses, and expects to continue to be dependent upon, contract manufacturers to manufacture each of its product candidates. Insert has established a quality control and quality assurance program, including a set of standard operating procedures and specifications, designed to ensure that its products are manufactured in accordance with current Good Manufacturing Procedures, or cGMPs, and other applicable domestic and foreign regulations. Additional manufacturing resources will require additional investment, and Insert may seek to enter into additional collaborative arrangements with other parties that have established manufacturing capabilities. Insert expects to continue to rely on third-party manufacture of its development and commercial products on a contract basis. Currently, Insert has agreements with third-party vendors to furnish IT-101 drug supply for clinical studies. Insert will be dependent upon these third-parties to supply it in a timely manner with products manufactured in compliance with cGMPs or similar standards imposed by foreign regulatory authorities where our products are tested and/or marketed.

Competition

The healthcare industry in general is characterized by extensive research efforts, rapid technological change and intense competition. Other pharmaceutical companies will compete with Insert in areas of research and development, acquisition of products and technology licenses, and the manufacturing and marketing of products that could potentially compete with Insert s products. Competition will be based on safety, efficacy, ease of administration, breadth of approved indications, price, reimbursement and physician and patient acceptance.

In addition to the already-approved irinotecan and topotecan, other companies are developing camptothecin formulations with a goal of delivering a more effective and tolerable therapy than the approved camptothecin-based products. Sonus Pharmaceuticals is currently conducting a Phase I trials for its SN2310 Injectable Emulsion (camptothecin suspended in a vitamin E emulsion). Mersana Therapeutics, Inc. is currently conducing a Phase I clinical trial with a polymer, camptothecin conjugate.

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Insert s ability to successfully compete in the biotechnology and pharmaceutical industries will be based on its ability to do the following:

- Create and maintain advanced formulation technologies
- Develop proprietary products
- Attract and retain key scientific personnel
- Obtain patent or other intellectual property protection for products
- Obtain required regulatory approvals
- Manufacture, market and/or license our products alone or with collaborative partners

Insert faces competition from a variety of companies focused on developing oncology drugs. Insert competes with large pharmaceutical companies and with other specialized biotechnology companies, including but not limited to Cell Therapeutics, Sonus Pharmaceuticals, Mersana Therapeutics, Abraxis Biosciences, Bristol-Myers Squibb Co., Sanofi-Aventis, Genentech, Lilly and Novartis. Many of Insert s competitors and potential competitors have substantially greater financial, technical and human resources than Insert and have substantially greater experience in developing products, obtaining regulatory approvals and marketing and manufacturing products. Smaller companies may also prove to be significant competitors, particularly through collaborative arrangements with large pharmaceutical and established biotechnology companies. Many of these competitors have products that have been approved or are in development and operate large, well-funded research and development programs. Companies that complete clinical trials, obtain required regulatory approvals and commence commercial sales of their products before their competitors may achieve a significant competitive advantage if their products work through a similar mechanism as Insert s products. In addition, other technologies or products may be developed that have an entirely different approach that would render Insert s technology and products noncompetitive or obsolete.

Intellectual Property

Insert Therapeutics has an exclusive, worldwide license from Caltech to a suite of U.S. and foreign patents that are pending or have been issued. Insert has also filed its own U.S. and foreign patent applications, which are pending. Insert has licensed its Cyclosert delivery technology to an affiliate company, Calando Pharmaceuticals Inc., for the development and commercialization of RNAi therapeutics. Under the terms of the license, Insert received an equity stake in Calando. Insert is also entitled to royalties and sublicensing fees on the sales of products covered by the licensing agreement.

Key Personnel

On November 1, 2007, Larry G. Stambaugh was appointed as President and Chief Executive Officer of two of the Company s majority-owned subsidiaries, Insert Therapeutics, Inc. and Calando Pharmaceuticals, Inc. Mr. Stambaugh is the former Chairman, CEO and co-founder for Maxim Pharmaceuticals, Inc. At Maxim, he established a public, global biopharmaceutical company with a pipeline of product candidates for life-threatening cancers and liver diseases. During his time with Maxim, he took the company public in the U.S. and Europe, conducted 17 clinical trials, including four phase 3 studies in over 20 countries, established several corporate partnerships with large pharmaceutical companies and acquired a promising biotechnology company. In 2006, he merged Maxim with an East Coast biotech company. From the time of the 2006 merger until his appointment at Insert and Calando, Mr. Stambaugh was a consultant to emerging biotech and biopharma companies. Prior to his tenure at Maxim, he was the Chairman, President and CEO for ABC Laboratories, a world-leading environmental research laboratory serving Fortune 100 pharmaceutical and chemical companies. Mr. Stambaugh has worked as a top executive in banking, manufacturing, and retail and began his career at KPMG. He has a B.B.A. from Washburn University and is a C.P.A.

Until October 31, 2007, Insert s corporate and business activities were led by John Petrovich. Mr. Petrovich continues to serve as the Executive Vice President of each Insert and Calando and is involved with management, strategic planning, legal and fundraising activities of Insert.

Research and development is conducted under the direction of Dr. Thomas Schluep, Insert s Chief Scientific Officer since August 2004. Dr. Schluep is an expert in the development of formulations for biologics. Prior to joining Insert, he was responsible for the non-viral gene-therapy program at Canji, Inc., a wholly owned subsidiary of Schering-Plough. He successfully led an interdisciplinary team of scientists in their effort to develop synthetic gene delivery vehicles for the systemic treatment of cancer with the p53 tumor suppressor gene. His other research activities included the development of formulations that enhance adenoviral gene delivery after systemic or local regional administration. As a senior member of the bio-analytical group, he was also responsible for assay development, qualification, and GMP testing of adenoviral gene therapy vectors. Prior to Canji, Dr. Schluep was a post-doctoral associate at the department of Chemical Engineering at the Massachusetts Institute of Technology. He received his Sc.D. in Process Engineering in 1995 and an M.S. in Biotechnology in 1989, both from the Swiss Federal Institute of Technology in Zurich, Switzerland.

Dr. Mark Davis is the founder of Insert and co-inventor of Insert s core technology. Dr. Davis is the Warren and Katharine Schlinger Professor of Chemical Engineering at Caltech. He is a Member of the National Academies of Engineering and Science and a recipient of numerous awards including the prestigious Alan T. Waterman Award, given by the National Science Foundation annually to only one scientist in the United States across all disciplines. Dr. Davis was the first engineer to win this award for his work in rationally designed materials. Dr. Davis earned his B.S., M.S. and Ph.D. degrees in Chemical Engineering and holds over 35 patents, has published more than 350 papers and has presented over 500 seminars throughout the world.

Insert s board of directors is comprised of Mark Davis, who also serves as a director of Calando, R. Bruce Stewart, who also serves as Executive Chairman of Arrowhead, and Edward W. Frykman, who also serves as a director of Arrowhead. Mr. Stambaugh was elected to the board of Insert on November 1, 2007, concurrently with his appointment as CEO of Insert.

As of September 30, 2007, Insert had 14 employees, all of whom were full time, not including Mr. Petrovich who also served as Chief Executive Officer and President of Calando until October 31, 2007.

Calando Pharmaceuticals, Inc.

General

Calando was formed in February 2005 to focus on designing, developing and commercializing novel RNAi therapeutics to treat diseases and other medical conditions by combining effective RNAi therapeutics with patented and proprietary delivery technologies. Calando s delivery technology is one of the family of cyclodextrin-containing polymers developed at Caltech and licensed to Calando for the field of RNAi therapeutics by affiliate Insert Therapeutics. The delivery technology is augmented by a second technology developed at and licensed from Caltech.

RNA interference, or RNAi, is a naturally occurring mechanism within cells for selectively silencing and regulating specific genes. Since many diseases are caused by the inappropriate activity of specific genes, the ability to silence genes selectively through RNAi could provide a new way to treat a wide range of human diseases. RNAi is induced by small, double-stranded RNA molecules. One method to activate RNAi is with chemically synthesized small interfering RNAs, or siRNAs, which are double-stranded RNAs that are targeted to a specific disease-associated gene. The siRNA molecules are used by the natural RNAi machinery in cells to cause highly targeted gene silencing.

A key roadblock to the therapeutic use of RNAi is the lack of an effective delivery mechanism. siRNA is degraded and destroyed in the bloodstream if unprotected and naked siRNA is not taken up by cells. Calando s delivery technology binds to and protects siRNA from degradation in the bloodstream. The linear cyclodextrin polymer self-assembles with the siRNA molecule to form a siRNA-containing nanoparticle. With appropriate targeting molecules attached, the siRNA is delivered to cells or tissues of interest, taken up by the cell and released inside the cell.

Calando has conducted and published results of preclinical studies with various collaborators to test the safety and efficacy of the siRNA delivery system and Calando s siRNA therapeutic candidate. Studies conducted with Caltech and the Children s Hospital of Los Angeles published in October 2005 reported sequence specific, anti-tumor effects and conclusive evidence of molecular targeting to and within tumor cells by using Calando s delivery system. In the March 2007 Proceedings of the National Academy of Sciences, data was published from a primate study of Calando s first therapeutic candidate, CALA-001, which contains the siRNA delivery system, Calando s proprietary siRNA sequence targeting an enzyme necessary for cell replication and a targeting molecule. The data showed that the formulation was well tolerated at doses significantly higher than those shown to be effective in previous studies using a similar formulation. Additionally, no significant immune response was detected except at the highest dose. Overall, this study shows that multiple, systemic doses of CALAA-01 can safely be administered to non-human primates, and is the first example of multiple systemic dosing of siRNA in monkeys.

Calando currently is conducting further preclinical testing for its CALA-001 drug candidates and has completed the scale-up of the manufacture of its delivery polymer and its proprietary siRNA.

Additional information about Calando Pharmaceuticals, Inc. can be found at its website, www.calandopharma.com.

The Oncology Market

Cancer is characterized by rapid, uncontrolled cell division resulting in the growth of an abnormal mass of cells generally referred to as a malignant tumor. Cancerous tumors can arise in almost any tissue or organ, and cancer cells, if not eradicated, can spread, or metastasize, throughout the body. As these tumors grow, they cause damage to the surrounding tissue and organs and commonly result in death if left untreated. Cancer is believed to occur as a result of a number of hereditary and environmental factors. According to the American Cancer Society, cancer is the second leading cause of death in the United States and accounts for approximately one in every four deaths.

CALAA-01

Calando s lead product candidate, CALAA-01, is a formulation containing Calando s proprietary delivery technology with a siRNA duplex targeting the M2 subunit of ribonucleotide reductase, a well-established cancer target. Ribonucleotide reductase catalyzes the conversion of ribonucleosides to deoxyribonucleosides and is necessary for DNA synthesis and cell replication. The duplex, developed at Calando, demonstrates potent anti-proliferative activity across multiple types of cancer cells.

Calando is preparing to file an Investigational New Drug (IND) application with the US Food and Drug Administration. Upon clearance of regulatory requirements and institutional review by the clinical trial site, Calando hopes to begin its first clinical trial in early calendar 2008. Calando s research and development efforts on CALAA-01 are preliminary, and there is no assurance that this compound will be successful or that it will progress to clinical trials.

Research and Preclinical Development

Calando continues to invest in the research and development of new product candidates, its proprietary siRNA delivery technology and new siRNA delivery technologies. Research and development efforts in these areas are preliminary, and there is no assurance that any of these compounds will be successful or will progress

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to clinical trials. Advancing these development candidates into human clinical trials is dependent on several factors, including technological feasibility and commercial opportunity as well as the availability of financial resources. It is difficult to evaluate the potential markets for these product candidates as the areas of potential application are diverse and specific applications are yet to be determined.

In addition to internal research and development efforts, acquisitions of other products, development candidates or technologies to expand Calando s pipeline and capabilities may be considered. When developing new products, a variety of factors are considered, including:

- Potential pricing and gross margins
- Existing and potential market size
- High barriers to entry
- Patent expiration dates
- Manufacturing capabilities and access to raw materials
- Potential development and competitive challenges
- How a potential product will fit within our existing array of products under development, and what synergies may exist

Collaboration and Licensing Arrangements

Calando is internally focused on using our technology to develop and commercialize siRNA therapeutics for systemic delivery applications, initially in the oncology area.

Insert Therapeutics, Inc., an affiliate of Calando, has licensed its linear cyclodextrin polymer delivery technology to Calando for the development of RNAi therapeutics. Under the terms of the license, Insert received an equity stake in Calando. Insert is also entitled to royalties and sublicensing fees on sales of any products covered by the licensing agreement.

Alnylam Pharmaceuticals, Inc., the holder of a substantial amount of foundational intellectual property for therapeutic uses of siRNA, has granted Calando an InterfeRx(TM) license to discover, develop, and commercialize an RNAi therapeutic utilizing a synthetic siRNA, together exclusively with Calando s proprietary delivery technology, that is directed towards the M2 subunit of ribonucleotide reductase as a cancer target. As part of the agreement, Calando also has an option to acquire an InterfeRx license for a second target gene. The licensing arrangement includes upfront, annual, and milestone payments, and royalties on sales of any products covered by the licensing agreement.

Manufacturing

Calando currently uses, and expects to continue to be dependent upon, contract manufacturers to manufacture each of its product candidates. Calando has established a quality control and quality assurance program, including a set of standard operating procedures and specifications, designed to ensure that its products are manufactured in accordance with current Good Manufacturing Procedures, or cGMPs, and other applicable domestic and foreign regulations. Additional manufacturing resources would require additional investment, and Calando may seek to enter into additional collaborative arrangements with other parties that have established manufacturing capabilities. It is likely that Calando will continue to rely on third-party contract manufacturers in the development and commercialization of its products. Currently, Calando has agreements with third-party vendors to furnish CALAA-01 drug supply for clinical studies. Calando will be dependent upon these third-parties to supply products in a timely manner manufactured in compliance with cGMPs or similar standards imposed by foreign regulatory authorities where Calando s products are tested and/or marketed.

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Competition

Calando is engaged in the rapidly changing business of developing treatments for human disease through the regulation of gene expression. Competition among entities attempting to develop products to treat diseases by regulating gene expression is intense and is expected to increase. In addition to competitors in the regulation of gene expression field, there are other competitors using other technologies to target the same diseases that we are targeting.

Calando faces direct competition from companies engaged in the research, development and commercialization of RNA interference-based technology, as well as competition from companies attempting other methods of gene expression control. Calando competes with large pharmaceutical companies and established biotechnology firms, many of whom are developing new products to treat the same diseases that Calando targets. In some cases, those companies have already commenced clinical trials for their products. Many of these companies have significantly greater financial resources and expertise in research and development, manufacturing, preclinical studies and clinical trials, obtaining regulatory approvals and marketing than Calando does. Calando s collaborators, licensors and potential licensees may be conducting research and development programs using RNA interference technology and non-RNA interference technologies directed at the same diseases that Calando is targeting. Smaller companies may also prove to be significant competitors, particularly through collaborative arrangements with large pharmaceutical and biotechnology companies. In addition, competitors may complete clinical trials, obtain required regulatory approvals and commence commercial sales of their products before Calando, thus achieving a significant competitive advantage.

A number of companies are pursuing research and development programs related to the emerging area of RNA interference. A number of these companies have filed patent applications in the area of RNA interference. It is difficult to predict whether any of these companies will be successful in obtaining patent protection, whether the patent protection sought will address important aspects of the technology and, to what extent these companies will be successful in their RNA interference efforts.

Academic institutions, governmental agencies and other public and private research organizations also conduct research, seek patent protection and establish collaborative arrangements for products and clinical development and marketing. These companies and institutions compete with Calando in recruiting and retaining highly qualified scientific and management personnel.

Intellectual Property

Calando Pharmaceuticals has an exclusive, worldwide license from Insert to a suite of U.S. and foreign patents that are pending or have been issued to Insert for its Cyclosert delivery technology for the development and commercialization of RNAi therapeutics. Calando has also filed its own U.S. patent applications, which are pending. Calando has an exclusive, worldwide license from Caltech to other proprietary delivery technology for RNAi therapeutics invented at Caltech by Dr. Mark Davis.

Key Personnel

Dr. Mark Davis is the founder of Calando. Dr. Davis is also the founder of Insert

Until October 31, 2007, Mr. John Petrovich was Calando s Chief Executive Officer and President. On November 1, Mr. Larry Stambaugh became Calando s Chief Executive Officer and President. Their biographies are set forth under the Key Personnel section of Insert Therapeutics in this filing.

Jeremy Heidel, Ph.D. is Chief Scientific Officer and Vice President, Research & Development, at Calando. Dr. Heidel earned his B.S. in Chemical Engineering and Biology from Massachusetts Institute of Technology and his M.S. and Ph.D. degrees in Chemical Engineering from Caltech. Dr. Heidel performed his doctoral thesis research on targeted, systemic, non-viral delivery of siRNA in the laboratory of Dr. Mark Davis, and has expertise in the areas of: (i) synthesis and characterization of polymeric delivery vehicles and their formulations,

(ii) identification of siRNA target sites and the design of potent RNAi molecules, and (iii) the design and execution of in vitro and in vivo experiments to evaluate formulation efficacy. He was the first to show that synthetic siRNA molecules do not elicit immune responses in animals.

Calando s board of directors is comprised of Mark Davis, who also serves as a director of Insert, R. Bruce Stewart, who also serves as Executive Chairman of Arrowhead, and Edward W. Frykman, who also serves as a director of Arrowhead. On November 1, 2007, Mr. Stambaugh was elected to the board of Calando, concurrent with his appoint as CEO of Calando.

As of September 30, 2007, Calando had 8 employees, all of whom were full time, including Mr. Petrovich, who also served as CEO and President of Insert.

Unidym, Inc.

General

Unidym, Inc. is engaged in the manufacture and application of carbon nanotubes (CNTs), a novel material with extraordinary electrical, thermal, and mechanical properties. Unidym provides CNT-enabled products, bulk CNT materials, and intellectual property to a wide range of customers and business partners. Unidym s initial CNT-enabled products are transparent electrodes consisting of a thin, transparent film of carbon nanotubes that could replace the expensive, failure-prone materials currently employed by manufacturers of such devices as touch screens, flat panel displays, solar cells and solid state lighting. In addition, Unidym has historically provided bulk CNT materials to hundreds of customers primarily for research or early commercial prototyping purposes, and recently has selectively entered into intellectual property licensing arrangements to license its CNT technology to customers or partners in non-core markets. Longer term, Unidym expects to extend its CNT-enabled product offerings to provide electrodes for fuel cells; and thin film transistors for thin film solar and printable electronics applications.

Unidym was formed when NanoPolaris, a Subsidiary of Arrowhead Research Corporation, acquired the assets of an early stage company called Unidym, Inc. NanoPolaris was founded to consolidate foundational intellectual property related to carbon nanomaterials. At the time of the acquisition, NanoPolaris had successfully negotiated exclusive commercial rights to nanotechnologies, mostly in the area of carbon nanotubes, developed at the California Institute of Technology, Duke University, Pennsylvania State University, State University of New York at Buffalo, University of Toronto, Rensselaer Polytechnic Institute and Tsinghua University. NanoPolaris purchased the assets of the former Unidym to gain access to the company s substantial expertise and intellectual property in carbon nanotube films, which may have broad application to the electronics industry. After its purchase of Unidym s assets in June 2006, NanoPolaris changed its name to Unidym.

In April 2007, Unidym merged with Carbon Nanotechnologies, Inc. (CNI) of Houston, Texas, a company founded in 2000 by the late Dr. Richard Smalley of Rice University. Dr. Smalley and his collaborators won the 1996 Nobel Prize in Chemistry for their discovery of carbon fullerenes, an allotrope (or molecular form) of carbon closely related to the carbon nanotube. Dr. Smalley s pioneering work led to the development of a suite of more than 100 patents (including 54 issued US patents) owned or controlled by CNI, as well as the development of significant development and manufacturing infrastructure for the production of CNT materials. Since its inception, CNI has provided bulk CNT materials to hundreds of customers, primarily for research or early commercial prototyping purposes, and has won research grants from government agencies such as the National Institute of Science (NIST) and the State of Missouri.

With the CNI merger, Unidym controls an expansive intellectual property portfolio related to CNT technology, with foundational patents covering CNT compositions of matter, synthesis, processing, and applications. Although Unidym is currently focused on the electronics industry, its patent portfolio broadly covers many other promising CNT applications, ranging from structural composites, to sensors and to therapeutics.

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Competition

Unidym faces competition from a number of start-ups and established companies in the industries it enters. In the electronics industry, there are a number of start-up or private companies that are focused on the application or production of nanotubes including Atomate, C-Nano, Eikos, Nantero and Southwest Nanotechnologies. More established companies with announced CNT programs include Brewer Sciences, DuPont, Honeywell, Samsung, Sumitomo and Toray. There are also potential competitors who are pursuing alternative nanotech based approaches to the markets served by Unidym, including the start-up Cambrios and large Japanese companies such as Fujitsu.

Manufacturing

As a result of the recent merger with CNI, Unidym possesses significant in-house manufacturing capability for the production and purification of nanotubes for both electronic and bulk material applications. Unidym also has limited in-house capability to produce sample and prototype quantities of CNT-based transparent conductive films.

Carbon Nanotube Production and Purification

Unidym can produce different grades of carbon nanotubes in high volume and at low cost. The Houston facility (formerly CNI) has developed two different processes for commercial production: High Pressure Carbon Monoxide (HiPco or MGP1) and Modified Gas Phase 2 (MGP2); as well as a new process, Modified Gas Phase 3 (MGP3) which is in the late stages of development and qualification. By varying production conditions and post-processing techniques, Unidym is able to produce a wide variety of nanotube grades that are tailored to different markets.

The HiPco route is an all-gas phase process that mixes catalyst precursor with hot carbon monoxide gas under conditions of high pressure and high temperature. It produces one-wall carbon nanotubes that are best utilized for certain high-end products, such as fuel cells. The MGP2 process combines the gas phase process with aspects of a supported catalyst route, which is sometimes referred to as a CVD process. The MGP2 process is used to produce materials grades required for composite materials and electrostatic discharge protection applications. The MGP3 process is a modified version of the MGP2 process which is used for producing electronics grade materials. The company is in the latter stages of development and qualification for this new material grade.

Manufacturing Carbon Nanotube Based Transparent Conductive Films

Unidym has capabilities for manufacturing tunable electronic components based on random networks of carbon nanotubes. First, CNT powders are dispersed in aqueous solutions to produce inks. The nanotube inks are then deposited on different substrates using high volume, roll to roll manufacturing equipment. After being deposited, the films are treated and encapsulated to protect them from environmental conditions such as moisture and abrasion. The nanotube networks can be tuned to provide desirable electrical, mechanical, and optical properties for different electronic applications. These tunable components include CNT-based transparent conductive films for use in transparent electrode applications in such products as touch screens, flat panel displays, solar cells and solid state lighting.

Unidym has in-house deposition or coating equipment which is used for the deposition of CNTs onto plastic or glass substrates in sample quantities. For early production of transparent conductive films, Unidym expects to engage with subcontractors (toll coaters) who have existing high volume, high quality roll to roll capacity which has historically been used in the production of films for the motion picture or still photography industries. The Company expects that given the abundance of these subcontractors and the availability of subcontract capacity, there will be no need to bring production capacity in house for the near or intermediate term. However, the Company expects to continually evaluate the quality and costs of its subcontract toll coaters, and may decide to bring such production in house if it is advantageous to the company to do so.

Marketing and Sales

Revenue is expected to be generated through direct product sales and license deals into relatively consolidated industries. As a result, Unidym intends to have a relatively small in-house business development team and will leverage the sales force and relationships of its distribution, development and production partners. Unidym has recently hired a Vice President of Business Development and Marketing who has more than 20 years of executive level experience in the electronics industry who will lead the Company s business development, sales and marketing efforts. The Company currently has a distribution relationship with the large Japanese trading firm, Sumitomo, for the distribution of its CNT materials in Asia. Unidym expects to also use similar distributors to assist in the distribution of its CNT-based transparent conductive films.

Intellectual Property

Unidym controls an expansive intellectual property portfolio covering CNT technolgy, with foundational patents covering CNT compositions of matter, synthesis, processing, and applications. Although Unidym is currently focused on the electronics industry, its patent portfolio broadly covers many other promising CNT applications, ranging from structural composites, to sensors and to therapeutics.

Key Personnel

Arthur Swift is President and CEO of Unidym and has over 20 years of senior management experience in the semiconductor industry. Previously, Mr. Swift was President and CEO of Transmeta Corporation, an innovative semiconductor company in the Silicon Valley.

Ralph J. Harms is the Chief Financial Officer who brings to Unidym a wealth of financial management experience, in both private and public technology companies. Ralph has experience in building the infrastructure necessary to successfully deal with the intricacies of technology manufacturing and licensing businesses.

Robert Bismuth is Vice President of Business Development & Marketing and has a track record of innovative business success in both building strategic relationships and in bringing to market new applications for a wide range of technologies.

Unidym s board of directors is comprised of R. Bruce Stewart, Chairman (who also serves as Executive Chairman of Arrowhead), Edward W. Frykman and Charles McKenney (who also serve as directors of Arrowhead), Arthur Swift, Dr. George Gruner, Dr. Bob Gower and Ray McLaughlin.

At September 30, 2007, Unidym had 32 full-time employees.

Tego BioSciences, Inc.

General

Tego BioSciences Corporation (Tego) was formed to acquire the assets of C Sixty, Inc. in April 2007. Tego is focused on developing and commercializing products for the health care industry based on modified buckministerfullerenes (also known as fullerenes or buckyballs). Tego s product candidates include therapeutic skin creams, cancer therapies, and drugs targeting central nervous system disorders. Tego is also exploring the use of modified fullerenes as contrast agents in magnetic resonance imaging (MRI).

Fullerenes are a highly structured, nanoscale form of pure carbon, similar to carbon nanotubes. Roughly one nanometer in diameter, a fullerene molecule is comprised of 60 carbon atoms and has the symmetry of a soccer ball. The spherical shape, hollow interior, and 60 carbon atoms of the molecule allow drug designers the opportunity to attach therapeutic and targeting chemical groups in many configurations.

Research and Development

Initially, Tego does not intend to hire staff to develop these products. Rather, for the first eighteen months, the company intends to use third parties to do most of the development work with a small staff located in Houston, Texas, to oversee the progress and to direct collaborations and licensing of the intellectual property.

Collaborations and Licensing

The preclinical studies for the chemotherapy protection product will be performed in the National Cancer Institute s (NCI) Nanotechnology Characterization Lab (NCL) to measure the ability of a Tego fullerene formulation to protect against harmful side effects of two anti-cancer drugs; cisplastin and adriamycin. The first stage of the studies will use NCL s resources, with follow on funding from Tego, as appropriate.

The National Cancer Institute, working in concert with the National Institute of Standards and Technology (NIST) and the U.S. Food and Drug Administration (FDA), established the Nanotechnology Characterization Laboratory (ncl.cancer.gov) to perform preclinical efficacy and toxicity testing of nanoparticles. The NCL serves as a national resource and knowledge base for all cancer researchers to facilitate the regulatory review of nanotechnologies intended for cancer therapies and diagnostics. By providing the critical infrastructure and characterization services to nanomaterial providers, the NCL can accelerate the transition of basic nanoscale particles and devices into clinical applications, thereby reducing suffering and death from cancer.

Licenses and collaborations for the other product targets will be pursued over the course of the next fiscal year.

Competition

Tego is competing with other companies developing fullerene products as well as alternatives to fullerene products. There are several companies that manufacture and sell fullerenes and fullerene formulations, including Frontier Carbon Corporation (Mitsubishi subsidiary) and Nano-C. There are also companies developing fullerene-based therapeutics, including Luna nanoWorks and Vitamin C60 Bioresearch (Mitsubishi subsidiary).

There are a variety of other technologies that Tego must compete with in commercializing its fullerene-based products. For example, other compounds can be used as antioxidants in therapeutic skin creams. Additionally, there are many different technologies being developed to improve cancer therapy and treat central nervous system disorders. There are also a variety of novel MRI contrast agents under development.

Manufacturing

Tego does not initially intend to manufacture and market its products directly. Rather, it is pursuing a strategy of partnering, licensing, and outsourced manufacturing.

Intellectual Property

Tego has a patent protected fullerene platform that forms the basis for several products. The company s intellectual property assets include exclusive licenses to issued patents and patent applications from Siemens and Washington University.

Key Personnel

On October 25, 2007, Dr. Russ Lebovitz was appointed CEO of Tego to chart the strategic direction and guide the operations of the new nano-biotechnology company. Dr. Lebovitz served previously as CEO of C Sixty, Inc., the company that pioneered the technology now owned by Tego.

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Tego s Board of Directors is composed of R. Bruce Stewart, Executive Chairman of Arrowhead, Ed Frykman, Russ Lebovitz and John Miller. Mr. Stewart and Mr. Frykman are also members of Arrowhead s Board.

At September 30, 2007, Tego had no full-time employees.

Aonex Technologies, Inc.

General

Aonex Technologies is developing engineered wafers to enable manufacturers of blue and white LEDs to reduce their production costs and create higher efficiency devices. The market for blue LEDs is currently $4 billion and expected to grow to $9 billion by 2009.

Blue and white LEDs are manufactured by depositing (or growing) gallium nitride (and its alloys) onto 2 sapphire substrates at high temperatures. While relatively inexpensive, sapphire poses two challenges to device manufacturers. First, it is an electrical and thermal insulator which means that it must be removed following device growth in order to create high efficiency (i.e., vertical) device structures. Second, it expands at a different rate than gallium nitride as the temperature is changed (a material property termed coefficient of thermal expansion or CTE) resulting in high levels of stress and wafer bow during and after the growth process. This latter limitation is the primary obstacle that prevents the industry from moving to larger wafer sizes to reduce costs.

Aonex s engineered wafers are comprised of thin films of materials suitable for LED fabrication that have been bonded onto specially engineered support wafers using a proprietary process. By optimizing the support wafer s properties, Aonex is able to simplify the manufacture of high efficiency LED structures, improve yields, and offer a viable path to larger wafer sizes (and corresponding lower costs). Aonex has performed testing of prototypes of its products and is shipping samples to potential partners.

Collaboration and Licensing Arrangements

After analyzing the existing competition and scale required for success in its core markets, Aonex has opted to seek an established company with which to partner in its future commercialization efforts. In such a partnership, Aonex would provide the technology developed to date while the larger partner would provide resources and the product stream. This change of strategy will likely limit the return that Arrowhead is able to achieve on its investment in Aonex.

Intellectual Property

Aonex has licensed a suite of intellectual property from Caltech in exchange for the issuance to Caltech of a warrant to purchase 700,000 shares of Aonex common stock for nominal consideration. This license agreement provides Aonex with exclusive, worldwide rights to certain patents and patent applications filed by Caltech. In addition, Aonex believes it possesses adequate intellectual property rights in a number of key areas of engineered substrates for compound semiconductor device production.

Key Personnel

Harry Atwater is a founder of Aonex and is Chairman of Aonex s Scientific Advisory Board. Dr. Atwater is the Howard Hughes Professor of Applied Physics and Materials Science at Caltech and possesses over 25 years of experience in Aonex s core technologies. Professor Atwater holds B.S., M.S. and Ph.D. degrees from MIT.

Sean Olson is the President of Aonex. Mr. Olson has both technical and business experience in the semiconductor industry and is a veteran of both early and late stage ventures.

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Aonex s board of directors is comprised of Sean Olson, Harry Atwater, R. Bruce Stewart who also serves as Executive Chairman of Arrowhead, and Edward W. Frykman, who also serves as a director of Arrowhead.

As of September 30, 2007, Aonex had one full time employee.

Discontinued Operations

As part of Arrowhead s model, the Company will open or close subsidiaries based upon the success of the subsidiary. The Company closed one subsidiary, Nanotechnica, during fiscal 2005. The subsidiary is shown in the line Loss on Discontinued Operations on the consolidated statements of operations.

Nanotechnica, Inc.

In the third quarter of fiscal 2005, the Company determined that the progress being made by Nanotechnica in commercializing microfluidics technology was not progressing satisfactorily and the market potential was uncertain. As a result, on June 3, 2005, a majority of the stockholders of Nanotechnica voted to dissolve the company. Because of Arrowhead s liquidation preference as the holder of Nanotechnica s Series A Preferred Stock, $2.8 million in cash was remitted to Arrowhead along with $213,000 of the other remaining assets. Arrowhead has discontinued development efforts related to microfluidics and returned the applicable patents to Caltech. The losses incurred by Nanotechnica are segregated in the Consolidated Statement of Operations as Loss from Operation of Discontinued Nanotechnica, Inc. Nanotechnica generated no revenues.

Sponsored Research

As of September 30, 2007, Arrowhead had two sponsored research agreements with the California Institute of Technology and Unidym had one with Duke University and one with University of Florida.

For each research agreement, the researchers focus their efforts on achieving certain mutually agreed upon goals. Arrowhead monitors the progress of the research, guides the researchers toward commercially viable prototypes, and works with the researchers in developing an intellectual property portfolio and commercialization plan for the technologies. In exchange for funding the research, the Company has the right to exclusively license and commercialize any technology developed as a result of the research.

California Institute of Technology

In September and October 2007, the funding for two sponsored research projects at the California Institute of Technology were cancelled when we determined that the research would not lead to near term commercialization. Under the terms of the agreement, upon notice of termination, Caltech will not make any further commitments and take reasonable action to terminate existing commitments. The Company is responsible for any outstanding commitments that cannot be cancelled. The Company does not expect to incur any material costs in connection with the termination of the agreements.

Duke University Nanoscale Interconnects For Integrated Circuit

Dr. Jie Liu and his team of researchers at Duke University are developing a process for fabricating new nanoscale interconnect materials in integrated circuits. Interconnects, which are metallic wires that carry electric power in computer chips, are currently made of copper. Resistance and electro-migration in copper interconnects cause problems in smaller integrated circuits. The momentum from moving electrons can cause atoms to move from their original positions leading to gaps in the connection. As a result, progressively smaller integrated circuits made with copper interconnects have reduced reliability, lose one or more connections, or can even cause failure of the entire circuit.

The Liu group is using carbon nanotubes to replace copper wires. Carbon nanotubes can carry larger current densities, have lower resistance, and may be more stable than copper at certain smaller size scales. Metallic nanotubes have a current carrying capacity of one billion amps per square centimeter while copper wires burn out at one million amps per square centimeter. At this time, one model demonstrates that, when bundles of tens-of-micrometer long densely packed nanotubes with small contact resistances are used, nanotubes can be 80% faster than copper wires at the 22 nm node.

The rights and obligations of the sponsored research agreement between the Company and Duke were transferred to Unidym prior to Unidym s acquisition of Carbon Nanotechnologies, Inc. The terms of the agreement provide for annual funding of approximately $340,000 to fund Dr. Liu s work from December 2005 through November 2007.

University of Florida Flexible Electronic Devices

Dr. Andrew Rinzler and his group at the University of Florida are developing flexible electronic devices. Thin film transistors (TFTs) could be used to make products such as low cost RFID (radio frequency ID) tags, flexible displays, and electronic paper. Further, unlike state of the art electronics manufacturing facilities which cost billions of dollars, flexible electronics are likely to be produced with low cost ink-jet printing technologies. According to estimates from NanoMarkets, the total market for products based on thin film transistors could reach over $20 billion by 2012.

Companies seeking to commercialize thin film transistors have primarily focused on organic transistors. Organic transistors have not, however, demonstrated the mobility and lifetimes necessary for device integration. Dr. Rinzler s team uses carbon nanotubes to make thin film transistors. In addition to having high carrier mobility, nanotubes can be deposited at low temperatures on most substrates directly from solutions. Transistors comprising nanotubes are robust, air stable, and can be bent substantially.

The rights and obligations of the sponsored research agreement between the University of Florida and the Company were transferred to Unidym prior to Unidym s acquisition of Carbon Nanotechnologies, Inc. The terms of the agreement provide for $647,000 in funding over a two year period from July 2006 through June 2008 to develop optimized TFT devices and prototypes of TFT arrays.

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ITEM 1A. RISK FACTORS

We are a development stage company and we have limited historical operations. We urge you to consider our likelihood of success and prospects in light of the risks, expenses and difficulties frequently encountered by entities at similar stages of development.

The following is a summary of certain risks we face. They are not the only risks we face. Additional risks of which we are not presently aware or that we currently believe are immaterial may also harm our business and results of operations. The trading price of our common stock could decline due to the occurrence of any of these risks, and investors could lose all or part of their investment. In assessing these risks, investors should also refer to the other information contained or incorporated by reference in our other filings with the Securities and Exchange Commission.

CERTAIN RISK FACTORS RELATING TO THE COMPANY S FOCUS ON NANOTECHNOLOGY

There are substantial inherent risks in attempting to commercialize new technological applications, and, as a result, we may not be able to successfully develop nanotechnology for commercial use.

The Company finances research and development of nanotechnology, which is a new and unproven field. The Company s research scientists are working on developing technology in various stages. However, such technology s commercial feasibility and acceptance is unknown. Scientific research and development requires significant amounts of capital and takes an extremely long time to reach commercial viability, if at all. To date, the Company s research and development projects have not produced commercially viable applications, and may never do so. During the research and development process, the Company may experience technological barriers that it may be unable to overcome. For example, our scientists must determine how to design and develop nanotechnology applications for potential products designed by third parties for use in cost-effective manufacturing processes. Because of these uncertainties, it is possible that none of our potential applications will be successfully developed. If the Company is unable to successfully develop nanotechnology applications for commercial use, we will be unable to generate revenue or build a sustainable or profitable business.

We will need to achieve commercial acceptance of our applications to generate revenues and achieve profitability.

Even if our research and development yields technologically feasible applications, the Company may not successfully develop commercial products, and even if it does, it may not be on a timely basis. If the Company s research efforts are successful on the technology side, it could take at least several years before this technology will be commercially viable. During this period, superior competitive technologies may be introduced or customer needs may change, which will diminish or extinguish the commercial uses for our applications. Because nanotechnology is an emerging field, the degree to which potential consumers will adopt nanotechnology-enabled products is uncertain. The Company cannot predict when significant commercial market acceptance for nanotechnology-enabled products will develop, if at all, and we cannot reliably estimate the projected size of any such potential market. If markets fail to accept nanotechnology-enabled products, we may not be able to generate revenues from the commercial application of our technologies. Our revenue growth and achievement of profitability will depend substantially on our ability to introduce new technological applications to manufacturers for products accepted by customers. If we are unable to cost-effectively achieve acceptance of our technology among original equipment manufacturers and customers, or if the associated products do not achieve wide market acceptance, our business will be materially and adversely affected.

The Company may not be able to effectively secure first-tier research and development projects when competing against existing or new ventures.

Management believes that the Company s success to date in raising capital to finance nanotechnology research and commercialization projects can be largely attributed to the fact that the plan of operations adopted by the Company is relatively novel. If the Company continues to be successful in attracting funding for research

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and commercialization projects, it is possible that additional competitors could emerge and compete for such funding. Should that occur, the Company could encounter difficulty in raising funds to finance its future operations and further research and commercialization projects.

Additionally, a substantial number of companies fund early-stage, scientific research at universities, and many venture capital firms and other institutional investors invest in companies seeking to commercialize various types of emerging technologies. It is possible that these companies, which may be more established and have greater resources than we do, and venture funds and institutional investors, as well as possible additional competitors, have financed or will begin to finance nanotechnology research. Should that occur, the Company may not be able to secure the opportunity to finance first-tier research and commercialization projects. Furthermore, should any commercial undertaking by the Company prove to be successful, there can be no assurance competitors with greater financial resources will not offer competitive products and/or technologies.

We will need to establish additional relationships with strategic and development partners to fully develop and market our products.

The Company does not possess all of the resources necessary to develop and commercialize products that may result from its technologies on a mass scale. Unless the Company expands its product development capacity and enhances its internal marketing, the Company will need to make appropriate arrangements with strategic partners to develop and commercialize current and future products. If the Company does not find appropriate partners, or if its existing arrangements or future agreements are not successful, the Company s ability to develop and commercialize products could be adversely affected. Even if the Company is able to find collaborative partners, the overall success of the development and commercialization of product candidates in those programs will depend largely on the efforts of other parties and is beyond our control. In addition, in the event the Company pursues its commercialization strategy through collaboration, there are a variety of attendant technical, business and legal risks, including:

- a development partner would likely gain access to Company proprietary information, potentially enabling the partner to develop products without the Company or design around the Company s intellectual property;

- the Company may not be able to control the amount and timing of resources that our collaborators may be willing or able to devote to the development or commercialization of our product candidates or to their marketing and distribution; and

- disputes may arise between us and our collaborators that result in the delay or termination of the research, development or commercialization of our product candidates or that result in costly litigation or arbitration that diverts our management s resources.

The occurrence of any of the above risks could impair our ability to generate revenues and harm our business and financial condition.

Nanotechnology-enabled products are new and may be viewed as being harmful to human health or the environment.

There is public concern regarding the environmental and ethical implications of nanotechnology that could impede market acceptance of products developed through these means. Nanotechnology-enabled products could be composed of materials such as carbon, silicon, silicon carbide, germanium, gallium arsenide, gallium nitride, cadmium selenide or indium phosphide, which may prove to be unsafe or harmful to the environment because of the size, shape or composition of the nanostructures. For this reason, these nanostructures may prove to present risks to human health or the environment that are different from and greater than the better understood risks that may be presented by the constituent materials in non-nanoscale forms. Government authorities in the United States or individual states, and foreign government authorities could, for social or other purposes, prohibit or regulate the use of some or all nanotechnologies. The regulation and limitation of the kinds of materials used in

or used to develop nanotechnology-enabled products, or the regulation of the products themselves, could halt or delay the commercialization of nanotechnology-enabled products or substantially increase the cost, which will impair our ability to achieve revenue from the license of nanotechnology applications.

We have entered into technology license agreements with third parties that require us to satisfy obligations to keep them effective, and if these agreements are terminated, our technology and our business would be seriously and adversely affected.

Through our Subsidiaries, we have entered into exclusive, long-term license agreements with Rice University, California Institute of Technology, Alnylam Pharmaceuticals, Inc., and other entities to incorporate their proprietary technologies into our proposed products. These license agreements require us to pay royalties and satisfy other conditions, including conditions related to the commercialization of the licensed technology. We cannot give any assurance that sales of products incorporating these technologies will be sufficient to recover the amounts that we are obligated to pay to the licensors. Failure by us to satisfy our obligations under these agreements may result in the modification of the terms of the licenses, such as by rendering them non-exclusive, or may give our licensors the right to terminate their respective agreement with us, which would limit our ability to implement our current business plan and harm our business and financial condition.

We rely on outside sources for various components and processes for our products.

We rely on third parties for various components and processes for our products, including the manufacture of Calando s and Insert s product candidates. While we try to have at least two sources for each component and process, we may not be able to achieve multiple sourcing because there may be no acceptable second source, other companies may choose not to work with us, or the component or process sought may be so new that a second source does not exist, or does not exist on acceptable terms. Therefore, it is possible that the business plans of the Company will have to be slowed down or stopped completely at times due to our inability to obtain required raw materials, components and outsourced processes at an acceptable cost, if at all, or to get a timely response from vendors.

We may be unable to scale up our manufacturing processes in a cost effective way.

In some cases, nanotechnology will require new technological and manufacturing processes that, at this time, are very expensive and subject to error. There is no assurance that technology and manufacturing processes will expand and improve quickly enough to enable the Company s targeted products to be made within rigorous tolerances cost effectively. If manufacturing and mass production are not available at a favorable cost, the Company s technology may not be adopted by the applicable industry. Under such scenario, the Company may not achieve its business plan for one or more processes or products, which could adversely impact the value of our Common Stock.

The Company will need approval from governmental authorities in the United States and other countries to successfully realize commercial value from the Company s activities.

In order to clinically test, manufacture and market products for commercial use, two of the Company s current Subsidiaries must satisfy mandatory procedures and safety and effectiveness standards established by various regulatory bodies, including the U.S. Food and Drug Administration (FDA). Technology and product development and approval within this regulatory framework takes a number of years and involves the expenditure of substantial resources. The time and expense required to perform the necessary testing can vary and is substantial. In addition, no action can be taken to market any biologic, drug or device in the United States until the FDA approves an appropriate marketing application. Furthermore, even after initial FDA approval has been obtained, further trials may be required to obtain additional data on safety and effectiveness. Adverse events that are reported during regulatory trials or after marketing approval can result in additional limitations being placed on a product s use and, potentially, withdrawal of the product from the market. Any adverse event, either before or after approval, can result in product liability claims against the Company, which could significantly and adversely impact the value of our Common Stock.

If export controls affecting our products are expanded, our business will be adversely affected.

The U.S. government regulates the sale and shipment of numerous technologies by U.S. companies to foreign countries. Arrowhead s Subsidiaries may develop products that might be useful for military and antiterrorism activities. Accordingly, U.S. government export regulations could restrict sales of these products in other countries. If the U.S. government places burdensome export controls on our technology or products, our business would be materially and adversely affected. If the U.S. government determines that we have not complied with the applicable export regulations, we may face penalties in the form of fines or other punishment.

Our research and product development efforts pertaining to the pharmaceutical industry are subject to additional risks.

Two of our Subsidiaries, Insert and Calando, are focused on research and development projects related to new and improved pharmaceutical conjugates. Drug development is time-consuming, expensive and risky. Even product candidates that appear promising in the early phases of development, such as in early animal and human clinical trials, often fail to reach the market for a number of reasons, such as:

- clinical trial results are not acceptable, even though preclinical trial results were promising;
- inefficacy and/or harmful side effects in humans or animals;
- the necessary regulatory bodies, such as the FDA, did not approve our potential product for the intended use; and
- manufacturing and distribution is uneconomical.

Clinical trial results are frequently susceptible to varying interpretations by scientists, medical personnel, regulatory personnel, statisticians and others, which often delays, limits, or prevents further clinical development or regulatory approvals of potential products. If Insert and Calando are unable to cost-effectively achieve acceptance of their respective biopharmaceutical technology, or if the associated drug products do not achieve wide market acceptance, the businesses of Insert and Calando will be materially and adversely affected, and the value of the Company s interest in these Subsidiaries will diminish.

Our corporate compliance program cannot guarantee that we are in compliance with all applicable federal and state regulations.

The Company s operations, including its research and development and its commercialization efforts, such as clinical trials, manufacturing and distribution, are subject to extensive federal and state regulation. While we have developed and instituted a corporate compliance program based on current best practices, we cannot assure you that the Company or its employees are or will be in compliance with all potentially applicable federal and state regulations or laws. If we fail to comply with any of these regulations or laws, a range of actions could result, including, but not limited to, the termination of clinical trials, the failure to approve a commercialized product, significant fines, sanctions, or litigation, any of which could harm our business and financial condition.

The technology licensed by the Company s Subsidiaries from various third parties may be subject to government rights and retained rights of the originating research institutions.

We license technology from Caltech, Rice University, and other universities and companies. Our licensors may have obligations to government agencies or universities. Under their agreements, a government agency or university may obtain certain rights over the technology that we have developed and licensed, including the right to require that a compulsory license be granted to one or more third parties selected by the government agency.

In addition, our collaborators often retain certain rights under their agreements with us, including the right to use the underlying technology for noncommercial academic and research use, to publish general scientific findings from research related to the technology, and to make customary scientific and scholarly disclosures of information relating to the technology. It is difficult to monitor whether our collaborators limit their use of the technology to these uses, and we could incur substantial expenses to enforce our rights to our licensed technology in the event of misuse.

The Company s ability to protect its patents and other proprietary rights is uncertain, exposing it to the possible loss of competitive advantage.

The Company s Subsidiaries have licensed rights to pending patents and have filed and will continue to file patent applications. The researchers sponsored by the Company may also file patent applications that Arrowhead chooses to license. If a particular patent is not granted, the value of the invention described in the patent would be diminished. Further, even if these patents are granted, they may be difficult to enforce. Even if successful, efforts to enforce our patent rights could be expensive, distracting for management, cause our patents to be invalidated, and frustrate commercialization of products. Additionally, even if patents are issued and are enforceable, others may independently develop similar, superior, or parallel technologies to any technology developed by us, or the Company s technology may prove to infringe upon patents or rights owned by others. Thus, the patents held by or licensed to us may not afford us any meaningful competitive advantage. If we are unable to derive value from our licensed or owned intellectual property, the value of your investment in the Company may decline.

We may be subject to patent infringement claims, which could result in substantial costs and liability and prevent us from commercializing our potential products.

Third parties may claim that our potential products or related technologies infringe their patents. Any patent infringement claims brought against us may cause us to incur significant expenses, divert the attention of our management and key personnel from other business concerns and, if successfully asserted against us, require us to pay substantial damages. In addition, as a result of a patent infringement suit, we may be forced to stop or delay developing, manufacturing or selling potential products that are claimed to infringe a patent covering a third party s intellectual property unless that party grants us rights to use its intellectual property. We may be unable to obtain these rights on terms acceptable to us, if at all. Even if we are able to obtain rights to a third party s patented intellectual property, these rights may be non-exclusive and, therefore, our competitors may obtain access to the same intellectual property. Ultimately, we may be unable to commercialize our potential products or may have to cease some of our business operations as a result of patent infringement claims, which could severely harm our business.

In addition, if our potential products infringe the intellectual property rights of third parties, these third parties may assert infringement claims against our customers, and we may be required to indemnify our customers for any damages they suffer as a result of these claims. The claims may require us to initiate or defend protracted and costly litigation on behalf of customers, regardless of the merits of these claims. If any of these claims succeed, we may be forced to pay damages on behalf of our customers or may be required to obtain licenses for the products they use. If we cannot obtain all necessary licenses on commercially reasonable terms, we may be unable to continue selling such products.

We may not be successful integrating operations of Unidym s California and Texas locations.

Our Subsidiary, Unidym, through its wholly-owned subsidiary, Unidym Acquisition LLC, merged with Texas-based Carbon Nanotechnologies, Inc. (CNI) through a reverse triangular merger on April 20, 2007. Management may fail to successfully integrate the two companies or realize the expected benefits from the merger. Additionally, it is possible that the merger will have a negative impact on Unidym s ability to sell carbon nanotubes, commercialize electronic products incorporating carbon nanotubes, and generate revenue. Unidym may be unable to obtain access to carbon nanotubes from other suppliers that may be better suited for Unidym s electronic products. Similarly, Unidym may lose existing customers or fail to secure prospective customers if those customers believe that Unidym s plan to manufacture electronic products incorporating carbon nanotubes represents a competitive threat. It is also possible that the costs required to integrate the two companies will be greater than expected. It is anticipated that, in the immediate future, both the Houston, Texas, and Menlo Park, California, facilities will continue to operate. Management will be required to supervise and coordinate activities at two facilities in different states. There may be unanticipated redundancies in the capital equipment and research efforts at each facility. Researchers and product managers at different facilities may not effectively communicate, and the cultures and work environments may differ between facilities.

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CERTAIN RISK FACTORS RELATING TO THE EARLY STAGE OF THE COMPANY S BUSINESS

We are a development stage company and the Company s success is subject to the substantial risks inherent in the establishment of a new business venture.

The implementation of the Company s business strategy is still in the development stage. We have acquired majority interests in five Subsidiary companies and, through Unidym, one university research project at Duke University and one university research project at the University of Florida. The Company s business and operations should be considered to be in the development stage and subject to all of the risks inherent in the establishment of a new business venture. Accordingly, the intended business and operations of the Company may not prove to be successful in the near future, if at all. Any future success that the Company might enjoy will depend upon many factors, several of which may be beyond the control of the Company, or which cannot be predicted at this time, and which could have a material adverse effect upon the financial condition, business prospects and operations of the Company and the value of an investment in the Company.

The Company has not generated significant revenues and its business model does not predict significant revenues in the foreseeable future.

To date, the Company has only generated a small amount of revenue as a result of its current plan of operations. Moreover, given its strategy of financing new and unproven technology research, we do not expect to realize significant revenue from operations in the foreseeable future, if at all.

Failure to effectively manage our growth could place strains on our managerial, operational and financial resources and could adversely affect our business and operating results.

Our growth has placed, and is expected to continue to place, a strain on our managerial, operational and financial resources. Further, as our Subsidiaries businesses grow, we will be required to manage multiple relationships. Any further growth by us or our Subsidiaries, or an increase in the number of our strategic relationships will increase this strain on our managerial, operational and financial resources. This strain may inhibit our ability to achieve the rapid execution necessary to implement our business plan, and could have a material adverse effect upon the financial condition, business prospects and operations of the Company and the value of an investment in the Company.

Our future success depends on our ability to expand our organization to match the growth of our Subsidiaries.

As our Subsidiaries grow, the administrative demands upon the Company will grow, and our success will depend on our ability to meet these demands. These demands include increased accounting, management, legal services, staff support and general office services. We may need to hire additional qualified personnel to meet these demands, the cost and quality of which is dependent in part on market factors beyond our control. Further, we will need to effectively manage the training and growth of our staff to maintain an efficient and effective workforce, and our failure to do so could adversely affect our business and operating results.

We must overcome the many obstacles associated with integrating and operating varying business ventures to succeed.

Arrowhead s model to integrate and oversee the strategic direction of various Subsidiaries and research and development projects presents many risks, including:

- the difficulty of integrating operations and personnel; and
- the diversion of our management s attention as a result of evaluating, negotiating and integrating acquisitions or new business ventures.

If we are unable to timely and efficiently design and integrate administrative and operational support for our Subsidiaries, we may be unable to manage projects effectively, which could adversely affect our ability to meet our business objectives and the value of an investment in the Company could decline.

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In addition, consummating acquisitions and taking advantage of strategic relationships could adversely impact our cash position and dilute stockholder interests for many reasons, including:

- changes to our income to reflect the amortization of acquired intangible assets, including goodwill;
- interest costs and debt service requirements for any debt incurred to fund our growth strategy; and
- any issuance of securities to fund our operations or growth, which dilutes or lessens the rights of current stockholders.

Neither the Company nor any of its Subsidiaries have confirmed the value of their assets or business by an independent valuation.

The Company is a development stage company and our assets consist mainly of intellectual property, rights and contracts. The Company s Common Stock is traded on the NASDAQ Capital Market and the trading price of our Common Stock has served as a baseline valuation for Arrowhead Research. However, neither the Company, on a consolidated basis, nor any Subsidiary has sought an independent valuation for their businesses or assets. Traditional methods of valuation include a discounted cash flow analysis and a comparable company analysis. The Company has not generated a positive cash flow to date and does not expect to generate significant cash flow in the near future. Additionally, the Company does not believe that there exist comparable public companies to provide a meaningful valuation comparison. Arrowhead Research s Subsidiary investments were the result of negotiation with Subsidiary management and equity holders, but the investment valuations were not independent verified. Accordingly, Arrowhead Research may have invested in its various holdings at higher or lower valuations than an independent source would have dictated. Therefore, there may be no correlation between the investment valuations used by Arrowhead Research over the years for its investments and the actual market values. If Arrowhead should eventually sell all or a part of any of its consolidated business or that of a Subsidiary, the ultimate sale price may be for a value substantially lower or higher than previously determined by Arrowhead, which could materially and adversely impair the value of our Common Stock.

The Company may need to raise additional capital in the near future, and, if we are unable to secure adequate funds on acceptable terms, the Company may be unable to support its business plan.

The Company s plan of operations is to provide substantial amounts of research project funding and financial support for majority-owned Subsidiaries over an extended period of time. Accordingly, the Company may need to raise additional capital in the near term, and may seek to do so by conducting one or more private placements of equity securities, selling additional securities in a registered public offering, or through a combination of one or more of such financing alternatives. There can be no assurance that any additional capital resources needed by the Company will be available to the Company as and when required, or on favorable terms that will be acceptable to the Company. If the Company is unable to raise the capital required on a timely basis, it may not be able to fund its research projects or the development of the businesses of its Subsidiaries. In such event, the Company may be required to delay or reduce implementation of certain aspects of its plan of operations.

Stockholder interest in the Company may be substantially diluted in additional financings by the Company.

Our Certificate of Incorporation authorizes the issuance of an aggregate of 75,000,000 shares of Common Stock, on such terms and at such prices as the Board of Directors of the Company may determine. As of December 10, 2007, 38,610,420 shares of common stock were issued and outstanding. As of December 10, 2007, 1,615,875 shares and 4,843,667 shares were reserved for issuance upon exercise of options granted under Arrowhead s 2000 Stock Option Plan and 2004 Equity Incentive Plan, respectively. As of December 10, 2007, options to purchase 1,615,875 shares were outstanding under the 2000 Stock Option Plan and options to purchase 3,554,048 shares were outstanding under the 2004 Incentive Plan. As of December 10, 2007, the Company had warrants outstanding to purchase 2,109,862 shares of Common Stock that are callable by the Company under certain market conditions. The issuance of additional securities in financing transactions by the Company or

through the exercise of options or warrants would dilute the equity interests of the Company s existing stockholders, perhaps substantially, and might result in dilution in the tangible net book value of a share of our Common Stock, depending upon the price and other terms on which the additional shares are issued.

The Company s success depends on the attraction and retention of senior management and scientists with relevant expertise.

The Company s future success will depend to a significant extent on the continued services of its key employees, particularly Mr. R. Bruce Stewart, Executive Chairman of Arrowhead, who conceived the Company s business and overall operating strategy and has been most instrumental in assisting the Company to raise capital. In addition, the Company relies on several key executives to manage each of our Subsidiaries. The Company does not maintain key man life insurance for Mr. Stewart or any other executive. The Company s ability to execute its strategy also will depend on its ability to continue to attract and retain qualified scientists, sales, marketing and additional managerial personnel. If we are unable to find, hire and retain qualified individuals, we could have difficulty implementing our business plan in a timely manner, or at all.

CERTAIN RISK FACTORS RELATING TO OUR STOCK

Arrowhead s Common Stock price has fluctuated significantly during fiscal 2005, 2006 and 2007 and may continue to do so in the future.

Because we are a development stage company, there are few objective metrics by which our progress may be measured. Consequently, we expect that the market price of our Common Stock will likely continue to fluctuate significantly. We do not expect to generate substantial revenue from the license or sale of our nanotechnology for several years, if at all. In the absence of product revenue as a measure of our operating performance, we anticipate that investors and market analysts will assess our performance by considering factors such as:

- announcements of developments related to our business;
- developments in our strategic relationships with scientists within the nanotechnology field;
- our ability to enter into or extend investigation phase, development phase, commercialization phase and other agreements with new and/or existing partners;
- announcements regarding the status of any or all of our collaborations or products;
- market perception and/or investor sentiment regarding nanotechnology as the next technological wave;
- announcements regarding developments in the nanotechnology field in general;
- the issuance of competitive patents or disallowance or loss of our patent rights; and
- quarterly variations in our operating results.

We will not have control over many of these factors but expect that they may influence our stock price. As a result, our stock price may be volatile and any extreme fluctuations in the market price of our Common Stock could result in the loss of all or part of your investment.

The market for purchases and sales of the Company s Common Stock may be very limited, and the sale of a limited number of shares could cause the price to fall sharply.

Although the Company s Common Stock is listed for trading on The NASDAQ Capital Market, currently, our securities are relatively thinly traded. Accordingly, it may be difficult to sell shares of Common Stock quickly without significantly depressing the value of the stock. Unless we are successful in developing continued investor interest in our stock, sales of our stock could continue to result in major fluctuations in the price of the stock.

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If securities or industry analysts do not publish research reports about our business, of if they make adverse recommendations regarding an investment in our stock, our stock price and trading volume may decline.

The trading market for our Common Stock will be influenced by the research and reports that industry or securities analysts publish about our business. We do not currently have and may never obtain research coverage by industry or securities analysts. Investors have many investment opportunities and may limit their investments to companies that receive coverage from analysts. If no industry or securities analysts commence coverage of our Company, the trading price of our stock could be negatively impacted. In the event we obtain industry or security analyst coverage, if one or more of the analysts downgrade our stock or comment negatively on our prospects, our stock price would likely decline. If one of more of these analysts cease to cover our industry or us or fails to publish reports about our Company regularly, our Common Stock could lose visibility in the financial markets, which could also cause our stock price or trading volume to decline.

The market price of our Common Stock may be adversely affected by the sale of shares by the Company s management or founding stockholders.

Sales of our Common Stock by our officers, directors and founding stockholders could adversely and unpredictably affect the price of those securities. Additionally, the price of Arrowhead s Common Stock could be affected even by the potential for sales by these persons. We cannot predict the effect that any future sales of our Common Stock or the potential for those sales, will have on our share price. Furthermore, due to relatively low trading volume of our stock, should one or more large stockholders seek to sell a significant portion of its stock in a short period of time, the price of our stock may decline.

We may be the target of securities class action litigation due to future stock price volatility.

In the past, when the market price of a stock has been volatile, holders of that stock have often initiated securities class action litigation against the company that issued the stock. If any of our Stockholders brought a lawsuit against us, we could incur substantial costs defending the lawsuit. The lawsuit could also divert the time and attention of our management.

We do not intend to declare cash dividends on our Common Stock.

We will not distribute cash to our stockholders until and unless we can develop sufficient funds from operations to meet our ongoing needs and implement our business plan. The time frame for that is inherently unpredictable, and you should not plan on it occurring in the near future, if at all.

Our Board of Directors has the authority to issue shares of blank check Preferred Stock, which may make an acquisition of our company by another company more difficult.

We have adopted and may in the future adopt certain measures that may have the effect of delaying, deferring or preventing a takeover or other change in control of the Company that a holder of our Common Stock might consider in its best interest. Specifically, the Company s Board of Directors, without further action by the Company s stockholders, currently has the authority to issue up to 5,000,000 shares of preferred stock and to fix the rights (including voting rights), preferences and privileges of these shares (blank check preferred). Such preferred stock may have rights, including economic rights, senior to our Common Stock. As a result, the issuance of the preferred stock could have a material adverse effect on the price of our Common Stock and could make it more difficult for a third party to acquire a majority of our outstanding Common Stock.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

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ITEM 2. PROPERTIES

Our corporate headquarters is located in Pasadena, California. The Company leases the following facilities:

	Lab/Office Space	Monthly Rent	Lease Commencement	Lease Term
Arrowhead				
Pasadena(1)	7,388 sq ft	$ 17,362	March 1, 2006	62 Months
New York(2)	130 sq ft	$ 3,600	September 1, 2007	12 Months
Aonex	4,000 sq ft	$ 7,611	July 1, 2004	48 Months
Calando	7,000 sq ft	$ 12,944	June 1, 2006	18 Months
Insert	4,354 sq ft	$ 12,173	June 1, 2006	36 Months
Unidym				
Menlo Park, CA	7,000 sq ft	$ 10,500	February 1, 2007	36 Months
Houston, TX	8,017 sq ft	$ 13,362	February 1, 2007	11 Months

(1) Arrowhead leases corporate office space in Pasadena, which it occupied beginning March 1, 2006. The lease agreement provides Arrowhead with two months free rent which was recorded as a deferred liability and is being amortized over the life of the lease.

(2) In September 2005, Arrowhead opened an office in New York City and has one employee working out of that office. In June 2007, the lease was renewed for 12 months effective September 1, 2007.

The Company has no plans to own any real estate and expects all facility leases will be operating leases.

ITEM 3. LEGAL PROCEEDINGS

The Company is not currently party to any material legal proceedings.

ITEM 4. SUBMISSION OF MATTERS TO A VOTE OF SECURITY HOLDERS

No matters were submitted to a vote of security holders during the fourth quarter of fiscal year ended September 30, 2007.

PART II

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

Price Range of Common Stock

Our Common Stock is traded on the NASDAQ Stock Market under the symbol ARWR . The following table sets for the high and low bid prices for a share of the Company s Common Stock during each period indicated. During the year ended September 30, 2007, the weekly trading volume ranged from 129,100 shares to 5,389,600 shares with an average weekly volume of 1,018,520 shares.

	Fiscal Year Ended September 30,			
	2007		2006	
	High	Low	High	Low
1st Quarter	5.30	4.13	5.25	2.99
2nd Quarter	4.63	3.60	5.62	4.04
3rd Quarter	7.60	4.48	7.65	4.10
4th Quarter	5.42	3.97	5.38	4.45

Shares Outstanding

At December 11, 2007, an aggregate of 38,610,420 shares of the Company s Common Stock were issued and outstanding, and were owned by 567 stockholders of record, based on information provided by the Company s transfer agent.

Dividends

The Company has never paid dividends on its Common Stock and does not anticipate that it will do so in the foreseeable future.

Sales of Unregistered Securities

The Company did not conduct any offerings of equity securities during the fourth quarter of 2007 that were not registered under the Securities Act of 1933.

Repurchases of Equity Securities

We did not repurchase any shares of our common stock during fiscal 2007 or fiscal 2006.

Information Regarding Equity Compensation Plans

The following table provides certain information as of September 30, 2007, with respect to all of the Company s equity compensation plans in effect on that date.

	Equity Compensation Plan Information		
Plan Category	**Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)**	**Weighted average exercise price of outstanding options, warrants and rights (b)**	**Number of securities remaining available for future issuance under equity compensation plans (excluding securities**

				reflected in column (a))(c)
Equity compensation plans approved by security holders(1)	4,994,923	$	3.10	1,464,619
Equity compensation plans not approved by security holders(2)				
Total	4,994,923			1,464,619

(1) Includes the 2000 Stock Option Plan and the 2004 Equity Incentive Plan.

(2) As of September 30, 2007, Arrowhead did not have any equity compensation plans that were not approved by stockholders.

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ITEM 6. SELECTED FINANCIAL DATA

The table below presents selected consolidated financial data of Arrowhead and its Subsidiaries as of and for the years ended September 30, 2007, 2006, 2005, 2004 and 2003, derived from Arrowhead s audited consolidated financial statements included in this Annual Report on Form 10-K and prior years reports filed on Form 10-K. Certain prior year amounts have been reclassified to conform to current year presentation or the retroactive application of FAS 123(R).

The selected consolidated financial data set forth below should be read in conjunction with our consolidated financial statements and related notes thereto and Management s Discussion and Analysis of Financial Condition and Results of Operations included elsewhere in this Annual Report on Form 10-K.

Arrowhead Research Corporation & Subsidiaries Selected Financial Data

Arrowhead Research Corporation

Selected Financial Data

	Year Ended September 30,				
	2007	**2006**	**2005**	**2004**	**2003**
Consolidated Statements of Operations Data:					
REVENUE	$ 1,208,022	$ 595,458	$ 590,683	$ 196,306	$
COST OF GOODS SOLD	724,088				
GROSS PROFIT ON SALES	483,934	595,458	590,683	196,306	
OPERATING EXPENSES					
Salaries	10,048,302	6,511,641	3,239,398	555,802	25,000
Consulting	1,798,143	749,720	447,111	624,330	25,000
General and administrative	5,240,150	4,389,232	2,561,295	913,653	41,063
Research & development	20,930,548	9,036,999	3,753,975	793,354	3,375
Patents amortization	415,963	391,248	181,752		
TOTAL OPERATING EXPENSES	38,433,106	21,078,840	10,183,531	2,887,139	94,438
OPERATING LOSS	(37,949,172)	(20,483,382)	(9,592,848)	(2,690,833)	(94,438)
OTHER INCOME (EXPENSE)					
Gain on sale of stock in subsidiary			2,292,800		
Unrealized (loss) in marketable securities		315,616	78,761	(12,113)	
Interest	1,264,693	852,967	151,052	31,341	
Other income	329		3,308		
TOTAL OTHER INCOME (EXPENSES)	1,265,022	1,168,583	2,525,921	19,228	
LOSS BEFORE MINORITY INTERESTS	(36,684,150)	(19,314,799)	(7,066,927)	(2,671,605)	(94,438)
Minority interests	6,753,032	317,590	1,520,039	251,723	
LOSS FROM CONTINUING OPERATIONS	(29,931,118)	(18,997,209)	(5,546,888)	(2,419,882)	(94,438)
Loss from discontinued operations of Nanotechnica, Inc.			(1,234,233)	(108,272)	
Loss on disposal of Nanotechnica, Inc.			(73,797)		
Provision for income taxes				(800)	(800)
NET LOSS	$ (29,931,118)	$ (18,997,209)	$ (6,854,918)	$ (2,528,954)	$ (95,238)

Amounts per common share:					
Loss from continuing operations per share, basic and diluted	$ (0.83)	$ (0.59)	$ (0.30)	$ (0.22)	$ (0.03)
Loss from discontinued operations per share, basic and diluted			(0.07)	(0.01)	
Net loss per share, basic and diluted	(0.83)	(0.59)	(0.36)	(0.23)	
Weighted-average shares, basic and diluted	35,867,091	31,953,809	18,725,263	11,002,094	3,738,750
Consolidated Balance Sheet Data:					
Cash, cash equivalents and marketable securities	$ 24,120,097	$ 28,020,304	$ 22,543,896	$ 9,040,554	$ 1,355,289
Working capital	22,409,053	25,855,557	21,789,931	8,807,377	1,417,737
Total assets	29,852,952	34,525,878	29,040,721	11,915,778	1,515,939
Current liabilities	2,896,375	2,920,234	1,024,064	689,698	96,177
Minority interest	152,609	934,438	1,889,190	1,777,699	
Stockholders equity	26,303,968	30,671,206	26,127,467	9,448,381	1,419,762

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

Overview

Arrowhead is a development stage nanotechnology company commercializing new technologies in the areas of life sciences, electronics, and energy. Arrowhead s mission is to build shareholder value through the identification, development and commercialization of nanotechnology-related products and applications. The Company works closely with universities to source early stage deals and to generate rights to intellectual property covering promising new nanotechnologies. Arrowhead takes a portfolio approach by operating multiple subsidiaries (each a Subsidiary, and, collectively, the Subsidiaries) which allows the pursuit of multiple opportunities and diversifies risk. Currently, Arrowhead operates five majority-owned Subsidiaries focused on developing and commercializing nanotech products and applications and has funded a number of prototype development efforts in leading university labs in exchange for the exclusive right to license the technology developed in such labs.

Majority-owned Subsidiaries

Arrowhead owns majority interest in its Subsidiaries, securing substantial participation in any success. Each Subsidiary is staffed with its own technical and business team that focuses on its specific technology and markets while Arrowhead provides accounting, financial, strategic, and administrative services. The Company s five majority-owned Subsidiaries are commercializing a variety of nanotech products and applications, including anti-cancer drugs, RNAi therapeutics, carbon-based electronics and compound semiconductor materials. In the near term, Arrowhead expects to add to its portfolio through selective acquisition and formation of new companies.

Sponsored Research

In exchange for the exclusive right to license the resultant technology developed in sponsored laboratories, Arrowhead and/or its Subsidiaries have worked with some of the most highly-regarded academic institutions in the country, including the California Institute of Technology (Caltech), Stanford University, Duke University and the University of Florida, in critical areas such as stem cell research, carbon electronics and molecular diagnostics. By funding university research, Arrowhead and/or its Subsidiaries has the ability to evaluate the probability of technical success at low research cost and, if warranted, continue development at the university by leveraging the existing resources available to scientists at universities, such as laboratories and equipment, as well as operating in an atmosphere that encourages the exchange of ideas. Moreover, the cultivation of relationships in the academic community provides an additional window into other promising technologies.

Subsidiaries

At September 30, 2007, the Company had five majority-owned, operating Subsidiaries, Insert Therapeutics, Inc. (Insert), Calando Pharmaceuticals, Inc. (Calando), Unidym, Inc. (Unidym , formerly NanoPolaris, Inc.), Tego BioSciences Corporation (Tego) and Aonex Technologies, Inc. (Aonex). As part of its model, the Company will create subsidiaries to commercialize promising technologies or close subsidiaries based upon lack of progress of the Subsidiary.

Insert has developed Cyclosert , a proprietary drug delivery platform technology based on a nano-engineered class of linear cyclodextrin-containing polymers. IT-101, Insert s first therapeutic candidate, is a conjugate of Insert s patented nano-engineered drug delivery polymer and camptothecin, a potent anti-cancer compound. Insert s investigational new drug (IND) application for IT-101 was accepted by the U.S. Food and Drug Administration (FDA) in March 2006. A Phase I study for IT-101 began in the summer of 2006 at the City of Hope Cancer Center. Interim results from the trial were reported in June 2007. The trial is expected to be completed in 2008.

Calando is designing, developing and commercializing novel RNAi therapeutics to treat diseases and other medical conditions by combining effective RNAi therapeutics with patented and proprietary delivery technologies. Calando s first therapeutic candidate is designed for the treatment of cancer. Calando expects to file an IND application in early 2008.

Unidym is developing high-performance, cost-effective carbon nanotube-based products for the electronics industry. Through license of intellectual property from several universities and by virtue of its April 2007 merger with Texas-based Carbon Nanotechnologies, Inc. (CNI), Unidym has assembled exclusive commercial rights related to carbon nanotube manufacture and applications. The merger also provided Unidym with the ability to manufacture carbon nanotubes on a larger scale. Unidym s initial product is a transparent conductive film designed to replace the expensive and brittle metal oxide films currently used in electronic products like flat panel displays, touch screens, OLEDs and thin film solar cells. In addition to its product development efforts, Unidym manufactures and sells carbon nanotubes to customers and has entered in joint development agreements to incorporate its carbon nanotube films into existing products.

On April 20, 2007, Tego BioSciences Corporation, a newly formed, wholly-owned subsidiary of Arrowhead, acquired the assets of C Sixty, Inc., a Texas-based company developing protective products based on the anti-oxidant properties of fullerenes. Initially, Tego is collaborating with the National Cancer Institute s Nanotechnology Characterization Lab (NCL) for preclinical studies to measure the ability of a Tego fullerene formulation to protect against harmful side effects of two anti-cancer drugs, cisplastin and adriamycin. The first stage of the studies used NCL s resources. In October 2007, Arrowhead invested $2.4 million into Tego to fund the development of various uses for fullerenes.

Aonex is developing engineered wafers to enable manufacturers of blue and white LEDs to reduce their production costs and create higher efficiency devices. After analyzing the existing competition and scale required for success in its core markets, Aonex has opted to seek an established company with which to partner in its future commercialization efforts. Aonex is continuing to develop its technology in a phase down mode while it explores possibilities for collaboration with other companies.

Critical Accounting Policies and Estimates

Management makes certain judgments and uses certain estimates and assumptions when applying accounting principles generally accepted in the United States in the preparation to our Consolidated Financial Statements. We evaluate our estimates and judgments on an ongoing basis and base our estimates on historical experience and on assumptions that we believe to be reasonable under the circumstances. Our experience and assumptions form the basis for our judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may vary from what we anticipate and different assumptions or estimates about the future could change our reported results. We believe the following accounting policies are the most critical to us, in that they are important to the portrayal of our consolidated financial statements and require our most difficult, subjective or complex judgments in the preparation of our consolidated financial statements. For further information, see *Note 1, Organization and Significant Accounting Policies*, to our Consolidated Financial Statements which outlines our application of significant accounting policies and new accounting standards.

Revenue Recognition

Revenue from product sales are recorded when persuasive evidence exists that an arrangement existed, title had passed and delivery has occurred, the price was fixed and determinable, and collection was reasonably assured.

We may generate revenue from product sales, technology licenses, collaborative research and development arrangements, and research grants. Revenue under technology licenses and collaborative agreements typically

consists of nonrefundable and/or guaranteed technology license fees, collaborative research funding, and various milestone and future product royalty or profit-sharing payments.

Revenue associated with up-front license fees and research and development funding payments, under collaborative agreements, is recognized ratably over the relevant periods specified in the agreement, generally the research and development period. Revenue from substantive milestones and future product royalties is recognized as earned based on the completion of the milestones and product sales, as defined in the respective agreements. Payments received in advance of recognition as revenue are recorded as deferred revenue.

Research and Development Expenses

Research and development expenses include salaries and benefits, trial (including pre-clinical, clinical and other) and manufacturing costs, purchased in-process research expenses, contract and other outside service fees, and facilities and overhead costs related to our research and development efforts. Research and development expenses also consist of costs incurred for proprietary and collaborative research and development. Research and development costs are expensed as incurred.

Impairment of Long-lived Assets

We review our long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of assets may not be fully recoverable or that our assumptions about the useful lives of these assets are no longer appropriate. If an impairment is indicated, the asset is written down to its estimated fair value based on quoted fair market values.

Valuation of Goodwill

In accordance with *Statement of Financial Accounting Standards,* or SFAS*, No. 142, Goodwill and Other Intangible Assets*, we review goodwill (if any) for impairment annually and whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Goodwill is tested for impairment by comparing the fair value of the single reporting unit to its carrying value. If the implied fair value of goodwill is less than its carrying value, an impairment charge would be recorded.

Intellectual Property

Intellectual property consists of patents and patent applications internally developed, licensed from universities or other third parties or obtained through acquisition. Patents and patent applications are reviewed for impairment whenever events or circumstances indicate that the carrying amount may not be recoverable, and any impairment found is written off. Licensed or internally developed patents are written off over the life of the patent unless impairment occurs. Purchased patents are written off over three years, unless an impairment occurs sooner.

Results of Operations

The Company had a consolidated loss of approximately $29.9 million for the year ended September 30, 2007, compared to a consolidated loss of $19.0 million and $6.9 million for the years ended September 30, 2006 and 2005, respectively. During the second quarter of fiscal 2005, the Company recognized a gain of $2.3 million applicable to the sale to third parties of a portion of Arrowhead s ownership in Insert, thereby reducing the loss for fiscal 2005 by the same amount.

The increase in the fiscal 2007 consolidated loss over fiscal 2006 and fiscal 2005 (adjusted for the one time gain in fiscal 2005) occurred in several areas. First, staffing continues to increase as the Company grows. With the phase up of Unidym starting in July of 2006 and the merger with CNI in April 2007, staffing has almost

doubled. Staff was added within Insert and Calando to accommodate the increase in development efforts of new products and of the IND to be filed by Calando. Staff was added in fiscal 2006 to handle the increase in general, accounting and administrative responsibilities as the Company has grown and to comply with the Sarbanes Oxley Act of 2002, as amended (SOX). Second, Calando incurred major expenses during fiscal 2007 related to preclinical research, preparation for the filing of its Investigational New Drug application (IND) with the U.S. Food and Drug Administration, (FDA), to obtaining sufficient drug inventories to be able to enter Phase I Clinical Trials, and payment for preparation required to enter the trials. Third, legal expenses increased as the Company completed the merger with CNI, a private placement for Insert and a private placement for Arrowhead.

The increased loss in fiscal 2007 was also the result of a non-cash $9.6 million charge to Purchased in-process research and development to account for the purchase of CNI, increased expenses in Unidym related to the establishment of the Menlo Park location and the addition of the Texas operations, and expenses related to Insert s continuation of Phase I clinical trials and preparation for Phase II clinical trials with Insert s drug candidate, IT-101, and preparation for Phase I clinical trials for Calando s drug candidate CALAA-01.

Revenues

The Company generated revenues of $1,175,505 for the year ended September 30, 2007, compared to $595,458 and $590,683 for the years ended September 30, 2006 and 2005, respectively. The revenue for fiscal 2007 consists of $874,380 of funded research for the development of carbon nanotube applications and $326,427 from the sale of carbon nanotubes to third parties (as a result of the merger with CNI) and $7,394 in residual funded research. The revenue in fiscal 2006 and fiscal 2005 was for funded research and for a license and development payments paid to Calando by a third party.

Operating Expenses

The analysis below details the operating expenses and discusses the expenditures of the Company within the major categories.

For purposes of comparison, the amounts for the three years ended September 30, 2007, 2006 and 2005, are shown in the tables below. Prior period amounts have been reclassified to conform to the current period presentation.

The amounts for each period have been adjusted to include the adoption of SFAS 123R.

Salary & Wage Expenses

Arrowhead employs management, administrative and technical staff at the Arrowhead corporate offices and the Subsidiaries. Salary and wage expense consists of salary, benefits, and non-cash charges related to equity based compensation in the form of stock options. Salary and benefits are allocated to two major categories: general and administrative compensation related expense, research and development (R&D) and a small portion of salaries and wages is allocated to cost of goods sold, beginning in 2007, depending on the primary activities of each employee. The following table details salary and related expenses for fiscal 2007, fiscal 2006 and fiscal 2005.

(in thousands)

	Year Ended September 30, 2007	% of expense category	Year Ended September 30, 2006	% of expense category	Year Ended September 30, 2005	% of expense category
G&A compensation-related	$ 4,342	42%	$ 1,795	28%	$ 1,115	34%
Stock-based compensation	2,176	21%	1,369	21%	576	18%
R&D compensation-related	3,530	34%	3,348	51%	1,548	48%
Cost of Goods Sold	300	3%	N/A	N/A	N/A	N/A
Total	$ 10,348	100%	$ 6,512	100%	$ 3,239	100%

The Company was established in May 2003, but had only one employee until the second quarter of fiscal 2004. The major reason for the growth in compensation since fiscal 2004 has been the addition of administrative and technical staff. During this four year period, the Company started Aonex (April 2004), NanoPolaris (April 2005), Calando (February 2005), Nanotechnica (September 2004 and closed in June 2005), acquired Insert (June 2004) and Unidym (June 2006) and merged Unidym with NanoPolaris (July 2006) and later merged with Carbon Nanotechnologies, Inc. (April 2007) Arrowhead also acquired the intellectual property of C Sixty (April 2007) now held in the name of Tego BioSciences Corporation (June 2007). The merger with CNI added about 30 employees to the payroll in April 2007.

In fiscal 2007, the Company accrued the cost of the severance (approximately $1 million) to be paid to two executives upon their departure from the Company over periods ranging from one to three years. This charge is non cash until paid but is included in G&A compensation for fiscal 2007.

In January 2007, the Company recruited a President and CEO for Insert, who left Insert at the end of May 2007. In November 2007, a new President and CEO was hired for Insert and Calando. In June 2007, the Company recruited a President and CEO for Unidym. G&A related compensation in fiscal 2006 when compared to fiscal 2005 is the result of hiring and subsequent departure of a President for Arrowhead and the associated severance. In addition to the cost associated with the former President and his severance, the corporate office incurred additional costs associated with the hiring of one additional executive to support the Company and the Subsidiaries in the areas of SOX implementation, financial analysis and budgeting in March 2006. In May 2005, Arrowhead s CEO pay was adjusted upward by the Compensation Committee. Prior to that time, the CEO was paid a nominal amount to accommodate the Company s start up status while the Company obtained financing and began operations. Prior to January 2005, the President of Insert/Calando was a consultant. Beginning in January 2005, he became a full time employee. Both Insert and Calando hired administrators in fiscal 2005 which further added to the increase in fiscal 2006. In December 2007, the Company hired a new President and Chief Executive Officer.

In fiscal 2007, fiscal 2006 and fiscal 2005, the Company and its Subsidiaries also had performance reviews and increased the pay of existing employees where warranted. These increases contributed to the growth in salary expense over the three year period.

Stock-based compensation is a non-cash charge related to the issuance of stock options to new and existing employees and the vesting of these options. This expense is recorded pursuant to the adoption of SFAS 123R which requires expensing of stock-based compensation for all options granted. Stock options are awarded to new full time employees and to existing employees. While the number of options has increased overall, this number will vary from year to year depending on hiring, on terminations and on awards to new and existing employees.

Research and development (R&D) compensation expense increased each fiscal year as the Company has grown. However, the primary factors which led to growth in fiscal 2007 was the June 2006 acquisition of

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Unidym and subsequent ramp-up of development activities, as well as the April 2007 merger with CNI and the resulting consolidation with its Texas operations under Unidym. In addition, technical staff was added at Insert and Calando to increase the scope of development at each subsidiary. The expense was partially offset by the termination of several employees at Aonex early in fiscal 2007. The Company expects that salaries and wages will continue to grow in fiscal 2008 as more people are hired to support development within the Subsidiaries.

General & Administrative Expenses

The following table summarizes our general and administrative expenses for each of the fiscal years ended September 30, 2007, 2006 and 2005.

(in thousands)

	Year Ended September 30, 2007	% of expense category	Year Ended September 30, 2006	% of expense category	Year Ended September 30, 2005	% of expense category
Professional/outside services	$ 1,381	26%	$ 1,559	35%	$ 902	35%
Recruiting	550	11%	200	5%	24	1%
Facilities related	303	6%	337	8%	89	3%
Patent expense	902	17%	849	19%	397	15%
Travel expense	649	12%	288	7%	172	7%
Business insurance	494	9%	258	6%	145	6%
Depreciation-G&A	191	4%	294	7%	277	11%
Communications and technology	250	5%	153	3%	210	8%
Office expense	269	5%	259	6%	200	8%
Others	251	5%	192	4%	145	6%
Total	$ 5,240	100%	$ 4,389	100%	$ 2,561	100%

Professional/outside services include general legal, accounting, and other outside services retained by the Company and its Subsidiaries. All periods include normally occurring legal and accounting expenses related to SEC compliance and other corporate matters as well as legal expenses related to intellectual property matters. Legal expenses for fiscal 2007 include expenses applicable to the merger with CNI (approximately $350,000) and a private placement for Arrowhead and legal expenses related to a financing by Insert including a $5 million follow-on investment by Arrowhead.

Recruiting expense increased dramatically due to the payment of approximately $150,000 to hire a president for Insert in the first quarter of Fiscal 2007 and the payment of approximately $150,000 in the second quarter of Fiscal 2007 related to the search for a president for Unidym. Recruiting fees are expected to continue as the Company builds out its management team, but the cost is not predictable at this time.

The Company incurred additional expense for new or expanded leases as Subsidiaries were established or expanded in fiscal 2006. The increase in fiscal 2006 over fiscal 2005 was primarily related to the Company s move to larger corporate offices in March 2006, and the move of Insert into new laboratory facilities in June 2006. In addition, Calando moved in July 2006 into the facility previously occupied by Insert which increased Calando s rent expense. In June 2006, the Company purchased the assets of Unidym and established office and lab facilities for Unidym. Facilities related expenses remained stable in fiscal 2007 and are expected remain stable in fiscal 2008.

Patent expenses for the last two fiscal years remain constant but the mix has changed. The increase in fiscal 2007 over fiscal 2006 was due to the patent portfolio acquired by the Company was a result of the CNI merger.

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The large dollar increase from fiscal 2005 to fiscal 2006 was primarily due to the establishment of NanoPolaris (now called Unidym) and the gathering of patents from various universities related to carbon nanotubes and a retro-active billing by Caltech ($300K) related to the patents that Insert has for the delivery system.

With the growth of the Company through mergers and acquisitions, the Company now has multiple locations in California, Texas and New York City. The increased travel among those locations has resulted in a significant increase in travel expense in fiscal 2007 compared to fiscal 2006 and fiscal 2005. In addition, the employees have traveled to Europe and Asia in pursuit of collaborations and agreements. The Company continues to pursue increased public and investor relations activities, and new business initiatives. Travel expense can be expected to increase in the future.

Insurance increased as a result of increases in limits and coverage as the Company has grown. For instance, the director and officer insurance coverage was increased from $5 million in fiscal 2005 to $15 million in fiscal 2006/fiscal 2007. The Company incurred this expense in anticipation of attracting new executive management to the Company and its Subsidiaries. In addition, Insert has additional insurance as a result of its entry into clinical trials in fiscal 2006 and Calando is expected to have the same expense in fiscal 2008 as it enters clinical trials. The Company will continue to see this expense increase as the Company grows.

The primary reason for the decrease in depreciation was completion of the write off of Aonex leasehold improvements in June 2006. It is our policy to write off leasehold improvements over the initial term of the lease even when the lease is later extended.

Research and Development Expenses

The bulk of Arrowhead s R & D expenses for fiscal 2007, fiscal 2006 and fiscal 2005 were related to research and development activities by Arrowhead s Subsidiaries. Currently, Arrowhead operates five majority-owned Subsidiaries, each focused on development and commercialization of nanotechnology products or applications and has funded a number of sponsored research efforts in leading university labs in exchange for the exclusive right to license the technology developed in such labs. Each Subsidiary is staffed with its own technical team that focuses on its specific technology and markets while Arrowhead provides financial, strategic and administrative resources.

The following table details R&D expenses for the three fiscal years ended September 30, 2007, 2006 and 2005:

(in thousands)

	Year Ended September 30, 2007	% of expense Category	Year Ended September 30, 2006	% of expense category	Year Ended September 30, 2005	% of expense category
Outside labs & contract services	$ 6,658	32%	$ 3,578	40%	$ 1,347	36%
In-Process R&D purchased	9,598	46%	2,448	27%	N/A	N/A
Laboratory supplies & services	1,246	6%	916	10%	761	20%
Facilities related	830	4%	461	5%	332	9%
Sponsored research	1,343	6%	1,170	13%	944	25%
Depreciation-R&D	397	2%	244	3%	200	5%
Other research expenses	859	4%	220	2%	183	5%
Total	$ 20,931	100%	$ 9,037	100%	$ 3,767	100%

Outside labs & contract services involves work done on behalf of the Subsidiaries. Using contract services allows each Subsidiary to keep its cost of development to a minimum, only hiring those people that it will need in the long run. Therefore, this expense can increase or decrease depending on the need of each Subsidiary. These expenses have increased significantly over the past three years, primarily due to Insert s Phase I clinical trials of IT-101, Calando s preparation for the anticipated initiation of clinical trials and to the full year that Unidym has been operating. Further, continued growth in the Company through mergers, acquisitions and formation of new subsidiaries could increase this number in the future.

Increased outside labs and contract services expense for Insert and Calando in fiscal 2007 over fiscal 2006 are due to outsourced preclinical studies for pipeline candidates for Insert, outsourced preclinical studies in preparation for the filing of an IND application filing by Calando, outsourced manufacture of Calando s therapeutic candidate for preclinical and clinical studies and regulatory consulting for the ongoing clinical trials by Insert and for the preparation of the IND filing by Calando. Unidym incurred similar expense related to the outsourcing of process development. Fluctuations in this expense category have been experienced in previous periods and can be expected to continue due to the differences in the demands of the development plans from quarter to quarter and year to year.

The increase in laboratory supplies and services and facilities related expenses over the same periods in prior years is primarily related to the commencement of the development effort for the transparent conductive film by Unidym starting in June 2006. From inception until the June 2006 acquisition of the net assets of Unidym, NanoPolaris (which subsequently changed its name to Unidym, Inc.) was primarily involved in the identification and licensing of intellectual property related to the manufacture and use of carbon nanotubes and had no employees. Starting in February 2007, Unidym rented laboratory space in Menlo Park and incurred expense to set up the lab. Laboratory supplies and facility expense related to Unidym s Texas facility also contributed to the increase in the expense for the year ended September 30, 2007. The build-out and move of Insert s offices and labs and the move of Calando into the lab previously occupied by Insert also contributed to the expense, as did the increase in rent at both facilities.

On March 14, 2006, Insert received approval for its IND application from the FDA for its lead anti-cancer therapeutic, IT-101 and began Phase I clinical trials in the third quarter of calendar 2006. In advance of the clinical trials, Insert was required to pay the cost to manufacture the entire amount of IT-101 necessary to complete animal trials in fiscal 2005 and Phase I clinical trials which started in fiscal 2006. It is the Company s policy to expense the cost of the supplies and services when received even if they may benefit subsequent years. Laboratory supplies & services remained fairly constant in fiscal 2006 and fiscal 2005. The cost of the supplies and services expensed in both years was approximately $1.3 million. While Insert was beginning Phase I clinical trials, Calando was beginning large mammal studies. While the purchase of supplies and animal studies of this magnitude is not a normal recurring expense, the continued development of new products in the Subsidiaries will result in increased R&D laboratory supplies and services in the future.

In fiscal 2007, Purchased in processed R&D represents the cost incurred for the CNI/Unidym merger in excess of the value of identifiable tangible and intangible value of assets at the time of the merger. CNI s focus has been on the development of manufacturing processes and applications for carbon nanotubes. The timing and estimated costs to complete project and estimated cash flows are impossible to determine. In connection with the merger, certain shareholders assumed $5.4 million of CNI s debt in exchange for $5.4 million of restricted Arrowhead common stock. In addition, Unidym Series A Preferred Stock with an estimated value of $4.2 million was issued in exchange for all the outstanding stock in CNI. The total amount of consideration for the CNI merger, estimated at $9.6 million, was expensed to Purchased in-process R&D.

In fiscal 2006, the Company accounted for the acquisition of minority interests of Calando as a purchase of in-process research and development. Arrowhead purchased 1,224,000 shares of Calando s common stock from various minority shareholders for an aggregate price of $2,448,000 in fiscal 2006. The purchases were made through a series of transactions during the year. Payment for the shares included a total of $1,370,667 in cash and $1,077,333 of Arrowhead common stock.

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Facility related expense increases in fiscal 2007 was primarily the result of leasing offices and lab space for Unidym in Menlo Park, California and the merger of Unidym and CNI in April 2007. In addition, Calando is paying more for its new space which it occupied just prior to the beginning of fiscal 2007.

Sponsored research expense increased slightly in fiscal 2007 over fiscal 2006 and fiscal 2005. The Company has added two sponsored research projects that were not in place at September 30, 2006. As part of the merger with CNI, Unidym has taken over the payments, rights and responsibilities related to the sponsored research projects at Duke and at the University of Florida. Subsequent to the year ended September 30, 2007, the Company decided to cancel the two sponsored research projects at Caltech pursuant to the provisions of the respective sponsored research agreements.

Use of outside labs and contract services allows the Subsidiaries access to equipment which is expensive to buy and which may not be needed on a regular basis. Arrowhead encourages its Subsidiaries to purchase assets when justified and to use outside services when possible to limit investment in capital equipment. This mode of operation keeps the depreciation low as a percentage of total cost.

The table below sets forth the approximate amount of Arrowhead s cash expenses for research and development projects at each Subsidiary for the periods described below.

Name of Subsidiary / Project	Project expenses for year ended September 30, 2007	Project expenses for year ended September 30, 2006	Project expenses for year ended September 30, 2005	Project expenses from inception of Project through September 30, 2007
Calando Pharmaceuticals, Inc. / CALAA-01	$ 6.7 Million	$ 2.1 Million	$ 0.3 Million	$ 9.1 Million
Insert Therapeutics/ IT 101	$ 7.5 Million	$ 5.2 Million	$ 2.0 Million	$ 14.7 Million
Unidym, Inc. / Thin Film Carbon Nanotubes	$ 5.7 Million	$ 0.9 Million		$ 6.6 Million
Aonex Technologies, Inc. / Wafer Fabrication	$ 0.7 Million	$ 2.1 Million	$ 2.2 Million	$ 5.8 Million
Tego Biosciences Corporation / Fullerene Anti-oxidants				
Total of all listed Subsidiaries	$ 20.6 Million	$ 10.3 Million	$ 4.5 Million	$ 36.2 Million

Calando Pharmaceuticals, Inc.

Calando s lead product candidate, CALAA-01, is a formulation containing Calando s proprietary drug delivery technology with a siRNA duplex targeting the M2 subunit of ribonucleotide reductase, a well-established cancer target. Calando is preparing an investigational new drug (IND) application for filing with the FDA and expects to begin its first clinical trial in 2008. Calando s research and development efforts on CALAA-01 are preliminary, and there is no assurance that this compound will be successful. Advancing this development candidate into human clinical trials is dependent on FDA review and approval of Calando s IND application. Research and development expenses related to CALAA-01 are reflected in the tables above. It is not possible at this time to accurately determine the final cost of CALAA-01, the completion date, or when revenue will commence. If Calando meets its milestone objectives (see *Note 7, Commitments and Contingencies*, to our Consolidated Financial Statements for an explanation of those milestones), it should have sufficient capital to fund its operations until the end of the second quarter of fiscal 2008.

Insert Therapeutics, Inc.

Insert was purchased by the Company in June 2004. Insert s primary asset was a license from Caltech for patents and other intellectual property for the use of cyclodextrin polymers in drug delivery applications. In fiscal 2005, Insert continued research and development of its anti-cancer therapeutic IT-101, which uses the technology covered by the Caltech patents. IT-101 is a conjugate of the cyclodextrin polymer and the anti-cancer agent, camptothecin. On March 14, 2006, Insert s IND application for IT-101 was accepted by the FDA and Insert began a Phase I clinical trial at the City of Hope in the third quarter of calendar 2006.

To build its pipeline of products, Insert has investigated conjugates of the cyclodextrin delivery molecule as well as two other potent anti-cancer agents, epotholones and tubulysins, and a steroid treatment for chronic inflammation. Insert is also preparing for Phase II trials of IT-101. Research and development expenses related to IT-101 are reflected in the tables above. Insert s research and development activities related to IT-101 and other pipeline candidates are preliminary, and there is no assurance that they will be successful. It is not possible at this time to accurately determine the final cost of IT-101, the completion date, or when revenue will commence.

Unidym, Inc.

Arrowhead founded the company now operating as Unidym in April 2005. Since inception, the company has aggregated intellectual property related to carbon nanotube manufacturing and product applications. The portfolio has been built through licensing of patents and other intellectual property from various universities, through sponsored research, and by the acquisition of Unidym, Inc., a UCLA spin out developing transparent electrodes, and a merger with CNI, a Texas-based company manufacturing and selling carbon nanotubes and developing products containing carbon nanotubes. Unidym is currently generating revenue by producing and selling carbon nanotubes, and is anticipated to generate additional revenue by continuing to produce and sell products and product applications using carbon nanotubes and by licensing technology to third parties beginning in 12 to 24 months.

In connection with the merger, in exchange for Arrowhead Common Stock valued at $5.4 million, Arrowhead acquired preferred stock in CNI originally issued to certain shareholders in exchange for their assumption of CNI s debt in the amount $5.4 million. In connection with the merger, Unidym also issued 5,000,000 shares of Series A Preferred Stock valued at $4.2 million for all of the outstanding stock of CNI. Unidym wrote off approximately $9.6 million to Purchased In Process R&D . See Note 4 to the Consolidated Financial Statements and the discussion of research and development expenses above. Also in connection with the merger, Arrowhead accelerated a planned capital contribution of $4,000,000 to Unidym.

Development, manufacturing, and sale of cost effective electronic products incorporating carbon nanotubes will require significant investment and take a long time. There are a variety of technical, cost, and marketing barriers that must be overcome. It is not possible at this time to predict the final cost of developing Unidym s transparent conductive film or other carbon nanotube products, the final cost of scaling up the manufacturing process for cost effective production of carbon nanotubes for products, or when or if Unidym will generate significant licensing revenue or become profitable. Subsequent to September 30, 2007, Unidym closed a private placement for approximately $10.8 million. Unidym currently has sufficient cash to operate through fiscal 2008 at the current rate of cash consumption.

Tego BioSciences Corporation

In April 2007, Tego BioSciences Corporation (Tego) was formed to acquire the assets of C Sixty, Inc. Tego is focused on developing and commercializing products for the health care industry based on modified buckministerfullerenes (also known as fullerenes or buckyballs). Tego s product pipeline includes therapeutic skin creams, cancer therapies, and drugs targeting central nervous system disorders. Tego is also exploring the use of modified fullerenes as contrast agents in magnetic resonance imaging (MRI).

Initially, Tego does not intend to expand its internal staff to develop these products. Rather, for the first eighteen months, the company intends to use third parties to do most of the development work with a small staff located in Houston, Texas, to oversee the progress and to direct collaborations and licensing of the intellectual property. A new President and CEO was appointed effective October 25, 2007. At the same time, the Company invested $2.4 million in Tego to enable the subsidiary to contract development with third parties.

Aonex Technologies, Inc.

Aonex is currently seeking a partner to help in the continued development of blue and white LEDs. Aonex engineers wafers that are comprised of thin films of materials suitable for fabrication of blue and white LEDs,

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and that have been bonded onto specially engineered support wafers using a proprietary process. By optimizing the support wafer s properties, Aonex is able to simplify the manufacture of high efficiency LED structures, improve yields, and offer a viable path to larger wafer sizes (and corresponding lower costs). Aonex has performed testing of prototypes of its products and is shipping samples to potential partners. Research and development expenses related to Aonex wafers are reflected in the tables above. Aonex continues to build and ship product but in a phase down mode. It is not possible at this time to accurately determine the final cost of Aonex development efforts, the completion date, or when revenue will commence.

Factors Affecting Further R&D Expenses

The Company expects that research and development expenses will continue to increase in the foreseeable future as it adds personnel, expands its pre-clinical research, begins clinical trial activities, and increases its regulatory compliance capabilities. The amount of these increases is difficult to predict due to the uncertainty inherent in the timing and extent of progress in the Company s research programs. As the Company s research efforts mature, it will continue to review the direction of its research based on an assessment of the value of possible commercial applications emerging from these efforts.

In addition to these general factors, specific factors that will determine the eventual cost to complete the current projects at Insert and Calando include the following:

- the number, size and duration of clinical trials required to gain FDA approval;
- the costs of producing supplies of the drug candidates needed for clinical trials and regulatory submissions;
- the efficacy and safety profile of the drug candidate; and
- the costs and timing of, and the ability to secure, regulatory approvals.

It is possible that the completion of studies could be delayed for a variety of reasons, including difficulties in enrolling patients, delays in manufacturing, incomplete or inconsistent data from the pre-clinical or clinical trials, and difficulties evaluating the trial results. Any delay in completion of a trial would increase the cost of that trial, which would harm the Company s results of operations. Due to these uncertainties, the Company cannot reasonably estimate the size, nature nor timing of the costs to complete, or the amount or timing of the net cash inflows from Insert or Calando s current activities. Until the Company obtains further relevant pre-clinical and clinical data, it will not be able to estimate its future expenses related to the Subsidiaries programs or when, if ever, and to what extent, the Company will receive cash inflows from resulting products.

Sponsored Research

In fiscal 2007, the Company continued to sponsor research at Caltech (commencing in October 2003), Stanford (commencing in June 2005), Duke (commencing in December 2005) and the University of Florida (commencing in August 2006.) The number of research projects can fluctuate as the Company adds or terminates projects. For instance, two sponsored research projects at Caltech were terminated in the first quarter of Fiscal 2005. These projects were replaced by sponsored research agreements at Duke University and the University of Florida so while the mix has changed, the dollars expended are about the same. As the Company grows, sponsored research is expected to increase as more opportunities are identified. As part of the merger of Unidym and CNI, the Duke and Florida sponsored research projects were transferred from Arrowhead to Unidym. It is believed that results from these sponsored research projects are directly applicable to the ongoing development efforts at Unidym, so the rights and obligations should be borne by Unidym. Subsequent to September 30, 2007, the two projects at Caltech were cancelled as the Company did not see any near term benefits to continuing the research. The research agreement with Stanford ended in May 2007.

Consulting

Consulting fees total approximately $1,798,000 for fiscal 2007. Of the total year-to-date consulting fees, approximately $715,000 was incurred at Unidym, $680,000 at Insert, and $342,000 at Calando.

Unidym incurred approximately $466,000 in consulting fees related to manufacturing processes for carbon nanotubes and an additional $249,000 for business strategy and technical consultation. One consultant was paid approximately $178,000 to develop a process for manufacture of sheets of thin film nanotubes. Temporary help in Houston to support development and manufacture of carbon nanotubes cost an additional $150,000. Cost related to thin film transistors was about $55,000.

Insert incurred approximately $364,000 in business strategy consulting and travel related expenses including $38,000 paid to Mr. Jacobs for consulting services prior to his employment at Insert full time as its President and CEO on January 1, 2007. The major expense in this area was approximately $188,000 spent in the third quarter of fiscal 2007 for strategic planning and marketing. Mr. Jacobs left at the end of May and this expense was reduced as Insert was still conducting clinical trials and did not as yet have a product. Insert also incurred an additional $316,000 for regulatory ($21K), clinical trials ($137K) and scientific consulting ($158K) for fiscal 2007.

Calando incurred approximately $330,000 for regulatory work related to the filing of an IND with the FDA ($141K), scientific consulting ($142K) and clinical consulting ($47K).

In fiscal 2006, consulting fees consisted of $332,000 paid for strategic business and governance consulting, acquisition related consulting of approximately $175,000, professors/non employee subsidiary founders of approximately $128,000, advisory board fees of about $68,000 and approximately $47,000 for consultants for regulatory and clinical trial services

In fiscal 2005, consulting fees consisted of approximately $330,000 paid for strategic business and governance consulting, to Caltech professors/non employee subsidiary founders of approximately $71,000, director and advisory board fees were about $35,000 and technical consulting of approximately $11,000.

The use of consultants with diverse backgrounds enabled the Company to accomplish various objectives without having to add full time staff.

Leveraged Technology and Revenue Strategy

Arrowhead continues to follow its strategy to leverage technology which is being or has been developed at universities. By doing so, Arrowhead benefits from work done at those universities and through majority-owned Subsidiaries, which can commercialize the most promising technologies developed from sponsored research and other sources. Although the Company is likely to produce prototypes and develop manufacturing processes, other than carbon nanotubes, it may not ultimately manufacture products developed. The Company has three primary strategies to potentially generate product sales revenue:

- License the products and processes to a third party for a royalty or other payment. By licensing, the Company would not be required to allocate resources to build a sales or a production infrastructure and could use those resources to develop additional products.

- Retain the rights to the products and processes, but contract with a third party for production. The Company would then market the finished products. This approach would require either the establishment of a sales and distribution network or collaboration with a supplier who has an established sales and distribution network, but would not require investment in production equipment.

- Build production capability in order to produce and market the end products. This last approach would likely require the most capital to build the production, sales and distribution infrastructure.

On a case-by-case basis, the Company will choose the strategy which, in the opinion of management, will generate the highest return for the Company.

On April 20, 2007, Unidym and CNI merged. Unidym then had the manufacturing capability to make carbon nanotubes which it uses internally for product development and sells externally to third parties. Prior to this merger, the only revenue generated by the Company was through grants from public and private entities and through one licensing deal. While the ultimate goal of the Company is to generate revenue through the sale of products and/or the licensing of technology, the Company does record revenue from grants and from development fees. Revenue from grants and development fees are considered to be reimbursements for efforts performed on behalf of third parties and not part of the Company s primary strategy to generate revenue.

Unidym generated combined revenues from grants and sales of carbon nanotubes totaling approximately $1,201,000 in fiscal 2007. The remaining revenue of $7,000 was from a remaining Calando grant.

In fiscal 2006, Calando generated approximately $ 311,000 in revenue applicable to a license with Benitec Ltd. for the combination of Calando s polymeric RNA interference (RNAi) delivery technology with Benitec s RNAi-based therapeutic for the hepatitis C virus (HCV). The license was signed in June 2005 and called for a upfront fee of $150,000, per year and reimbursement for development expenses that Calando incurred on Benitec s behalf. The fee was paid in fiscal 2006 at which time Calando booked the revenue. On July 31, 2006, the License Agreement with Benitec was terminated by mutual agreement.

Also in fiscal 2006, Aonex recognized revenue of about $134,000 related to an SBIR grant and other research fees. During fiscal 2006, Arrowhead was told by the Small Business Administration that it no longer qualified as a small business because it could not show that 51% of its shareholders were U.S. citizens or legal resident aliens. Therefore, the Company does not expect to receive any small business funding in the future.

In fiscal 2005, the bulk of the revenue (approximately $537,000) came from grants Insert received prior to being acquired by Arrowhead. In addition, Calando generated about $44,000 from the Benitec license and Aonex had about $10,000 applicable to the SBIR grant.

Except for the sale of carbon nanotubes, the Company does not expect any product sales in fiscal 2008. Therefore, losses can be expected to increase before any substantial revenue is generated. To partially offset these losses, the Company is pursuing other means of funding such as licenses, contracts and collaborations with third parties. The award of such grants and contracts depends on numerous factors, many of which are not in the Company s control and, therefore, it is difficult to predict if this strategy will be successful.

Liquidity and Capital Resources

Since inception in May 2003, the Company has incurred significant losses. As of September 30, 2007, the Company had $24.1 million in cash and cash equivalents compared to $28.0 million in cash and cash equivalents and marketable securities at September 30, 2006. The Company s investment objectives are primarily to preserve capital and liquidity and secondarily to obtain investment income. The Company invests excess cash in certificates of deposit, U.S. government obligations and high grade commercial paper.

The Company s operating activities have required significant amounts of cash. This trend will continue through fiscal 2008 as the Company s Subsidiaries continue to develop and refine their products and technology. During this period the Company does not expect to generate significant amounts of revenue. It is projected that the Company and its Subsidiaries will continue to add staff, property, and equipment during fiscal 2008. In addition, the Company expects to continue to invest in new sponsored research projects and new business opportunities. At September 30, 2007, the Company had the right to provide, in its sole discretion, an additional $6 million to Calando if certain milestones are reached at specified times. These capital commitments will be used for research and development, for business development and salaries. The remainder of the cash will be used to fund ongoing operations. The Company believes that the cash on hand at September 30, 2007, is sufficient to meet all existing obligations and fund existing operations in fiscal 2008.

Since inception, the Company has funded operations and acquisitions through the issuance of equity. As of September 30, 2007, the Company had raised approximately $79 million through the sale of Common Stock and the exercise of Warrants. New business opportunities may require additional cash resources. In the future, the Company may seek additional funding through public or private financing, through collaborations and/or through private and U.S. government grants.

Except for copy machines, the Company does not lease any equipment and purchases all of its required capital assets. To date, when leasing facility space, the Company has been successful in having most leasehold improvements paid for by the landlord and included in the lease cost. The Company may not be able to do so in all cases going forward.

Off-Balance Sheet Arrangements

We do not have and have not had any off-balance sheet arrangements or relationships.

Inflation and Changing Prices

Inflation has not generally been a material factor affecting our financial condition, results of operations or cash flows in the periods shown. Management does not believe that inflation will be a material factor in fiscal 2008, even though our general operating expenses, such as salaries, employee benefits and facilities costs are subject to normal inflationary pressures.

Contractual Obligations and Commitments

Our contractual commitments as of September 30, 2007 are summarized below by category in the following table:

	Total	Less than 1 year	>1-3 Years	>3-5 Years	More than 5 Years
Operating Lease Obligation	$ 1,606,175	$ 699,620	$ 777,265	$ 129,290	$
Sponsored Research(1)	$ 409,160	$ 409,160	$ 0	$ 0	$

(1) The sponsored research obligations in the table above include our commitments to Duke University, the University of Florida and Caltech. Two sponsored research projects at Caltech were cancelled in October and December 2007.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We manage our fixed income investment portfolio in accordance with our Investment Policy that has been approved by our Board of Directors. The primary objectives of our Investment Policy are to preserve principal, maintain a high degree of liquidity to meet operating needs, and obtain competitive returns subject to prevailing market conditions. Investments are made primarily in certificates of deposit, U.S. government agency debt securities and high grade commercial paper. Management may use additional investment vehicles as long as the vehicle meets the Investment Objectives and Minimum Acceptable Credit Quality. Our Investment Policy specifies credit quality standards for our investments. We do not own derivative financial instruments in our investment portfolio.

As of September 30, 2007, we have no debt, no derivative instruments outstanding and we did not have any financing arrangements that were not reflected in our balance sheet.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Financial statements and notes thereto appear on pages F-1 to F-21 of this Annual Report on Form 10-K.

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

None.

ITEM 9A. CONTROLS AND PROCEDURES.

Our chief executive officer and our chief financial officer, after evaluating our disclosure controls and procedures (as defined in Securities Exchange Act of 1934 (Exchange Act) Rules 13a-15(e) and 15-d-15(e)) as of the end of the period covered by this Annual Report on Form 10-K (Evaluation Date) have concluded that as of the Evaluation Date, our disclosure controls and procedures are effective to ensure that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms, and to ensure that information required to be disclosed by us in such reports is accumulated and communicated to our management, including our chief executive officer and chief financial officer where appropriate, to allow timely decisions regarding required disclosure.

Management s Annual Report on Internal Control over Financial Reporting

Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Our internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. This process includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on our financial statements.

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

Management s Assessment of the Effectiveness of our Internal Control over Financial Reporting

Management has evaluated the effectiveness of our internal control over financial reporting as of September 30, 2007. In conducting its evaluation, management used the framework set forth in Internal Control Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on our evaluation under such framework, our management has concluded that our internal control over financial reporting was effective as of September 30, 2007.

Attestation Report

Rose, Snyder & Jacobs, the independent registered public accounting firm that audited our consolidated financial statements included in this Annual Report on Form 10-K, independently assessed the effectiveness of our internal control over financial reporting. Such attestation report is included below under the heading Attestation Report of Independent Registered Public Accounting Firm.

Attestation Report of Independent Registered Public Accounting Firm

Report of Independent Registered Public Accounting Firm on Internal Control Over Financial Reporting

The Board of Directors and Stockholders of Arrowhead Research Corporation

We have audited Arrowhead Research Corporation s internal control over financial reporting as of September 30, 2007, based on criteria established in *Internal Control-Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (the COSO criteria). Arrowhead Research Corporation s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting. Our responsibility is to express an opinion on the company s internal control over financial reporting based on our audit.

We conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

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

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

As indicated in the accompanying Management s Annual Report on Internal Control Over Financial Reporting, management s assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of Carbon Nanotechnologies, Inc. (CNI), (Unidym Inc. s operations in Houston, Texas), which is included in the 2007 consolidated financial statements of Arrowhead Research Corporation and constituted $474,000 of the total assets at September 30, 2007 and $1,200,627 of total revenues for the year then ended. Our audit of internal control over financial reporting of Arrowhead Research Corporation also did not include an evaluation of the internal control over financial reporting of CNI.

In our opinion, Arrowhead Research Corporation maintained, in all material respects, effective internal control over financial reporting as of September 30, 2007, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated balance sheets of Arrowhead Research Corporation as of September 30, 2007 and 2006, and the related consolidated statements of operations, stockholders equity, and cash flows for each of

the three years in the period ended September 30, 2007, and for the period from May 7, 2003 (inception) through September 30, 2007 of Arrowhead Research Corporation and our report dated December 7, 2007 expressed an unqualified opinion thereon.

/s/ Rose, Snyder & Jacobs

A Corporation of Certified Public Accountants

Encino, California

December 7, 2007

Changes in Internal Control Over Financial Reporting

There was no change in our internal control over financial reporting that occurred during the fourth quarter of the year ended September 30, 2007, that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION
Not applicable

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PART III

ITEM 10. DIRECTORS AND EXECUTIVE OFFICERS OF THE REGISTRANT.

The following table sets forth, as of December 11, 2007, information about our executive officers and directors of the Company for fiscal 2007 are as follows:

Name	Age	Position with Arrowhead
Christopher Anzalone	38	Chief Executive Officer, President and Director
R. Bruce Stewart	70	Executive Chairman of the Board
Joseph T. (Ted) Kingsley	62	Chief Financial Officer and Secretary
John Miller	29	Vice President, Business Development
Larry Stambaugh	62	President and Chief Executive Officer of Calando and Insert
John Petrovich	52	Former President and Chief Executive Officer of Calando and Insert
Arthur Swift	49	President and Chief Executive Officer of Unidym
Edward W. Frykman	71	Director
Leroy T. Rahn	72	Director
Charles P. McKenney	68	Director

Christopher Anzalone was appointed President and Chief Executive Officer of the Company on December 1, 2007. From 2005 until the present, Dr. Anzalone was CEO and principal in the Benet Group LLC, a private equity firm focused on creating and building new nanobiotechnology companies from university generated science. While at Benet Group, Dr. Anzalone was founding CEO in two portfolio companies, Nanotope Inc., a tissue regeneration company, and Leonardo Biosystems Inc., a cancer drug delivery company. Prior to his tenure at Benet Group, from 1999 until 2003, he was a partner at the Washington DC-based private equity firm Galway Partners, LLC. There, he was in charge of sourcing, structuring, and building new business ventures and was founding CEO of NanoInk, Inc., a leading nanolithography company. He continued as CEO of NanoInk until 2004. Dr. Anzalone holds a Ph.D. and M.A. in Biology from UCLA and a B.A. in Government from Lawrence University.

R. Bruce Stewart is Executive Chairman of the Board of Directors of the Company. Prior to December 1, 2007, Mr. Stewart was Arrowhead s Chief Executive Officer and Chairman of the Board of the Company since January 2004. Mr. Stewart was the Chairman of the Board of the predecessor California corporation since its inception in May 2003 and devoted much of his time from early in 2003 to development of its plan of operations. Mr. Stewart founded Acacia Research Corporation in March 1991, and was employed by Acacia Research Corporation in various capacities until January 2003, serving as its President from inception through January 1997, Chairman until April 2000, and as a senior advisor until January 2003. From August 1977 to March 1991, Mr. Stewart was the President of Annandale Corporation. He also was a licensed principal of Annandale Securities, Inc., a licensed broker-dealer.

Joseph T. (Ted) Kingsley has been Arrowhead s Chief Financial Officer and Secretary since September 2004. Mr. Kingsley was Arrowhead s Interim President of the Company from June 2, 2006, until December 1, 2007. Mr. Kingsley brings to Arrowhead more than 20 years of executive-level, financial management experience in biotech, commercial, international, and defense-related industries. Prior to joining the Company, from January 2002 to September 2004, he was Chief Financial Officer for Eidogen, Inc., a Pasadena-based company developing computational drug discovery platforms. From March 1997 to January 2002, Mr. Kingsley was Vice President Operations and Chief Financial Officer for Paracel, an integrated turnkey computer systems provider for the life sciences community that was acquired by Celera Genomics (AMEX:CRA) in June 2000. Mr. Kingsley held similar positions with Pico Products, a publicly-held cable TV product supplier, Kaiser Marquardt, Inc., and Science Applications International Corp. (SAIC), a Fortune 500 government and commercial contractor. Mr. Kingsley is a CPA. He received his B.A. in Economics from Ohio Wesleyan University, and his MBA from Northwestern University.

John Miller, Vice President, Business Development joined Arrowhead in May 2004 and has been instrumental in monitoring the intellectual property landscape and licensing and enforcing patents held by Arrowhead and its subsidiaries, as well as identifying and developing new business ideas for Arrowhead. Mr. Miller founded NanoPolaris and guided its development through the acquisition of the assets of Unidym, a company developing electronic applications of carbon nanotubes and Carbon Nanotechnologies, Inc., a company possessing an expansive portfolio of carbon nanotube patents and carbon nanotube manufacturing capabilities. Prior to joining the Company, from 2002 until 2004, Mr. Miller was a founder and Managing Editor of Nanotechnology Law & Business, a peer-reviewed, quarterly journal. He has published various articles on legal and policy issues in nanotechnology and co-authored The Handbook of Nanotechnology Business, Policy, and Intellectual Property Law (John Wiley, 2004). John is a member of the California bar and federal courts in the Northern District of California. He graduated Order of the Coif from Stanford Law School.

Larry G. Stambaugh was appointed President and Chief Executive Officer of Calando and Insert effective November 1, 2007. From 1993 until 2006, Mr. Stambaugh was Chairman, CEO and co-founder of Maxim Pharmaceuticals, Inc. At Maxim, he established a public, global biopharmaceutical company with a pipeline of product candidates for life-threatening cancers and liver diseases. During his time with Maxim he took the company public in the U.S. and Europe, conducted 17 clinical trials, including four phase 3 studies, in over 20 countries, established several corporate partnerships with large pharmaceutical companies and acquired a promising biotechnology company. In 2006, he merged Maxim with an East Coast biotech company. Previously, he was the Chairman, President and CEO for ABC Laboratories, a world-leading environmental research laboratory serving Fortune 100 pharmaceutical and chemical companies. Mr. Stambaugh has worked as a top executive in banking, manufacturing, and retail and began his career at KPMG. He has a B.B.A. from Washburn University and is a C.P.A.

John Petrovich is Executive Vice President of Calando and Insert. He has been with each company since inception in 2005 and 2000, respectively and acted as President and Chief Executive Officer of each company until October 31, 2007, except for a period between January and May 2007 when another CEO was appointed at Insert. He brings general management, strategic planning, legal and fundraising expertise to both companies. His recent management activities include preparing the IND for Calando, guiding the development of the Cyclosert delivery system that has been licensed to Calando by Insert, and also led the drive to Phase I clinical trials for Insert s lead anti-cancer compound, a Cyclosert-enhanced form of camptothecin. He earned his B.S. in Business Administration/Finance from the University of Southern California and his Juris Doctor from the UCLA School of Law.

Arthur L. Swift has been President and Chief Executive Officer of Unidym, Inc. since June 2007 He comes to Unidym from Transmeta Corporation, an innovative semiconductor company in the Silicon Valley, where he most recently held the position of President and Chief Executive Officer. Prior to his promotion to CEO, he was Senior Vice President of Marketing. At Transmeta, Mr. Swift was instrumental in transforming the company s strategy from selling semiconductor chips to developing and licensing intellectual property, a change that nearly doubled Transmeta s revenue in the first two years after the strategy shift. Prior to Transmeta, Art held senior leadership roles ranging from President and Chief Operating Officer at an embedded software startup, Lynuxworks, to Vice President and General Manager at a variety of large divisions of the established chip-maker Cirrus Logic. Art has also held senior marketing and engineering positions with Summit Microelectronics, Sun Microsystems, Digital Equipment, and Fairchild Semiconductor. Mr. Swift earned a B.S. in Electrical Engineering at the Pennsylvania State University.

Edward W. Frykman has been a director of the Company since January 2004. Mr. Frykman has been an Account Executive with Crowell, Weedon & Co. since 1992. Previously, Mr. Frykman served as Senior Vice President of L.H. Friend & Co. Both Crowell, Weedon & Co. and L.H. Friend & Co. are investment brokerage firms located in Southern California. In addition, Mr. Frykman was a Senior Account Executive with Shearson Lehman Hutton, where he served as the Manager of the Los Angeles Regional Retail Office of E. F. Hutton & Co. Mr. Frykman was a director in the predecessor California corporation since its inception in May 2003 until

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January 2004, when he became a director of the Company. Mr. Frykman is also a director of Acacia Research Corporation (NASDAQ: ACTG & CBMX), a publicly-held corporation based in Newport Beach, California.

LeRoy (Lee) T. Rahn has been a director of the Company since January 2004. Mr. Rahn was a partner with the intellectual property law firm of Christie, Parker & Hale from 1968 to 2003, more than 30 years, with a practice focused on assisting clients in protecting their intellectual property through obtaining, maintaining and enforcing patents and other legal rights. He retired from the law firm s partnership in 2003, but remains affiliated with the firm on an of counsel basis. He is a former president of the Los Angeles Intellectual Property Association and frequently makes presentations on intellectual property law to legal and trade groups. Prior to becoming an attorney, Mr. Rahn obtained a degree in electrical engineering. Mr. Rahn was a director in the predecessor California corporation from December 2003 to January 2004 when he became a director of the Company.

Charles P. McKenney has been a director of the Company since April 2004. Mr. McKenney has maintained a government affairs law practice in Pasadena, California, since 1989, representing businesses and organizations in their relations with state and local government regarding their obligations under state and local land use and trade practices laws. From 1973 through 1989, he served as Attorney for Corporate Government Affairs for Sears, Roebuck and Co., helping organize and carry out Sears western state and local government relations programs. Mr. McKenney has served two terms on the Pasadena, California, City Council as well as on several city boards and committees, including three city Charter Reform Task Forces. Mr. McKenney became a director of the Company in March 2004.

Information appearing in the Proxy Statement for the 2008 Annual Meeting under the captions Election of Directors, Executive Officers, and Compliance with Section 16 of the Securities Exchange Act of 1934, is hereby incorporated by reference.

ITEM 11. EXECUTIVE COMPENSATION.

The information required hereunder is incorporated herein by reference to our Proxy Statement to be filed within 120 days of September 30, 2007 and delivered to stockholders in connection with our Annual Meeting of Stockholders to be held on March 13, 2008.

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

The information required hereunder is incorporated herein by reference to our Proxy Statement to be filed within 120 days of September 30, 2007, and delivered to stockholders in connection with our Annual Meeting of Stockholders to be held on March 13, 2008.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

The information required hereunder is incorporated herein by reference to our Proxy Statement to be filed within 120 days of September 30, 2007, and delivered to stockholders in connection with our Annual Meeting of Stockholders to be held on March 13, 2008.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required hereunder is incorporated herein by reference to our Proxy Statement to be filed within 120 days of September 30, 2007, and delivered to stockholders in connection with our Annual Meeting of Stockholders to be held on March 13, 2008.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES
(a) The following documents are filed as part of this Annual Report on Form 10-K:

(1) Financial Statements.

See Index to Financial Statements and Schedule on page F-1.

(2) Financial Statement Schedules.

See Index to Financial Statements and Schedule on page F-1. All other schedules are omitted as the required information is not present or is not present in amounts sufficient to require submission of the schedule, or because the information required is included in the consolidated financial statements or notes thereto.

(3) Exhibits.

The following exhibits are filed (or incorporated by reference herein) as part of this Annual Report on Form 10-K:

Exhibit Number	Document Description
3.1	Certificate of Incorporation of InterActive, Inc., a Delaware company, dated February 8, 2001(1)
3.2	Certificate of Amendment of Certificate of Incorporation of InterActive Group, Inc., dated January 12, 2004 (effecting, among other things a change in the corporation s name to Arrowhead Research Corporation)(2)
3.3	Certificate of Amendment to Certificate of Incorporation, dated January 25, 2005(3)
3.4	Bylaws(1)
4.1	Form of Registration Rights Agreement dated January 24, 2006(4)
4.2	Form of Warrant to Purchase Common Stock issued January 24, 2006(4)
4.3	Form of Warrant to Purchase Common Stock issued May 29, 2007(14)
10.1**	Copy of the Arrowhead Research Corporation (fka InterActive, Inc.) 2000 Stock Option Plan, the Arrowhead Research Corporation Stock Option Agreement (Incentive Stock Option) and the Arrowhead Research Corporation Stock Option Agreement (Nonstatutory Option)(5)
10.2**	Copy of the Arrowhead Research Corporation 2004 Equity Incentive Plan(6)
10.3	Common Stock and Warrant Purchase Agreement, dated as of January 11, 2006, among Arrowhead, York, Knott and certain affiliates(4)
10.4**	Copy of Arrowhead Research Corporation 2004 Equity Incentive Plan, as amended February 23, 2006(7)
10.5	Series A Preferred Stock Purchase Agreement between Arrowhead Research and Calando Pharmaceuticals, Inc. dated March 31, 2006(8)
10.6	Agreement to Provide Additional Capital between Arrowhead Research and Calando Pharmaceuticals, Inc. dated March 31, 2006(8)
10.7	Common Stock Transfer Agreement among Arrowhead Research, Mark Davis, John Petrovich and John Rossi(8)
10.8	Series A Preferred Stock Purchase Agreement between Arrowhead Research Corporation and Nanopolaris, Inc. dated June 13, 2006(9)

10.9	Agreement to Provide Additional Capital between Arrowhead Research Corporation and NanoPolaris, Inc. dated June 13, 2006(9)
10.10	Severance Agreement and General Release between Arrowhead Research Corporation and Leon Ekchian dated August 1, 2006(10)

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Exhibit Number	Document Description
10.11**	Executive Incentive Plan, adopted December 12, 2006(11)
10.12**	Directors Compensation Policy, as amended December 12, 2006(11)
10.13	Amended and Restated License Agreement between Insert Therapeutics, Inc. and Calando Pharmaceuticals, Inc. dated July 1, 2005 (Portions omitted pursuant to request for confidential treatment.)(11)
10.14	Agreement and Plan of Merger dated as of March 21, 2007 by and among Unidym, Inc., Unidym Acquisition, LLC, Carbon Nanotechnologies, Inc., and William A. McMinn as the Stockholder Representative(12)
10.15	Stock Purchase Agreement dated as of April 20, 2007, by and among Arrowhead and the selling stockholders of Carbon Nanotechnologies, Inc.(13)
10.16	Registration Rights Agreement dated as of April 20, 2007, by and among Arrowhead and the purchasers of Arrowhead s Common Stock listed on Exhibit A thereto(13)
10.17	Lock-up and Standstill Agreement dated as of April 20, 2007, by and among Arrowhead and the securityholders of Arrowhead listed on the signature pages thereto(13)
10.18	Registration Rights Agreement dated May 16, 2007, by and among Arrowhead and the purchasers of Arrowhead s Common Stock listed on Exhibit A thereto(14)
10.19	Form of Subscription Agreement by and between Arrowhead and each of the purchasers of Arrowhead s Common Stock in the private placement transaction completed in May 2007(14)
10.20	Severance Agreement dated May 24, 2007 by and between Arrowhead and R. Bruce Stewart(15)
10.21	Severance Agreement dated May 24, 2007 by and between Arrowhead and Joseph T. Kingsley(15)
10.22**	Employment Offer Letter Agreement dated June 5, 2007 by and between Unidym, Inc. and Arthur L. Swift(16)
21.1	List of Subsidiaries*
31.1	Certification of Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002*
31.2	Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002*
32.1	Certification by Chief Executive Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002*
32.2	Certification by Chief Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002*

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* Filed herewith.
** Indicates compensation plan, contract or arrangement.
(1) Incorporated by reference from the Schedule 14C filed by registrant on December 22, 2000.
(2) Incorporated by reference from the Schedule 14C filed by registrant on December 22, 2003.
(3) Incorporated by reference from the Quarterly Report on Form 10-QSB for the quarter ended December 31, 2004, filed by registrant on February 11, 2005.
(4) Incorporated by reference from the Current Report on Form 8-K, filed by registrant on January 18, 2006.
(5) Incorporated by reference from the Registration Statement on Form S-8, filed by registrant on October 29, 2004.
(6) Incorporated by reference from Annex A to the definitive Schedule 14C filed by registrant on December 16, 2004.
(7) Incorporated by reference from the Current Report on Form 8-K filed by registrant on February 28, 2006.
(8) Incorporated by reference from the Current Report on Form 8-K filed by registrant on April 6, 2006.
(9) Incorporated by reference from the Current Report on Form 8-K filed by the registrant on June 16, 2006.
(10) Incorporated by reference from the Quarterly Report on Form 10-Q filed by the registrant on August 9, 2006.
(11) Incorporated by reference from the Annual Report on Form 10-K filed by the registrant on December 14, 2006.
(12) Incorporated by reference from the Current Report on Form 8-K filed by the registrant on March 26, 2007.
(13) Incorporated by reference from the Current Report on Form 8-K filed by the registrant on April 25, 2007.
(14) Incorporated by reference from the Current Report on Form 8-K (Items 3.02 and 9.01), filed by the registrant on May 30, 2007.
(15) Incorporated by reference from the Current Report on Form 8-K (Items 5.02 and 9.01), filed by the registrant on May 30, 2007.
(16) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on June 18, 2007.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized, on this 14th day of December 2007.

ARROWHEAD RESEARCH CORPORATION

By: /s/ Christopher Anzalone
Christopher Anzalone

Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL THESE PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Christopher Anzalone and Joseph T. Kingsley and each of them, jointly and severally, his attorneys-in-fact, each with full power of substitution, for him in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each said attorneys-in-fact or his substitute or substitutes, may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report on Form 10-K has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated:

Signature	Title	Date
/s/ Christopher Anzalone **Christopher Anzalone**	Chief Executive Officer, President and Director (Principal Executive Officer)	December 14, 2007
/s/ Joseph T. Kingsley **Joseph T. Kingsley**	Chief Financial Officer (Principal Financial and Accounting Officer)	December 14, 2007
/s/ Edward W. Frykman **Edward W. Frykman**	Director	December 14, 2007
/s/ LeRoy T. Rahn **LeRoy T. Rahn**	Director	December 14, 2007
/s/ Charles P. McKenney **Charles P. McKenney**	Director	December 14, 2007
/s/ R. Bruce Stewart **R. Bruce Stewart**	Executive Chairman & Director	December 14, 2007

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INDEX TO FINANCIAL STATEMENTS AND SCHEDULE

As a result of the change in control resulting from the stock exchange transaction (the Share Exchange) with the owners of Arrowhead Research Corporation, a California corporation (ARC), the financial statements of the Company are deemed to be the historical financial statements of ARC.

Arrowhead Research Corporation,

Report of Independent Registered Public Accounting Firm	F-2
Consolidated Balance Sheets of Arrowhead Research Corporation and Subsidiaries, September 30, 2007 and 2006	F-3
Consolidated Statements of Operations of Arrowhead Research Corporation and Subsidiaries for the years ended September 30, 2007, 2006, and 2005 and the period from May 7, 2003 (inception) through September 30, 2007	F-4
Consolidated Statement of Stockholders Equity of Arrowhead Research Corporation and Subsidiaries for the period from May 7, 2003 (inception) through September 30, 2007	F-5
Consolidated Statement of Cash Flows of Arrowhead Research Corporation and Subsidiaries for the years ended September 30, 2007, 2006, and 2005 and the period from May 7, 2003 (inception) through September 30, 2007	F-6
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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of Arrowhead Research Corporation

We have audited the accompanying consolidated balance sheets of Arrowhead Research Corporation (a Delaware corporation) and Subsidiaries as of September 30, 2007 and 2006 and the related consolidated statements of operations, stockholders equity and cash flows for the years ended September 30, 2007, 2006 and 2005 and for the period from May 7, 2003 (inception) through September 30, 2007. These consolidated financial statements are the responsibility of the Company s management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits.

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

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the consolidated financial position of Arrowhead Research Corporation and Subsidiaries as of September 30, 2007 and 2006, and the consolidated results of their operations and their cash flows for the years ended September 30, 2007, 2006 and 2005, and for the period from May 7, 2003 (inception) through September 30, 2007 in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the effectiveness of Arrowhead Research Corporation s internal control over financial reporting as of September 30, 2007, based on the criteria established in Internal Control Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), and our report dated December 7, 2007 expressed an unqualified opinion.

Rose, Snyder & Jacobs

A Corporation of Certified Public Accountants

Encino, California

December 7, 2007

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Arrowhead Research Corporation and Subsidiaries

(A Development Stage Company)

Consolidated Balance Sheets

	September 30, 2007	September 30, 2006
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	$ 24,120,097	$ 28,020,304
Trade receivable, net of allowance for doubtful account of $45,659	273,864	
Grant receivable, net of allowance for doubtful account of $0		3,697
Other receivables	2,200	70,517
Prepaid sponsored research, *Note 7*.	221,053	358,020
Other prepaid research	278,558	7,600
Other prepaid expenses	409,656	315,653
TOTAL CURRENT ASSETS	25,305,428	28,775,791
PROPERTY AND EQUIPMENT		
Computers, office equipment and furniture	614,213	544,823
Research equipment	1,977,882	1,375,595
Software	107,128	68,969
Leasehold improvement	416,234	369,699
	3,115,457	2,359,086
Less: Accumulated depreciation and amortization	(1,675,998)	(1,088,105)
NET PROPERTY AND EQUIPMENT	1,439,459	1,270,981
INTANGIBLE AND OTHER ASSETS		
Rent deposit	169,552	161,469
Patents, *Note 1*.	2,938,513	3,354,487
Goodwill		963,150
TOTAL OTHER ASSETS	3,108,065	4,479,106
TOTAL ASSETS	**$ 29,852,952**	**$ 34,525,878**
LIABILITIES AND STOCKHOLDERS EQUITY		
CURRENT LIABILITIES		
Accounts payable, *Note 1*.	$ 1,349,105	$ 846,580
Accrued expenses	545,703	677,722
Payroll liabilities	407,997	233,932
Accrued severance	495,000	
Preferred stock liability		1,162,000
Deferred revenue	98,570	
TOTAL CURRENT LIABILITIES	2,896,375	2,920,234
LONG-TERM LIABILITIES		
Accrued severance, *Note 7*.	500,000	
Minority interests	152,609	934,438

Commitment and contingencies, *Note 7*.		
STOCKHOLDERS EQUITY, *Note 5*.		
Common stock	38,622	34,156
Preferred stock		
Additional paid-in capital	84,672,783	59,113,369
Accumulated deficit during the development stage	(58,407,437)	(28,476,319)
TOTAL STOCKHOLDERS EQUITY	26,303,968	30,671,206
TOTAL LIABILITIES AND STOCKHOLDERS EQUITY	**$ 29,852,952**	**$ 34,525,878**

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

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Arrowhead Research Corporation and Subsidiaries

(A Development Stage Company)

Consolidated Statements of Operations

	September 30, 2007	2006	2005	May 7, 2003 (Inception) to September 30, 2007
REVENUE, *Note 1*	**$ 1,208,022**	**$ 595,458**	**$ 590,683**	**$ 2,590,469**
COST OF GOODS SOLD	724,088			724,088
GROSS PROFIT ON SALES	483,934	595,458	590,683	1,866,381
OPERATING EXPENSES				
Salaries	10,048,302	6,511,641	3,239,398	20,380,143
Consulting	1,798,143	749,720	447,111	3,644,304
General and administrative expenses	5,240,150	4,389,232	2,561,295	13,145,393
Research and development	20,930,548	9,036,999	3,753,975	34,518,251
Patent amortization	415,963	391,248	181,752	988,963
TOTAL OPERATING EXPENSES	**38,433,106**	**21,078,840**	**10,183,531**	**72,677,054**
OPERATING LOSS	(37,949,172)	(20,483,382)	(9,592,848)	(70,810,673)
OTHER INCOME (EXPENSES)				
Gain on sale of stock in subsidiary			2,292,800	2,292,800
Realized and unrealized gain (loss) in marketable securities		315,616	78,761	382,264
Interest income	1,264,693	852,967	151,052	2,300,053
Other income	329		3,308	3,637
TOTAL OTHER INCOME (EXPENSES)	**1,265,022**	**1,168,583**	**2,525,921**	**4,978,754**
LOSS BEFORE MINORITY INTERESTS	(36,684,150)	(19,314,799)	(7,066,927)	(65,831,919)
Minority interests	6,753,032	317,590	1,520,039	8,842,384
LOSS FROM CONTINUING OPERATIONS	**(29,931,118)**	**(18,997,209)**	**(5,546,888)**	**(56,989,535)**
Loss from operation of discontinued Nanotechnica, Inc.			(1,234,233)	(1,342,505)
Loss on disposal of Nanotechnica, Inc. (July 2005 September 2005)			(73,797)	(73,797)
Provision for income taxes				(1,600)
NET INCOME (LOSS)	**$ (29,931,118)**	**$ (18,997,209)**	**$ (6,854,918)**	**$ (58,407,437)**
Income (loss) from continuing operations per share, diluted and undiluted	$ (0.83)	$ (0.59)	$ (0.30)	
Loss from discontinued operations	$	$	$ (0.07)	
Net income (loss) per share, diluted and undiluted	$ (0.83)	$ (0.59)	$ (0.37)	
Weighted average shares outstanding, diluted and undiluted	35,867,091	31,953,806	18,725,263	

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

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Arrowhead Research Corporation and Subsidiaries

(A Development Stage Company)

Consolidated Statement of Stockholders Equity

from inception to September 30, 2007

	Common Stock		Additional Paid-in-	Accumulated Deficit	
				during the Development	
	Shares	Amount	Capital	Stage	Totals
Initial Issuance of Stock:					
Common stock & warrants issued for cash @ $0.001 per unit	3,000,000	$ 3,000	$	$	$ 3,000
Common stock & warrants issued for cash @ $1.00 per unit	1,680,000	1,680	1,678,320		1,680,000
Stock issuance cost charged to additional paid-in capital			(168,000)		(168,000)
Net loss for period from inception to September 30, 2003				(95,238)	(95,238)
Balance at September 30, 2003	**4,680,000**	**4,680**	**1,510,320**	**(95,238)**	**1,419,762**
Exercise of stock options @ $0.20 per share	75,000	75	14,925		15,000
Common stock & warrants issued for cash @ $1.00 per unit	475,000	475	474,525		475,000
Common stock & warrants issued for marketable securities @ $1.00 per unit	500,000	500	499,500		500,000
Stock issuance cost charged to additional paid-in capital			(96,500)		(96,500)
Common stock and warrants issued for cash @ $1.50 per unit	6,608,788	6,609	9,906,573		9,913,182
Common stock issued in reverse acquisition	705,529	706	(151,175)		(150,469)
Common stock issued as a gift for $1.09 per share	150,000	163	162,587		162,750
Common stock and warrants issued as stock issuance cost @ $1.50 per unit	356,229	356	533,988		534,344
Stock issuance cost charged to additional paid-in capital			(991,318)		(991,318)
Exercise of stock option @ $0.20 per share	75,000	75	14,925		15,000
Exercise of stock options @ $1.00 per share	6,000	6	5,994		6,000
Stock-based compensation			175,653		175,653
Net loss for the year ended September 30 ,2004				(2,528,954)	(2,528,954)
Balance at September 30, 2004	**13,631,546**	**13,645**	**12,059,997**	**(2,624,192)**	**9,449,450**
Exercise of warrants @ $1.50 per share	13,812,888	13,813	20,705,522		20,719,335
Exercise of stock options @ $1.00 per share	25,000	25	24,975		25,000
Purchase of Insert Therapeutics shares @ $0.28/share	502,260	502	1,999,498		2,000,000
Common stock issued for services	12,500	12	49,988		50,000
Stock-based compensation			508,513		508,513
Change in percentage of ownership in subsidiary			230,087		230,087
Net loss for the year ended September 30 ,2005				(6,854,918)	(6,854,918)
Balance at September 30, 2005	**27,984,194**	**27,997**	**35,578,580**	**(9,479,110)**	**26,127,467**
Exercise of stock options	115,794	116	341,421		341,537
Common stock issued @ $4.88 per share	204,854	205	999,795		1,000,000
Common stock issued @ $3.84 per share to Dr. M. Moskovits as payment for application of patents	15,000	15	57,585		57,600
Common stock issued @ $3.50 per share	5,590,000	5,590	19,539,410		19,545,000
Common stock issued to Caltech as payment for legal fees	25,364	25	149,975		150,000
Purchase of Calando Pharmaceuticals, Inc. @ $5.17/share	208,382	208	1,077,125		1,077,333
Stock-based compensation			1,270,339		1,270,339
Accelerated stock options			99,139		99,139
Net loss for the year ended September 30, 2006				(18,997,209)	(18,997,209)

Balance at September 30, 2006	**34,143,588**	**34,156**		**59,113,369**		**(28,476,319)**	**30,671,206**
Exercise of stock options	186,164	186		434,541			434,727
Common stock issued, net	2,849,446	2,849		15,149,366			15,152,215
Arrowhead s increase in proportionate share of Insert Therapeutics equity				2,401,394			2,401,394
Common stock issued for purchase of Carbon Nanotechnologies, Inc.	1,431,222	1,431		5,398,569			5,400,000
Stock-based compensation				2,175,544			2,175,544
Net loss for the year ended September 30, 2007						(29,931,118)	(29,931,118)
Balance at September 30, 2007	**38,610,420**	**$ 38,622**	**$**	**84,672,783**	**$**	**(58,407,437)**	**$ 26,303,968**

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

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Arrowhead Research Corporation and Subsidiaries

(A Development Stage Company)

Consolidated Statements of Cash Flows

	September 30, 2007	2006	2005	Period from May 7, 2003 (Date of insception) to September 30, 2007
CASH FLOWS FROM OPERATING ACTIVITIES:				
Net Loss	$ (29,931,118)	$ (18,997,209)	$ (6,854,918)	$ (58,407,437)
Realized and unrealized (gain) loss on investment		(315,615)	(78,761)	(382,263)
Stock issued as gift to Caltech				162,750
Stock issued for professional services		150,000	50,000	200,000
Stock issued for in-process research and development	9,597,005	1,077,333		10,674,338
Stock-based compensation	2,175,544	1,369,478	508,513	4,229,188
Depreciation and amortization	1,003,868	886,956	644,006	2,609,660
Gain on sale of stock in subsidiary			(2,292,800)	(2,292,800)
Minority interests	(6,753,032)	(317,590)	(1,520,039)	(8,842,384)
Decrease/increase in:				
Receivables	(201,850)	(40,766)	18,387	(276,064)
Prepaid research expense	(133,991)	(273,954)	272,711	(499,612)
Other prepaid expenses	(94,002)	(170,668)	(104,677)	(409,655)
Deposits	(8,083)	(51,090)	(85,761)	(159,594)
Accounts payable	504,919	370,365	(68,795)	1,147,337
Accrued expenses	(132,019)	413,181	191,216	512,600
Deferred revenue	98,570	(106,250)	106,250	98,570
Preferred stock liability	(1,162,000)	1,162,000		
Other liabilities	1,169,065	52,602	115,351	1,405,686
NET CASH PROVIDED (USED) IN OPERATING ACTIVITIES	(23,867,124)	(14,791,227)	(9,099,317)	(50,229,680)
CASH FLOWS FROM INVESTING ACTIVITIES:				
Purchase of marketable securities US Treasury Bills		(18,575,915)		(18,575,915)
Purchase of property and equipment	(756,371)	(729,450)	(672,761)	(2,826,162)
Cash paid for interest in Nanotechnica				(4,000,000)
Cash paid for interest in Aonex		(1,000,000)	(2,000,000)	(5,000,000)
Cash paid for interest in Insert	(5,150,000)		(4,000,000)	(10,150,000)
Cash paid for interest in Calando	(1,000,000)	(5,000,000)	(2,000,000)	(8,000,000)
Cash paid for interest in Unidym	(4,000,000)	(3,000,000)	(1,000)	(7,001,000)
Cash paid for interest in Tego	(101,000)			(101,000)
Cash obtained from interest in Nanotechnica				4,000,000
Cash obtained from interest in Aonex		1,000,000	2,000,000	5,001,250
Cash obtained from interest in Insert	5,150,000		4,075,000	10,529,594
Cash obtained from interest in Calando	1,000,000	5,000,000	2,000,000	8,000,000
Cash obtained from interest in Unidym	4,000,000	3,000,000	1,000	7,001,000
Cash obtained from interest in Tego	101,000			101,000
Proceeds from sale of marketable securities US Treasury Bills		18,888,265		18,888,265
Proceeds from sale of stock in subsidiary	5,136,346		2,424,924	7,561,270
Proceeds from sale of investments		80,145	489,768	569,913
Payment for patents		(205,067)	(98,373)	(303,440)
Restricted cash			50,773	50,773
NET CASH USED IN INVESTING ACTIVITIES	4,379,975	(542,022)	2,269,331	5,745,548
CASH FLOWS FROM FINANCING ACTIVITIES:				
Proceeds from issuance of common stock and warrants, net	15,586,942	20,886,537	20,744,335	68,604,229
NET CASH PROVIDED BY FINANCING ACTIVITIES	15,586,942	20,886,537	20,744,335	68,604,229

NET INCREASE (DECREASE) IN CASH	(3,900,207)	5,553,288	13,914,349	24,120,097
CASH AT BEGINNING OF PERIOD	28,020,304	22,467,016	8,552,667	
CASH AT END OF PERIOD	$ 24,120,097	$ 28,020,304	$ 22,467,016	$ 24,120,097
Supplementary disclosures:				
Interest paid	$	$	$	$
Income tax paid	$ 4,800	$ 4,000	$ 2,400	$ 7,200

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Arrowhead Research Corporation and Subsidiaries

(A Development Stage Company)

Consolidated Statements of Cash Flows (Continued)

SUPPLEMENT NON CASH TRANSACTIONS

On March 23, 2005, Arrowhead purchased 7,375,000 shares of Insert Therapeutics, Inc. common stock from two minority stockholders of Insert for 502,260 newly issued shares of Arrowhead Common Stock valued at $2,000,000 based on the closing market price of Arrowhead Common Stock on NASDAQ on the date of the closing.

On March 31, 2006, Arrowhead purchased 964,000 shares of Calando Pharmaceuticals, Inc. common stock from minority stockholders of Calando for $1,928,000 consisting of 208,382 newly issued shares of Arrowhead Common Stock valued at $1,077,333 plus $850,667 in cash. The 208,382 shares of Arrowhead common stock were valued based on the average closing price of Arrowhead s Common Stock on NASDAQ during the last ten days prior to the date of the closing.

On April 20, 2007, Arrowhead purchased the Series E Preferred Stock of Carbon Nanotechnologies, Inc. in exchange for 1,431,222 shares of Arrowhead Common Stock with an estimated fair market value of $5,400,000.

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

Arrowhead Research Corporation

(A Development Stage Company)

Notes to Consolidated Financial Statements

September 30, 2007

NOTE 1. ***ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES***

Nature of Business

Arrowhead Research Corporation (Company) is a development stage nanotechnology company commercializing new technologies in the areas of life sciences, electronics, and energy. Arrowhead s mission is to build value through the identification, development and commercialization of nanotechnology-related products and applications. The Company works closely with universities to source early stage deals and to generate rights to intellectual property covering promising new nanotechnologies. Arrowhead takes a portfolio approach by operating multiple subsidiaries (each a Subsidiary, and collectively the Subsidiaries) which allows the pursuit of multiple opportunities and diversifies risk. Arrowhead operates five majority-owned Subsidiaries commercializing nanotech products and applications, and has funded a number of prototype development efforts in leading university labs in exchange for the exclusive right to license the technology developed in such labs.

Arrowhead owns majority interest in each of its Subsidiaries, securing substantial participation in any success. Each Subsidiary is staffed with its own technical and business team that focuses on its specific technology and markets while Arrowhead provides financial, strategic and administrative resources. The Company s five majority-owned Subsidiaries are commercializing a variety of nanotech products and applications, including anti-cancer drugs, RNAi therapeutics, carbon-based electronics and compound semiconductor materials. In the near term, Arrowhead expects to add to its portfolio through selective acquisition and formation of new companies.

In exchange for the exclusive right to license the resultant technology developed in sponsored laboratories, Arrowhead has worked with some of the most highly-regarded academic institutions in the country, including the California Institute of Technology (Caltech), Stanford University, Duke University and the University of Florida, in critical areas such as stem cell research, carbon electronics and molecular diagnostics. By funding university research, Arrowhead has the ability to evaluate the probability of technical success at low research cost and, if warranted, continue cost effective development at the university by leveraging the already existing resources available to scientists at universities, such as laboratories and equipment, as well as an atmosphere that encourages the exchange of ideas. Moreover, the cultivation of relationships in the academic community provides an additional window into other promising technologies.

Arrowhead is incorporated in Delaware and its principal executive offices are located in Pasadena, California.

Until the recent acquisition and merger of Carbon Nanotechnologies, Inc. (CNI) into Arrowhead s majority owned subsidiary Unidym, the Company had no revenue from product sales since its inception. With the CNI acquisition in April 2007, Unidym now manufactures and sells a variety of carbon nanotubes for commercial, research applications. Unidym is engaged in a number of government grants generating additional revenues and cost reimbursements. Prior to the acquisition of CNI, in prior years, Arrowhead had some revenue from licensing and from grants.

Summary of Significant Accounting Policies

Basis of Presentation The presentation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates. Certain prior year amounts have been reclassified to conform with current year presentation.

Arrowhead Research Corporation

(A Development Stage Company)

Notes to Consolidated Financial Statements (Continued)

September 30, 2007

Principles of Consolidation The consolidated financial statements of the Company include the accounts of Arrowhead and its subsidiaries Insert Therapeutics, Inc. (Insert), Calando Pharmaceuticals, Inc. (Calando), Unidym, Inc. (Unidym , formerly known as NanoPolaris, Inc.), Tego BioSciences Corporation (Tego) and Aonex Technologies, Inc. (Aonex). Nanotechnica, Inc. (Nanotechnica) is included in the results as Loss from Discontinued Operations. All significant intercompany accounts and transactions are eliminated in consolidation, and minority interests are accounted for in the consolidated statements of operations and the balance sheets.

Use of Estimates The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the amounts reported in the accompanying financial statements. Significant estimates made in preparing these financial statements include value of the stock of its subsidiaries, assumptions to calculate value of stock options, the allowance for doubtful accounts, deferred tax asset valuation allowance, patents, goodwill, minority-interest Common Stock and useful lives for depreciable and amortizable assets. Actual results could differ from those estimates.

Cash and Cash Equivalents For purposes relating to the statement of cash flows, the Company considers all liquid debt instruments purchased with a maturity of three months or less to be cash equivalents.

Credit Risk The Company extends credit to its customers in the normal course of business and generally does not require collateral or other security. The Company performs ongoing credit evaluations of its customers financial condition and historically has not incurred significant credit losses.

Concentration of Credit Risk The Company maintains checking accounts for Arrowhead and separate accounts for each subsidiary at either of two financial institutions. These accounts are insured by the Federal Deposit Insurance Corporation (FDIC), up to $100,000. The Company has four wealth management accounts at the same financial institution which invests in higher yield money market accounts and in government securities. At September 30, 2007, the Company had uninsured cash deposits totaling $23,854,539. The Company has not experienced any losses in such accounts and management believes it has placed its cash on deposit with financial institutions that are financially stable.

Property and Equipment Property and equipment are recorded at cost. Depreciation of property and equipment is recorded on the straight-line method over the respective useful lives of the assets ranging from 3 to 7 years. Leasehold improvements are amortized ot:1pt none #D9D9D9 ;border-bottom:1pt none #D9D9D9 ;border-right:1pt none #D9D9D9 ;padding:0pt;">

Condensed Consolidated Balance Sheets:

Assets

Mortgage loans held for sale at fair value

$

2,172,815

$

1,101,204

$

1,147,884

$

531,004

$

448,384

Mortgage servicing rights

1,627,672

1,411,935

730,828

483,664

108,975

Carried Interest due from Investment Funds

70,906

69,926

67,298

61,142

47,723

Servicing advances

348,306

299,354

228,630

154,328

93,152

Other

914,203

622,875

332,046

354,337

133,929

Total assets

$

5,133,902

$

3,505,294

$

2,506,686

$

1,584,475

$

832,163

Liabilities and stockholders' equity

Assets sold under agreements to repurchase

$

1,735,114

$

1,166,731

$

822,252

$

471,592

$

393,534

Mortgage loan participation and sale agreements

671,426

234,872

143,568

—

—

Notes payable

150,942

61,136

146,855

52,154

53,013

Excess servicing spread financing at fair value payable to PennyMac Mortgage Investment Trust

288,669

412,425

191,166

138,723

—

Other

888,395

567,780

395,579

292,802

123,866

Total liabilities

3,734,546

2,442,944

1,699,420

955,271

570,413

Stockholders' equity

1,399,356

1,062,350

807,266

629,204

261,750

Total liabilities and stockholders' equity

$

5,133,902

$

3,505,294

$

2,506,686

$

1,584,475

$

832,163

Earnings Per Share of Common Stock (1):

Basic

$

2.98

$

2.17

$

1.73

$

0.83

Diluted

$

2.94

$

2.17

$

1.73

$

0.82

Year end Share:

Book value per share

$

15.49

$

12.32

$

9.92

$

8.04

Share price

$

16.65

$

15.36

$

17.30

$

17.55

45

(1) After we completed our IPO on May 14, 2013, the earnings per share of common stock calculation became applicable.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Observations on Current Market Conditions

Our business is affected by macroeconomic conditions in the United States, including economic growth, unemployment rates, the residential housing market and interest rate levels and expectations. The U.S. economy continues to grow, albeit at a modest pace, as reflected in recent economic data. During 2016, U.S. real gross domestic product expanded at an annual rate of 1.9% compared to 0.9% for 2015. The national seasonally adjusted unemployment rate was 4.7% at December 31, 2016, 5.0% at December 31, 2015 and 5.6% at December 31, 2014. Delinquency rates on residential real estate loans remain somewhat elevated compared to historical rates, but have been steadily declining. As reported by the Federal Reserve Bank, during the third quarter of 2016, the delinquency rate on residential real estate loans held by commercial banks was 4.3%, a reduction from 5.2% during the fourth quarter of 2015.

Residential real estate activity remains strong. The seasonally adjusted annual rate of existing home sales for December 2016 was 1.5% higher than for December 2015, and the national median existing home price for all housing types was $233,500, a 3.8% increase from December 2015 (Source: National Association of Realtors®). On a national level, foreclosure filings during 2016 decreased by 14% as compared to 2015. However, foreclosure activity is expected to remain above historical average levels through 2017 and beyond.

Changes in fixed-rate residential mortgage loan interest rates generally follow changes in long-term U.S. Treasury yields. Following the U.S. presidential election, an increase in Treasury yields led to an increase in mortgage loan interest rates. In addition, the Federal Open Market Committee (FOMC) of the Federal Reserve announced a 25 basis point increase in the target range for the federal funds rate at the December 2016 meeting. Thirty-year fixed mortgage interest rates ranged from a low of 3.41% to a high of 4.32% during 2016, while during 2015 thirty-year fixed mortgage interest rates ranged from a low of 3.59% to a high of 4.09% (Source: Freddie Mac's Weekly Primary Mortgage Market Survey).

Mortgage lenders originated an estimated $1.9 trillion of home loans during 2016, up 12% from 2015. Total mortgage originations are forecast to be lower in 2017 versus 2016, with current industry estimates for 2017 averaging $1.5 trillion (Source: average of Fannie Mae, Freddie Mac and Mortgage Bankers Association forecasts).

We believe there is long-term market opportunity for the production of non-Agency jumbo mortgage loans. However, most new jumbo mortgage loans are either being originated or purchased by banks, and the current market for jumbo mortgage loan securitizations is limited, as evidenced by weak demand and inconsistent pricing observed during 2015

and 2016. Prime jumbo MBS securitizations totaled $4 billion in UPB during 2016, a decrease from $11 billion in 2015. During the year ended December 31, 2016, we produced approximately $14 million in UPB of jumbo loans compared to $124 million in UPB of jumbo loans produced during the year ended December 31, 2015.

In our capacity as an investment manager, we expect to see a continued supply of distressed whole loans; however, we believe the pricing for recent transactions has been less attractive for buyers. We are transitioning PMT's portfolio away from distressed whole loans to correspondent-related investments such as CRT and MSRs, and we continue to monitor the market to assess optimal resolution opportunities for distressed portfolio investments held by the Advised Entities.

Critical Accounting Policies

Preparation of financial statements in compliance with accounting principles generally accepted in the United States ("GAAP") requires us to make estimates that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, and revenues and expenses during the reporting period. Certain of these estimates significantly influence the portrayal of our financial condition and results, and they require us to make difficult, subjective or complex judgments. Our critical accounting policies primarily relate to our fair value estimates.

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Fair Value

We group assets measured at or based on fair value in three levels based on the markets in which the assets are traded and the observability of the inputs used to determine fair value. These levels are:

Level/Description		December 31, 2016		
		Carrying value of assets measured (in thousands)	Percentage of Total assets	Percentage of Total stockholders' equity
Level 1:	Prices determined using quoted prices in active markets for identical assets or liabilities.	$ 90,504	2%	6%
Level 2:	Prices determined using other significant observable inputs. Observable inputs are inputs that other market participants would use in pricing an asset or liability and are developed based on market data obtained from sources independent of us. These may include quoted prices for similar assets or liabilities, interest rates, prepayment speeds, credit risk and others.	2,235,924	44%	160%
Level 3:	Prices determined using significant unobservable inputs. In situations where observable inputs are unavailable (for example, when there is little or no market activity for an investment at the end of the year), unobservable inputs may be used. Unobservable inputs reflect our assumptions about the factors that market participants use in pricing an asset or liability, and are based on the best information available in the circumstances.	1,742,209	34%	125%
Total assets measured at or based on fair value (1)		$ 4,068,637	79%	291%
Total assets		$ 5,133,902		
Total stockholders' equity		$ 1,399,356		

(1) Includes assets measured on both a recurring and nonrecurring basis based on the accounting principles applicable to the specific asset or liability and whether we have elected to carry the item at its fair value.

As shown above, our consolidated balance sheet is substantially comprised of assets and liabilities that are measured at or based on their fair values. At December 31, 2016, $2.9 billion or 57% of our total assets were carried at fair value and $1.1 billion or 22% were carried based on their fair values (comprised of certain of our MSRs and real estate acquired in settlement of loans (“REO”) properties, which are carried at the lower of amortized cost or fair value). Of these assets carried at or based on fair value, $1.7 billion or 34% are measured using “Level 3” fair value inputs – significant inputs that are difficult to observe due to the illiquidity of the markets in which the assets are traded and the difficulty in observing the inputs used by market participants in establishing fair value. Changes in inputs to

measurement of these assets can have a significant effect on the amounts reported for these items including their reported balances and their effects on our results of operations.

As a result of the difficulty in observing certain significant valuation inputs affecting “Level 3” fair value assets and liabilities, we are required to make judgments regarding these items’ fair values. Different persons in possession of the same facts may reasonably arrive at different conclusions as to the inputs to be applied in valuing these assets and liabilities. Likewise, due to the general illiquidity of some of these assets and liabilities, subsequent transactions may be at values significantly different from those reported.

Because the fair value of “Level 3” fair value assets and liabilities are difficult to estimate, our process includes performance of these items’ fair value estimation by specialized staff and significant senior management oversight. We have assigned the responsibility for estimating the fair values of non- interest rate lock commitment (“IRLC”) “Level 3”

fair value assets and liabilities to our Financial Analysis and Valuation group (the "FAV group"), which is responsible for valuing and monitoring these items and maintenance of our valuation policies and procedures for non-IRLC assets and liabilities. The FAV group submits the results of its valuations to our senior management valuation committee, which oversees and approves the valuations. During 2016, our senior management valuation committee included our chief executive, financial, operating, business development, risk and asset/liability management officers.

The fair value of our IRLCs is developed by our Capital Markets Risk Management staff and is reviewed by our Capital Markets Operations group.

Following is a discussion of our approach to measuring the balance sheet items that are most affected by "Level 3" fair value estimates.

Mortgage Loans

We carry mortgage loans at their fair values. We recognize changes in the fair value of mortgage loans in current period income as a component of Net gains on mortgage loans held for sale at fair value. We estimate the fair value of mortgage loans based on whether the mortgage loans are saleable into active markets with observable fair value inputs.

· We categorize mortgage loans that are saleable into active markets as "Level 2" fair value assets. At December 31, 2016, we held $2.1 billion of such mortgage loans at fair value that we estimated using their quoted market price or market price equivalent.

· We categorize mortgage loans that are not saleable into active markets as "Level 3" fair value assets. "Level 3" fair value mortgage loans arise primarily from two sources:

- We may purchase certain delinquent government guaranteed or insured mortgage loans from Ginnie Mae guaranteed pools in our mortgage loan servicing portfolio. Our right to purchase such mortgage loans arises as the result of the borrower's failure to make payments for three consecutive months preceding the month that we repurchase the mortgage loan and provides an alternative to our obligation to continue advancing principal and interest at the coupon rate of the related Ginnie Mae security. To the extent such loans ("early buyout loans" or "EBO") have not become saleable into another Ginnie Mae guaranteed security by becoming current either through the borrower's reperformance or through completion of a modification of the mortgage loan's terms, we measure such mortgage loans using "Level 3" fair value inputs.

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Certain of our mortgage loans may become non-saleable into active markets due to our identification of one or more defects. Because such mortgage loans are generally not saleable into active mortgage markets, we classify them as “Level 3” fair value assets.

At December 31, 2016, we held $47.3 million of “Level 3” fair value mortgage loans.

The significant unobservable inputs used in the fair value measurement of our “Level 3” fair value mortgage loans held for sale are discount rates, home price projections, voluntary prepayment speeds and default speeds. Significant changes in any of those inputs in isolation could result in a significant change to the mortgage loans’ fair value measurement.

Interest Rate Lock Commitments

Our net gains on mortgage loans held for sale includes our estimates of the gains or losses we expect to realize upon the sale of mortgage loans we have contractually committed to fund or purchase but have not yet funded, purchased or sold. We recognize a substantial portion of our net gains on mortgage loans held for sale at fair value before we fund or purchase the mortgage loan as the result of these commitments. We call these commitments IRLCs. We recognize the fair value of IRLCs at the time we make the commitment to the correspondent seller or mortgage loan

applicant and adjust the fair value of such IRLCs as the mortgage loan approaches the point of funding or purchase or the prospective transaction is canceled.

We carry IRLCs as either derivative assets or derivative liabilities on our consolidated balance sheet. The fair value of an IRLC is transferred to the fair value of mortgage loans held for sale at fair value when the mortgage loan is funded or purchased. At December 31, 2016, we held $65.8 million of IRLC assets at fair value.

An active, observable market for IRLCs does not exist. Therefore, we measure the fair value of IRLCs using methods we believe that market participants use in pricing IRLCs. We estimate the fair value of an IRLC based on observable Agency MBS prices, our estimates of the fair value of the MSRs we expect to receive in the sale of the mortgage loans and the probability that we will fund or purchase the mortgage loan (the "pull-through rate").

Pull-through rates and MSR fair values are based on our estimates as these inputs are difficult to observe in the mortgage marketplace. Our estimate of the probability that a mortgage loan will be funded and market interest rates are updated as the mortgage loans move through the funding process and as mortgage market interest rates change and may result in significant changes in the estimates of the fair value of the IRLCs. Such changes are reflected in the change in fair value of IRLCs which is a component of our Net gains on mortgage loans held for sale at fair value in the period of the change. The financial effects of changes in these inputs are generally inversely correlated. Increasing mortgage interest rates have a positive effect on the fair value of the MSR component of IRLC fair value but increase the pull-through rate for the mortgage loan principal and interest payment cash flow component, which has decreased in fair value.

A shift in our assessment of an input to the valuation of IRLCs can have a significant effect on the amount of Net gains on sale of mortgage loans held for sale for the period. We believe that the most significant "Level 3" fair value input to the measurement of IRLCs is the pull-through rate. Following is a quantitative summary of the effect of changes in the pull-through rate input on the fair value of IRLCs:

Shift in input	Effect on fair value of IRLC of a change in pull-through rate (in thousands)
5 %	$ 3,183
10 %	$ 6,073
20 %	$ 11,218

(5)	%	$ (3,864)
(10)	%	$ (7,728)
(20)	%	$ (15,456)

The preceding analysis holds constant all of the other inputs to show an estimate of the effect on fair value of a change in the pull-through rate. We expect that in a market shock event, multiple inputs would be affected and the effects of these changes may compound or counteract each other. Therefore the preceding analysis is not a projection of the effects of a shock event or a change in our estimate of an input and should not be relied upon as an earnings projection.

Mortgage Servicing Rights and Mortgage Servicing Liabilities ("MSLs")

MSRs and MSLs represent the value assigned to a contract that obligates us to service the mortgage loans on behalf of the owner of the mortgage loan in exchange for servicing fees and the right to collect certain ancillary income from the borrower. We initially recognize MSRs at our estimate of the fair value of the contract to service the loans. At December 31, 2016, we held $1.6 billion of carrying value of MSRs net of MSLs.

As economic fundamentals influencing the underlying mortgage loans change, our estimate of the fair value of the related MSR or MSL we hold will also change. As a result, we will record changes in fair value for the MSRs and MSLs we carry at fair value, and we may recognize changes in fair value relating to our MSRs carried at the lower of amortized cost or fair value depending on the relationship of the MSR's fair value to its carrying value at the measurement date. These fair value changes will be recognized as a component of Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities.

After the initial recognition of MSRs and MSLs, we account for such assets based on the class of MSRs: originated MSRs backed by mortgage loans with initial interest rates of less than or equal to 4.5%; originated MSRs backed by mortgage loans with initial interest rates of more than 4.5%; and purchased MSRs. We account for originated MSRs backed by mortgage loans with initial interest rates of less than or equal to 4.5% using the amortization method. Originated MSRs backed by loans with initial interest rates of more than 4.5% and purchased MSRs are accounted for at fair value with changes in fair value recorded in current period income. MSLs are accounted for at fair value with changes in fair value recorded in current period income.

MSRs Accounted for Using the Amortization Method

We amortize MSRs accounted for using the amortization method. MSR amortization is determined by applying the ratio of the net MSR cash flows projected for the current period to the estimated total remaining net MSR cash flows. The estimated total net MSR cash flows are determined at the beginning of each month using prepayment inputs applicable at that time.

We also evaluate MSRs accounted for using the amortization method for impairment with reference to the assets' fair value at the measurement date. Impairment occurs when the current fair value of the MSR falls below the asset's amortized cost. If MSRs are impaired, the impairment is recognized in current period income and the carrying value of the MSRs is adjusted through a valuation allowance. If the fair value of impaired MSRs subsequently increases, we recognize the increase in fair value in current period income and, through a reduction in the valuation allowance, adjust the carrying value of the MSRs to a level not in excess of amortized cost.

When evaluating MSRs for impairment, we stratify the assets by predominant fair value risk characteristic including loan type (fixed-rate or adjustable-rate) and note interest rate. We stratify fixed-rate mortgage loans into note interest rate pools of 50 basis points for note interest rates between 3.0% and 4.5% and a single pool for note interest rates of less than or equal to 3.0%. We evaluate adjustable-rate mortgage loans with initial interest rates of 4.5% or less in a single pool. Amortization and impairment of MSRs accounted for using the amortization method are included in current period income as a component of Net mortgage loan servicing fees. During the year ended December 31, 2016, we recognized $60.5 million in impairment of MSRs accounted for using the amortization method.

We periodically review the various impairment strata to determine whether the fair value of the impaired MSRs in a given stratum is likely to recover. When we conclude that recovery of the value is unlikely in the foreseeable future, a write-down of the cost of the MSRs for that stratum to its estimated recoverable value is charged to the valuation allowance. During the year ended December 31, 2016, we recognized $12.8 million in write-downs of MSRs.

MSRs and MSLs Accounted for at Fair Value

We include changes in fair value of MSRs and MSLs accounted for at fair value in current period income as a component of Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities. During the year ended December 31, 2016, we recognized a $146.0 million net reduction in fair value of MSRs and MSLs accounted for at fair value.

A shift in the market for MSRs and MSLs or a change in our assessment of an input to the valuation of MSRs and MSLs can have a significant effect on their fair value and in our income for the period. We believe the most significant “Level 3” fair value inputs to the valuation of MSRs and MSLs are the pricing spread (discount rate), prepayment speed and annual per-loan cost of servicing.

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Following is a summary of the effect on fair value of MSRs (which totaled $1.6 billion at December 31, 2016) of various changes to these key inputs:

Shift in input		Effect on fair value of MSRs of a change in input value		
		Pricing spread	Prepayment speed	Servicing cost
		(in thousands)		
5	%	$ (31,479)	$ (25,454)	$ (14,502)
10	%	$ (61,761)	$ (50,086)	$ (29,006)
20	%	$ (118,980)	$ (97,046)	$ (58,012)
(5)	%	$ 32,744	$ 26,318	$ 14,502
(10)	%	$ 66,826	$ 53,545	$ 29,006
(20)	%	$ 139,320	$ 110,928	$ 58,012

The preceding analyses hold constant all of the inputs other than the input that is being changed to show an estimate of the effect on fair value of a change in a specific input. We expect that in a market shock event, multiple inputs would be affected and the effects of these changes may compound or counteract each other. Furthermore, certain of our MSRs are accounted for using the amortization method and are carried at the lower of amortized cost or fair value. Such assets' carrying value may not be immediately affected as a result of a change in input values depending on the carrying value of the MSR asset before the change in input occurs and whether the input change causes our estimate of fair value to change to a level below the amortized cost of those MSRs. Therefore the preceding analyses are not projections of the effects of a shock event or a change in our estimate of an input and should not be relied upon as earnings projections.

Excess Servicing Spread

We finance a portion of the cost of Agency MSRs that we purchase from non-affiliate sellers through the sale to PMT of the servicing spread in excess of the level specified in the sale agreement. We carry our excess servicing spread financing ("ESS") at fair value. At December 31, 2016, we carried $288.7 million of fair value of ESS.

Because the ESS is a claim to a portion of the cash flows from MSRs, the valuation of the ESS is similar to that of MSRs. We use the same discounted cash flow approach to measure the ESS and the related MSRs except that certain inputs relating to the cost to service the mortgage loans underlying the MSRs and certain ancillary income are not included in the ESS valuation as these cash flows do not accrue to the holder of the ESS.

A shift in the market for ESS or a change in our assessment of an input to the valuation of ESS can have a significant effect on the fair value of ESS and in our income for the period. However, we believe that this change will be offset to

a great extent by a change in the fair value of the MSRs that the ESS is financing. We record changes in the fair value of excess servicing spread in Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities. During the year ended December 31, 2016, we recorded $23.9 million of net reduction in fair value of ESS.

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We believe that the most significant “Level 3” fair value inputs to the valuation of ESS are the pricing spread (discount rate) and prepayment speed. Following is a summary of the effect on fair value of various changes to these inputs:

Shift in input	Effect on excess servicing spread of a change in input value	
	Pricing spread	Prepayment speed
	(in thousands)	
5 %	$ (2,748)	$ (6,386)
10 %	$ (5,445)	$ (12,516)
20 %	$ (10,691)	$ (24,067)
(5) %	$ 2,800	$ 6,657
(10)%	$ 5,654	$ 13,602
(20)%	$ 11,529	$ 28,430

The preceding analyses hold constant all of the inputs other than the input that is being changed to show an estimate of the effect on fair value of a change in that specific input. We expect that in a market shock event, multiple inputs would be affected and the effects of these changes may compound or counteract each other. Therefore the preceding analyses are not projections of the effects of a shock event or a change in our estimate of an input and should not be relied upon as earnings projections.

Critical Accounting Policy Not Based on Fair Value- Liability for Losses Under Representations and Warranties

We record a provision for losses relating to our representations and warranties as part of our mortgage loan sale transactions. The method we use to estimate the liability for representations and warranties is a function of the representations and warranties given and considers a combination of factors, including, but not limited to, estimated future default and mortgage loan repurchase rates, the potential severity of loss in the event of default and, if applicable, the probability of reimbursement by the correspondent mortgage loan seller. We establish a liability at the time loans are sold and periodically update our liability estimate. At December 31, 2016, the balance of our liability for losses under representations and warranties totaled $19.1 million.

The level of the liability for losses under representations and warranties is difficult to estimate and requires considerable management judgment. The level of mortgage loan repurchase losses is dependent on economic factors, purchaser or insurer loss mitigation strategies, and other external conditions that may change over the lives of the underlying mortgage loans. Our estimate of the liability for representations and warranties is developed by our credit administration staff. The liability estimate is reviewed and approved by our senior management credit committee which includes the senior executives of the Company and of the loan production, loan servicing and credit risk management areas.

As economic fundamentals change, as purchaser and insurer evaluations of their loss mitigation strategies (including claims under representations and warranties) change and as the mortgage market and general economic conditions affect our correspondent sellers, the level of repurchase activity and ensuing losses will change. As a result of these changes, we may be required to adjust the estimate of our liability for representations and warranties. Such an adjustment may be material to our financial condition and results of operations. During the year ended December 31, 2016, we recorded reductions to our previously recorded representations and warranties liability amounts totaling $7.7 million.

Accounting Developments

In May 2014, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") ASU 2014-09, Revenue from Contracts with Customers (Subtopic 606)("ASU 2014-09"), which supersedes the guidance in the revenue recognition topic of its Accounting Standards Codification (the "ASC"). ASU 2014-09 clarifies the principles for recognizing revenue in order to improve comparability of revenue recognition practices across entities

and industries with certain scope exceptions including financial instruments, leases, and guarantees. ASU 2014-09 provides guidance intended to assist in the identification of contracts with customers and separate performance obligations within those contracts, the determination and allocation of the transaction price to those identified performance obligations and the recognition of revenue when a performance obligation has been satisfied. ASU 2014-09 also requires disclosures regarding the nature, amount, timing, and uncertainty of revenues and cash flows from contracts with customers.

Upon adoption, ASU 2014-09 provides for transition through either a full retrospective approach requiring the restatement of all presented prior periods or a modified retrospective approach, which allows the new recognition standard to be applied to only those contracts that are not completed at the date of transition. If the modified retrospective approach is adopted, a cumulative-effect adjustment to retained earnings is performed with additional disclosures required including the amount by which each line item is affected by the transition as compared to the guidance in effect before adoption and an explanation of the reasons for significant changes in these amounts.

The FASB has issued several amendments to ASU 2014-09, including:

· In May 2014, ASU 2015-14, Revenue From Contracts with Customers (“ASU 2015-14”). This update deferred the initial effective date of ASU 2014-09. As a result of the issuance of ASU 2015-14, ASU 2014-09 is effective for annual reporting periods beginning on or after December 15, 2017, and interim periods within those annual periods. Early adoption is permitted only as of annual reporting periods beginning after December 15, 2016, including interim reporting periods within that reporting period.

· In March 2015, ASU 2016-08, Principal Versus Agent Considerations (Reporting Revenue Gross versus Net). The amendments to this update are intended to improve the implementation guidance on principal versus agent considerations in ASU 2014-09 by clarifying how an entity should identify the unit of account (i.e. the specified good or service) and how an entity should apply the control principle to certain types of arrangements.

· In May 2016, ASU 2016-12, Narrow-Scope Improvements and Practical Expedients. The amendments to this update clarify certain core recognition principles and provide practical expedients available at transition. The improvements address collectability, sales tax presentation, noncash consideration, contract modifications and completed contracts at transition.

· In December 2016, ASU 2016-20, Technical Corrections and Improvements to Topic 606, Revenue From Contracts with Customers. The amendments to this update affect narrow aspects of the guidance issued in ASU 2014-09. The amendments remove certain items under its scope and clarify application of certain principles. The amendments address loan guarantee fees, contracts costs impairment testing, provisions for losses on construction, insurance contracts, disclosure of remaining performance obligations, contract modifications, contract asset versus receivable, refund liability, advertising cost, fixed-odds wagering contracts in the casino industry and cost capitalization for advisor to private funds and public funds.

The Company expects that upon adoption, the guidance currently applied by the Company to its Carried Interest may be affected. The Company's Carried Interest arrangements with the Investment Funds represent capital allocations to PFSI. The Company is currently evaluating whether the nature and substance of its Carried Interest arrangements are within the scope of ASU 2014-09, or whether such Carried Interest should be accounted for under the equity method of accounting under the Investments – Equity Method and Joint Ventures topic of the ASC.

If the Company concludes the Carried Interest should be accounted for under the equity method of accounting, Carried Interest would be accounted for as a financial instrument and the amount recognized by the Company would not change significantly. The Company is still determining the potential additional effects of ASU 2014-09 on its financial

statements for other arrangements that may be within the scope of ASU 2014-09.

In August 2014, the FASB issued Accounting Standards Update No. 2014-15, Presentation of Financial Statements—Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern ("ASU 2014-15"). ASU 2014-15 is intended to define management's responsibility to evaluate whether there is substantial doubt about an organization's ability to continue as a going concern and to provide related note disclosures.

Under GAAP, financial statements are prepared under the presumption that the reporting organization will continue to operate as a going concern, except in limited circumstances. Financial reporting under this presumption is commonly referred to as the going concern basis of accounting. The going concern basis of accounting establishes the fundamental basis for measuring and classifying assets and liabilities.

Under ASU 2014-15, an entity would be required to evaluate its status as a going concern as part of its periodic financial statement preparation process and would be required to disclose information about its potential inability to continue as a going concern when "substantial doubt" about its ability to continue as a going concern for the period of one year from the earlier of the date its financial statements are issued or are ready to be issued.

If management concludes that there is "substantial doubt" about the entity's ability to continue as a going concern, it must disclose the principal conditions or events causing substantial doubt to be raised, management's evaluation of the conditions and management's plans. If substantial doubt is not alleviated as a result of management's plans, the company is required to include a statement that there is "substantial doubt about the entity's ability to continue as a going concern." ASU 2014-15 also requires an entity to disclose how the substantial doubt was resolved in the period that substantial doubt no longer exists.

ASU 2014-15 is effective for the annual period ending December 31, 2016. The adoption of ASU 2014-15 did not have an effect on the financial statements of the Company.

In February 2015, the FASB issued ASU 2015-02, Consolidation (Topic 810): Amendments to the Consolidation Analysis ("ASU 2015-02"). ASU 2015-02 affects reporting entities that are required to evaluate whether they should consolidate certain legal entities. ASU 2015-02 modifies the evaluation of whether limited partnerships and similar legal entities are Variable Interest Entities ("VIEs") or voting interest entities, eliminates the presumption that a general partner should consolidate a limited partnership and affects the consolidation analysis of reporting entities that are involved with VIEs, particularly those that have fee arrangements and related party relationships. ASU 2015-02 is effective for fiscal years, and for interim periods within those fiscal years, beginning after December 15, 2015. The Company adopted ASU 2015-02 effective January 1, 2016. The adoption of ASU 2015-02 had no effect on the Company's consolidated financial statements.

In January 2016, the FASB issued ASU 2016-01, Financial Instruments–Overall: Recognition and Measurement of Financial Assets and Financial Liabilities (“ASU 2016-01”). ASU 2016-01 affects the accounting for equity investments, financial liabilities under the fair value option, the presentation and disclosure requirements for financial instruments, and the valuation allowance assessment when recognizing deferred tax assets resulting from unrealized losses on available-for-sale debt securities.

ASU 2016-01 requires that:

- All equity investments in unconsolidated entities (other than those accounted for using the equity method of accounting) with readily determinable fair values will generally be measured at fair value through earnings.
- When the fair value option has been elected for financial liabilities, changes in fair value due to instrument-specific credit risk will be recognized separately in other comprehensive income. The accumulated gains and losses due to these changes will be reclassified from accumulated other comprehensive income to earnings if the financial liability is settled before maturity.

- For financial instruments measured at amortized cost, public business entities will be required to use the exit price when measuring the fair value of financial instruments for disclosure purposes.
- Financial assets and financial liabilities shall be presented separately in the notes to the financial statements, grouped by measurement category (e.g., fair value, amortized cost, lower of cost or fair value) and form of financial asset (e.g., loans, securities).
- Public business entities will no longer be required to disclose the methods and significant assumptions used to estimate the fair value of financial instruments carried at amortized cost.
- Entities will have to assess the realizability of a deferred tax asset related to a debt security classified as available for sale in combination with the entity's other deferred tax assets.

The classification and measurement guidance will be effective for public business entities in fiscal years beginning after December 15, 2017, including interim periods within those fiscal years. Early adoption of the provision to record fair value changes for financial liabilities under the fair value option resulting from instrument-specific credit risk in other comprehensive income is permitted and can be elected for all financial statements of fiscal years and interim periods that have not yet been issued or that have not yet been made available for issuance. The Company does not expect the adoption of ASU 2016-01to have a significant effect on its consolidated financial statements.

In February 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842) ("ASU 2016-02"). ASU 2016-02 sets out the principles for the recognition, measurement, presentation and disclosure of leases for both parties to a contract (i.e. lessees and lessors) and supersedes previous leasing standards. ASU 2016-02 requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether the lease is effectively a financed purchase of the leased asset by the lessee. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than 12 months regardless of their classification.

ASU 2016-02 is effective for the Company for reporting periods beginning after December 15, 2018, with early adoption permitted. As shown in Note 24 - Commitments and Contingencies, the Company had approximately $100.8 million in future minimum lease payment commitments as of December 31, 2016. Were the Company to adopt ASU 2016-02 as of December 31, 2016, it would be required to recognize a right-of-use asset and a corresponding liability based on the present value of such obligation as of December 31, 2016. The Company does not expect to recognize a significant cumulative effect adjustment to its stockholders' equity as a result of adopting ASU 2016-02.

In March 2016, the FASB issued ASU 2016-09, Compensation—Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting ("ASU 2016-09"). ASU 2016-09 simplifies several aspects of the accounting for share-based payment award transactions, including:

- Modifies the accounting for income taxes relating to share-based payments. All excess tax benefits and tax deficiencies (including tax benefits of dividends on share-based payment awards) will be recognized as income tax expense or benefit in the consolidated income statement. The tax effects of exercised or vested awards will be treated as discrete items in the reporting period in which they occur. An entity will recognize excess tax benefits regardless of whether the benefit reduces taxes payable in the current period. Under current GAAP, excess tax benefits are recognized in additional paid-in capital; tax deficiencies are recognized either as an offset to accumulated excess tax benefits, if any, or in the consolidated income statement in the period they reduce income taxes payable.

- Changes the classification of excess tax benefits on the consolidated statement of cash flows. In the consolidated statement of cash flows, excess tax benefits will be classified along with other income tax cash flows as an operating activity. Under current GAAP, excess tax benefits are separated from other income tax cash flows and classified as a financing activity.

- Changes the requirement to estimate the number of awards that are expected to vest. Under ASU 2016-09, an entity can make an entity-wide accounting policy election to either estimate the number of awards that are expected to vest as presently required or account for forfeitures when they occur.

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Under current GAAP, accruals of compensation cost are based on the number of awards that are expected to vest.

· Changes the tax withholding requirements for share-based payment awards to qualify for equity accounting. The threshold to qualify for equity classification permits withholding up to the maximum statutory tax rates in the applicable jurisdictions. Under current GAAP, for an award to qualify for equity classification is that an entity cannot partially settle the award in cash in excess of the employer's minimum statutory withholding requirements.

· Establishes GAAP for the classification of employee taxes paid when an employer withholds shares for tax withholding purposes. Cash paid by an employer when directly withholding shares for tax- withholding purposes should be classified as a financing activity. This guidance establishes GAAP related to the classification of withholding taxes in the statement of cash flows as there is no such guidance under current GAAP.

ASU 2016-09 is effective for annual periods beginning after December 15, 2016, and interim periods within those annual periods. Early adoption is permitted for any organization in any interim or annual period. The Company does not expect the adoption of ASU 2016-09 to have a significant effect on its stock-based compensation expense or on previously recognized paid-in capital relating to such expense.

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Results of Operations

Our results of operations are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Revenues:			
Net gains on mortgage loans held for sale at fair value	$ 531,780	$ 320,715	$ 167,024
Mortgage loan origination fees	125,534	91,520	41,576
Fulfillment fees from PennyMac Mortgage Investment Trust	86,465	58,607	48,719
Net mortgage loan servicing fees	185,466	229,543	216,919
Management fees & Carried Interest	23,726	30,865	48,664
Net interest expense	(25,079)	(19,382)	(9,486)
Other	3,995	1,242	4,861
Total net revenue	931,887	713,110	518,277
Expenses	548,804	433,917	295,244
Provision for income taxes	46,103	31,635	26,722
Net income	$ 336,980	$ 247,558	$ 196,311
Income before provision for income taxes by segment:			
Mortgage banking:			
Production	$ 416,096	$ 271,869	$ 135,619
Servicing	(36,099)	1,297	65,925
Total mortgage banking	379,997	273,166	201,544
Investment management	2,486	7,722	20,111
Non-segment activities (1)	600	(1,695)	1,378
	$ 383,083	$ 279,193	$ 223,033
During the period:			
Interest rate lock commitments issued	$ 52,648,017	$ 39,432,317	$ 19,589,704
Fair value of mortgage loans purchased and originated for sale:			
Government-insured or guaranteed loans acquired from PennyMac Mortgage Investment Trust	$ 42,051,505	$ 31,490,920	$ 16,431,338
Mortgage loans originated through consumer direct channel	6,491,107	4,143,239	1,952,505
	$ 48,542,612	$ 35,634,159	$ 18,383,843
Unpaid principal balance of mortgage loans fulfilled for PennyMac Mortgage Investment Trust	$ 23,188,386	$ 14,014,603	$ 11,476,448
Unpaid principal balance of mortgage loan servicing portfolio:			
Owned:			
Mortgage servicing rights	$ 129,177,106	$ 110,602,704	$ 64,690,613
Mortgage servicing liabilities	2,074,896	806,897	478,581

Mortgage loans held for sale	2,101,283	1,052,485	1,100,910
	133,353,285	112,462,086	66,270,104
Subserviced for Advised Entities	60,886,717	47,810,632	39,709,945
	$ 194,240,002	$ 160,272,718	$ 105,980,049
Net assets of Advised Entities:			
PennyMac Mortgage Investment Trust	$ 1,351,114	$ 1,496,113	$ 1,578,172
Investment Funds	197,550	231,745	424,182
	$ 1,548,664	$ 1,727,858	$ 2,002,354

(1) Primarily represents repricing of Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement.

Comparison of the years ended December 31, 2016, 2015 and 2014

During the year ended December 31, 2016, we recorded net income of $337.0 million, an increase of $89.4 million, or 36%, from 2015. Our net income in 2016 reflects net gains on mortgage loans held for sale at fair value of $531.8 million, an increase of $211.1 million, or 66%, from 2015 resulting from a 44% increase in our loan production. This growth was supplemented by an increase of $34.0 million, or 37%, in mortgage loan origination fees. These revenue increases were partially offset by a decrease of $44.1 million in net mortgage loan servicing fees, primarily reflecting an increase in amortization, impairment and change in fair value of MSRs due to low mortgage rates through

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most of the year leading to higher actual and expected prepayment activity in the future, and an increased risk premium for government servicing assets.

During the year ended December 31, 2015, we recorded net income of $247.6 million, an increase of $51.2 million or 26% from 2014. Our net income in 2015 reflects net gains on mortgage loans held for sale at fair value of $320.7 million, an increase of $153.7 million, or 92%, from 2014, reflecting a 94% increase in our loan production. This growth was supplemented by an increase of $49.9 million, or 120%, in mortgage loan origination fees. These revenue increases were partially offset by a decrease in management fees and Carried Interest of $17.8 million and increased expenses incurred to accommodate the growth of our mortgage banking segments.

Net gains on mortgage loans held for sale at fair value

During the year ended December 31, 2016, we recognized net gains on mortgage loans held for sale at fair value totaling $531.8 million, compared to $320.7 million and $167.0 million during the years ended December 31, 2015 and 2014, respectively.

The increases in net gains on mortgage loans held for sale at fair value in 2016 and 2015 were primarily due to growth in the volume of mortgage loans that we purchased or originated and subsequently sold. Our net gains on mortgage loans held for sale include both cash and non-cash elements. We receive proceeds on sale that include both cash and MSRs. The net gain for the years ended December 31, 2016, 2015 and 2014 included $562.5 million, $452.4 million and $207.9 million, respectively, in fair value of MSRs received as part of proceeds on sales, net of mortgage servicing liabilities incurred. We also recognize a liability for our estimate of the losses we expect to incur in the future as a result of claims against us in connection with the representations and warranties that we made in the loan sales transactions. The net gain for the years ended December 31, 2016, 2015 and 2014, included net (reversals) provisions for losses relating to representations and warranties of ($582,000), $7.5 million and $5.3 million, respectively.

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Our net gains on mortgage loans held for sale are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
From non affiliates:			
Cash (loss) gain:			
Mortgage loans	$ (62,283)	$ (82,709)	$ 43,665
Hedging activities	10,275	(47,150)	(90,507)
	(52,008)	(129,859)	(46,842)
Non-cash gain:			
Mortgage servicing rights and mortgage servicing liabilities resulting from mortgage loan sales, net	562,540	452,411	207,885
Provision for losses relating to representations and warranties:			
Pursuant to mortgage loan sales	(7,090)	(7,512)	(5,291)
Reduction in liability due to change in estimate	7,672	—	—
Change in fair value of mortgage loans and derivative financial instruments outstanding at year end:			
Interest rate lock commitments	15,618	11,372	25,640
Mortgage loans	2,796	3,949	12,733
Hedging derivatives	10,344	(1,810)	(19,264)
	539,872	328,551	174,861
From PennyMac Mortgage Investment Trust - Recapture payable	(8,092)	(7,836)	(7,837)
	$ 531,780	$ 320,715	$ 167,024
During the year:			
Unpaid principal balance of mortgage loans sold	$ 47,410,115	$ 35,111,710	$ 17,928,780
Interest rate lock commitments issued:			
Conventional mortgage loans	$ 3,146,908	$ 7,001,938	$ 1,341,492
Government-insured or guaranteed mortgage loans	49,501,109	32,430,379	18,248,212
	$ 52,648,017	$ 39,432,317	$ 19,589,704
Year end:			
Mortgage loans held for sale at fair value	$ 2,172,815	$ 1,101,204	$ 1,147,884
Commitments to fund and purchase mortgage loans	$ 4,279,611	$ 3,487,366	$ 1,765,597

Provision for Losses Under Representations and Warranties

We record our estimate of the losses that we expect to incur in the future as a result of claims against us made in connection with the representations and warranties provided to the purchasers and insurers of the mortgage loans we sold in our Net gains on sale of mortgage loans held for sale at fair value. Our agreements with the purchasers and insurers include representations and warranties related to the mortgage loans we sell to the purchasers. The representations and warranties require adherence to purchaser and insurer origination and underwriting guidelines,

including but not limited to the validity of the lien securing the mortgage loan, property eligibility, borrower credit, income and asset requirements, and compliance with applicable federal, state and local law.

In the event of a breach of our representations and warranties, we may be required to either repurchase the mortgage loans with the identified defects or indemnify the purchaser or insurer. In such cases, we bear any subsequent credit loss on the mortgage loans. Our credit loss may be reduced by any recourse we have to correspondent originators that sold such mortgage loans to us and breached similar or other representations and warranties. In such event, we have the right to seek a recovery of related repurchase losses from that correspondent seller.

The method used to estimate our losses on representations and warranties is a function of our estimate of future defaults, mortgage loan repurchase rates, the severity of loss in the event of defaults, if applicable, and the probability of reimbursement by the correspondent mortgage loan seller. We establish a liability at the time mortgage loans are sold and review our liability estimate on a periodic basis.

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During the years ended December 31, 2016, 2015 and 2014, we recorded net provisions for (reversals of) losses under representations and warranties totaling ($582,000), $7.5 million and $5.3 million, respectively. The reversal recognized during 2016 was comprised of a provision for losses related to current year sales totaling $7.1 million offset by a $7.7 million reduction relating to mortgage loans sold in prior periods. We recorded this reversal due to our losses continuing to be realized at lower-than-anticipated levels due in part to the high rate of refinancing activity resulting from the historically low interest rates over recent years. The increase in 2015 over 2014 was primarily due to an increase in the volume of mortgage loan sales activity during 2015 as compared to 2014.

Following is a summary of mortgage loan repurchase activity and the unpaid balance of mortgage loans subject to representations and warranties:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
During the year:			
Indemnification activity			
Mortgage loans indemnified by PFSI at beginning of period	$ 3,470	$ 1,521	$ 80
New indemnifications	3,063	2,311	1,441
Less:			
Indemnified mortgage loans repurchased	—	—	—
Indemnified mortgage loans repaid or refinanced	934	362	—
Mortgage loans indemnified by PFSI at end of period	$ 5,599	$ 3,470	$ 1,521
Repurchase activity			
Total mortgage loans repurchased by PFSI	$ 19,248	$ 21,723	$ 2,742
Less:			
Mortgage loans repurchased by correspondent lenders	12,625	17,538	2,451
Mortgage loans repaid by borrowers or resold with defects resolved	4,793	3,118	138
Net mortgage loans repurchased by PFSI with losses chargeable to liability for representations and warranties	$ 1,830	$ 1,067	$ 153
Net losses charged to liability for representations and warranties	$ 962	$ 160	$ 155
Year end:			
Unpaid principal balance of mortgage loans subject to representations and warranties	$ 90,650,605	$ 60,687,246	37,014,687
Liability for representations and warranties	$ 19,067	$ 20,611	13,259

During the year ended December 31, 2016, we repurchased mortgage loans with unpaid principal balances totaling $19.2 million and charged $962,000 in incurred losses relating to repurchases against our liability for representations and warranties. As the outstanding balance of mortgage loans we purchase and sell subject to representations and warranties increases and as previously sold mortgage loans outstanding continue to season, we expect the level of repurchase and loss activity to increase.

Other Mortgage Loan Production-Related Revenues

Loan origination fees increased $34.0 million during the year ended December 31, 2016 compared to the year ended December 31, 2015. The increase was primarily due to an increase in the volume of mortgage loans we produced.

During the year ended December 31, 2015, loan origination fees increased $49.9 million to $91.5 million. The increase was primarily due to an increase in the volume of mortgage loans we produced compounded by increases in certain fees we charge in our loan production activities.

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Fulfillment fees from PMT represent fees we collect for services we perform on behalf of PMT in connection with the acquisition, packaging and sale of mortgage loans. The fulfillment fees are calculated as a percentage of the UPB of the mortgage loans we fulfill for PMT. The fulfillment fees increased $27.9 million in 2016, compared to 2015, due to an increase in the volume of mortgage loans we fulfilled in 2016 compared to 2015, partially offset by reductions in fulfillment fee rates pursuant to an amendment to our mortgage banking services agreement with PMT and discretionary reductions in fees relating to mortgage loan sales prior to the date of the amendment to the agreement. Fulfillment fees increased $9.9 million in 2015, compared to 2014, due to increases in the volume of mortgage loans we fulfilled in 2015 as compared to 2014, partially offset by contractual discretionary reductions in fulfillment fees made to facilitate certain transactions.

Summarized below are our fulfillment fees:

	Year ended December 31,		
	2016	2015	2014
	(dollars in thousands)		
Fulfillment fee revenue	$ 86,465	$ 58,607	$ 48,719
Unpaid principal balance of mortgage loans fulfilled	$ 23,188,386	$ 14,014,603	$ 11,476,448
Average fulfillment fee rate (in basis points)	37	42	42

Net mortgage loan servicing fees

Our net mortgage loan servicing fees are summarized below.

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Net mortgage loan servicing fees:			
Mortgage loan servicing fees:			
From non-affiliates	$ 385,633	$ 290,474	$ 173,005
From PennyMac Mortgage Investment Trust	50,615	46,423	52,522
From Investment Funds	2,583	2,636	6,425
Ancillary and other fees	46,910	43,139	26,469
	485,741	382,672	258,421
Amortization, impairment and change in fair value of mortgage servicing rights and excess servicing spread financing	(300,275)	(153,129)	(41,502)
Net mortgage loan servicing fees	$ 185,466	$ 229,543	$ 216,919

Average mortgage loan servicing portfolio	$ 177,676,686	$ 135,177,080	$ 91,887,504

Amortization, impairment and change in fair value of mortgage servicing rights and excess servicing spread are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Amortization of mortgage servicing rights carried at lower of amortized cost or fair value and realization of cash flows of mortgage servicing rights carried at fair value	$ (204,608)	$ (134,790)	$ (68,996)
Other changes in fair value of mortgage servicing rights and mortgage servicing liabilities carried at fair value and provision for impairment of mortgage servicing rights carried at lower of amortized cost or fair value	(145,995)	(14,432)	(28,009)
Change in fair value of excess servicing spread	23,923	3,810	28,663
Hedging results	26,405	(7,717)	26,840
Total fair value adjustments, net of hedging results	(95,667)	(18,339)	27,494
Total amortization, impairment and change in fair value of mortgage servicing rights, mortgage servicing liabilities and excess servicing spread	$ (300,275)	$ (153,129)	$ (41,502)
Average mortgage servicing rights balances:			
Carried at lower of amortized cost or fair value	$ 839,289	$ 553,395	$ 321,049
Carried at fair value	557,595	527,134	277,313
	$ 1,396,884	$ 1,080,529	$ 598,362
Mortgage servicing rights at year end:			
Carried at lower of amortized cost or fair value	$ 1,111,747	$ 751,688	$ 405,445
Carried at fair value	515,925	660,247	325,383
	$ 1,627,672	$ 1,411,935	$ 730,828

Following is a summary of our mortgage loan servicing portfolio:

	December 31,	
	2016	2015
	(unpaid principal balance-in thousands)	
Mortgage loans serviced		
Prime servicing:		
Owned:		
Mortgage servicing rights		
Originated	$ 89,516,155	$ 59,880,349
Acquired	39,660,951	50,722,355
	129,177,106	110,602,704
Mortgage servicing liabilities	2,074,896	806,897
Mortgage loans held for sale	2,101,283	1,052,485

	133,353,285	112,462,086
Subserviced for Advised Entities	58,327,748	43,963,378
Total prime servicing	191,681,033	156,425,464
Special servicing–Subserviced for Advised Entities	2,558,969	3,847,254
Total mortgage loans serviced	$ 194,240,002	$ 160,272,718

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During the year ended December 31, 2016, net mortgage loan servicing fees decreased $44.1 million, or 19%, when compared to the year ended December 31, 2015. The decrease during the year was due to an increase of $147.1 million, or 96%, in MSR amortization and MSR, MSL and ESS valuation adjustments reflecting the effects of the historically low interest rate environment that prevailed during 2016 compounded by the growth in our investment in MSRs. The low interest rate environment encouraged borrower-refinancing activities, which negatively affected MSR fair values and the expected lives of the mortgage loans underlying such MSRs. Additionally, the risk premium demanded by market participants for government servicing assets increased during the year, which also negatively affected MSR fair values. The negative effect was partially offset by an increase of $103.1 million, or 27%, in mortgage loan servicing fee revenue due to an increase in our average MSR portfolio of $42.5 billion, or 31%, in 2016 compared to 2015. The increase in our average MSR portfolio reflects the growth in our mortgage loan production and sales.

During the year ended December 31, 2015, net mortgage loan servicing fees increased $12.6 million, or 6%, when compared to the year ended December 31, 2014. The increase during the year was due to:

· an increase of $117.5 million in mortgage loan servicing fees from non-affiliates resulting from growth in our portfolio of loans serviced due to purchases of MSRs supplemented with the ongoing sales of mortgage loans with servicing rights retained;

· a decrease of $9.9 million in mortgage loan servicing fees from our Advised Entities primarily due to nonrecurrence of certain activity-based fees;

· an increase of $16.7 million in ancillary fees due to growth in the portfolio of mortgage loans serviced; and

· an increase of $111.6 million in amortization, impairment and change in fair value of mortgage servicing rights and excess servicing spread primarily due to increased amortization and negative changes in total fair value adjustments of MSRs and ESS, net of hedging results.

Management fees and Carried Interest

Management fees and Carried Interest are summarized below:

	Year ended December 31,		
	2016	2015	2014

	(in thousands)		
Management fees:			
PennyMac Mortgage Investment Trust:			
Base management	$ 20,657	$ 22,851	$ 23,330
Performance incentive	—	1,343	11,705
	20,657	24,194	35,035
Investment Funds	2,089	4,043	7,473
Total management fees	22,746	28,237	42,508
Carried Interest	980	2,628	6,156
Total management fees and Carried Interest	$ 23,726	$ 30,865	$ 48,664
Net assets of Advised Entities at year end:			
PennyMac Mortgage Investment Trust	$ 1,351,114	$ 1,496,113	$ 1,578,172
Investment Funds	197,550	231,745	424,182
	$ 1,548,664	$ 1,727,858	$ 2,002,354

Management fees from PMT decreased by $3.5 million during the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily reflecting the reduction in PMT's shareholder's equity upon which its management fees are based.

Management fees from PMT decreased $10.8 million during the year ended December 31, 2015 compared to the year ended December 31, 2014. The decrease was due primarily to:

- a decrease in base management fees of $0.5 million due to a decrease in PMT's shareholders' equity upon which its base management fee is based; and
- a decrease in performance incentive fees of $10.4 million because of PMT's reduced financial performance over the four-quarter period for which incentive fees were calculated.

Management fees from the Investment Funds decreased $2.0 million and $3.4 million for the years ended December 31, 2016 and December 31, 2015, respectively, compared to the years ended December 31, 2015 and December 31, 2014. The reduction of management fees was anticipated and is due to the continued decrease in the Investment Funds' net asset value as the Investment Funds continue their distributions from their liquidating portfolios following the end of the funds' investment period on December 31, 2011.

Carried Interest income from the Investment Funds decreased $1.6 million and $3.5 million for the years ended December 31, 2016 and December 31, 2015 compared to the years ended December 31, 2015 and December 31, 2014, respectively. Appreciation returns have decreased due to changes in observed market demand for similar assets, to less than anticipated residual proceeds on liquidated assets and to a shrinking investment base on which returns are generated.

Other revenues

Net interest expense increased $5.7 million during the year ended December 31, 2016 compared to the year ended December 31, 2015 and $9.9 million during the year ended December 31, 2015 compared to the year ended December 31, 2014 due to growth in financing of our investments in non-interest earning assets — primarily MSRs which are financed in part with ESS sales.

The results of our holdings of common shares of PMT, which is included in Changes in fair value of investment in, and dividends received from PMT are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Dividends received from PennyMac Mortgage Investment Trust	$ 141	$ 207	$ 134
Change in fair value of investment in PennyMac Mortgage Investment Trust	83	(437)	(140)
Dividends received and change in fair value	$ 224	$ (230)	$ (6)
Fair value of PennyMac Mortgage Investment Trust shares at year end	$ 1,228	$ 1,145	$ 1,582

Change in fair value of investment in and dividends received from PMT increased $454,000 during the year ended December 31, 2016 compared to the year ended December 31, 2015 and decreased $224,000 during the year ended December 31, 2015 compared to the year ended December 31, 2014, primarily due to changes in the fair value of our investment in PMT. We held 75,000 common shares of PMT during each of the years ended December 31, 2016, 2015 and 2014.

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Expenses

Compensation

Our compensation expense is summarized below:

	Year ended December 31,		
	2016	2015	2014
	(dollars in thousands)		
Salaries and wages	$ 211,238	$ 166,166	$ 118,428
Incentive compensation	78,241	61,216	41,937
Taxes and benefits	36,169	29,359	20,011
Stock and unit-based compensation	16,505	17,521	10,331
	$ 342,153	$ 274,262	$ 190,707
Head count:			
Average	2,745	2,239	1,581
Year end	3,038	2,509	1,816

Compensation expense increased $67.9 million, or 25%, during the year ended December 31, 2016 compared to the year ended December 31, 2015. The increase in compensation was in continuing support of the growth in our mortgage banking activities. Incentive compensation increased primarily due to an increase in production-related incentives, arising from growth in our mortgage loan production and, to a lesser extent, increased discretionary bonuses due to increased profitability in 2016 compared to 2015.

Compensation expense increased $83.6 million, or 44%, during the year ended December 31, 2015 compared to the year ended December 31, 2014. The increase in compensation expense was primarily due to the development of and growth in our mortgage banking segments. Incentive compensation increased primarily due to additions to incentive compensation-eligible staff made to facilitate increases in net income. The increase in compensation for the year ended December 31, 2015 as compared to the year ended December 31, 2014 includes increased stock-based compensation expense as a result of employee and director equity awards granted late in the second quarter of 2014 and in 2015.

Servicing

Servicing expense increased $17.8 million and $19.7 million in the years ended December 31, 2016 and 2015 compared to the year ended December 31, 2015 and, 2014, respectively. The increases were due to growth in our government-insured or guaranteed mortgage servicing portfolio, which includes mortgage loans that are subject to nonreimbursable servicing advance losses, and to the EBO program to purchase defaulted mortgage loans out of seasoned Ginnie Mae pools. The EBO program reduces the ultimate cost of servicing such mortgage loan pools but accelerates loss recognition when the mortgage loans are purchased. The EBO program reduces the ongoing cost of servicing defaulted mortgage loans subject to Ginnie Mae MBS when we purchase and either sell the defaulted loans or finance them with debt at interest rates below the Ginnie Mae MBS pass-through rates.

During the year ended December 31, 2016, we purchased $1.6 billion in UPB of EBOs as compared to $883.6 million for the year ended December 31, 2015 and $592.7 million for the year ended December 31, 2014, producing current period expense as accumulated non-reimbursable interest advances, net of interest receivable from the mortgage loans' insurer or guarantor at the debenture rate of interest applicable to the respective mortgage loans, are charged to servicing expense when the mortgage loans are purchased from the Ginnie Mae pools.

Technology

Technology expense increased $10.2 million and $9.7 million in the years ended December 31, 2016 and 2015 compared to the years ended December 31, 2015 and 2014, respectively. The increase was primarily due to growth in loan servicing operations and continued investment in loan production and servicing infrastructure.

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Loan origination

Loan origination expenses increased $5.1million and $7.8 million during 2016 and 2015, as compared to the prior year, respectively. The increases in loan origination expenses during 2016 and 2015 were primarily due to growth in the volume of loan origination activities.

Professional services and other expenses

Professional service expenses increased $2.6 million and $4.4 million during 2016 and 2015, as compared to the prior year, respectively. Other expenses increased $11.3 million and $13.5 million during 2016 and 2015, as compared to the prior year, respectively. The increases reflect the Company's growth during both years.

Expenses Allocated to PMT

PMT reimburses us for other expenses, including common overhead expenses incurred on its behalf by us, in accordance with the terms of our management agreement with PMT. The expense amounts presented in our income statement are net of these allocations. Common overhead expense amounts allocated to PMT during the years ended December 31, 2016, 2015 and 2014 are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Technology	$ 3,136	$ 4,629	$ 4,346
Occupancy	2,033	2,034	2,149
Depreciation and amortization	1,350	2,051	2,066
Other	1,379	2,028	1,916
Total expenses	$ 7,898	$ 10,742	$ 10,477

Provision for Income Taxes

For the years ended December 31, 2016, 2015 and 2014, our effective tax rates were 12.0%, 11.3% and 12.0%, respectively. The difference between our effective tax rate and the statutory rate is primarily due to the allocation of earnings to the noncontrolling interest unitholders. As the noncontrolling interest unitholders convert their ownership

units into our shares, we expect an increase in allocated earnings that will be subject to corporate federal and state statutory tax rates, which will in turn increase our effective income tax rate.

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Balance Sheet Analysis

Following is a summary of key balance sheet items as of the dates presented:

	December 31, 2016	2015
	(in thousands)	
ASSETS		
Cash and short-term investments	$ 185,331	$ 151,791
Mortgage loans held for sale at fair value	2,172,815	1,101,204
Servicing advances, net	348,306	299,354
Investments in and advances to affiliates	168,863	171,426
Carried Interest due from Investment Funds	70,906	69,926
Mortgage servicing rights	1,627,672	1,411,935
Mortgage loans eligible for repurchase	382,268	166,070
Other	177,741	133,588
Total assets	$ 5,133,902	$ 3,505,294
LIABILITIES AND STOCKHOLDERS' EQUITY		
Borrowings	$ 2,580,906	$ 1,476,318
Payable to affiliates	555,052	679,548
Liability for mortgage loans eligible for repurchase	382,268	166,070
Other	216,320	121,008
Total liabilities	3,734,546	2,442,944
Stockholders' equity	1,399,356	1,062,350
Total liabilities and stockholders' equity	$ 5,133,902	$ 3,505,294

Total assets increased $1.6 billion from $3.5 billion at December 31, 2015 to $5.1 billion at December 31, 2016. The increase was primarily due to an increase of $1.1 billion in mortgage loans held for sale at fair value, an increase in mortgage loans eligible for repurchase of $216.2 million arising from the growth and seasoning of our portfolio of MSRs backed by government guaranteed and insured mortgage loans and an increase of $215.7 million of MSRs, resulting from growth in our mortgage loan production in 2016 compared to 2015.

Total liabilities increased by $1.3 billion from $2.4 billion as of December 31, 2015 to $3.7 billion as of December 31, 2016. The increase was primarily attributable to an increase in assets sold under agreements to repurchase of $568.4 million, an increase of $436.6 million in mortgage loan participation and sale agreements, an increase in liability for mortgage loans eligible for repurchase of $216.2 million and an increase of $89.8 million in notes payable, primarily to fund growth in our inventory of mortgage loans held for sale and MSRs.

Cash Flows

Our cash flows for the three years ended December 31, 2016 are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Operating	$ (938,522)	$ 53,144	$ (578,954)
Investing	(34,739)	(563,142)	6,752
Financing	967,156	539,214	617,819
Net (decrease) increase in cash	$ (6,105)	$ 29,216	$ 45,617

Operating activities

Cash (used in) provided by operating activities totaled ($938.5) million, $53.1 million and ($579.0) million during the years ended December 31, 2016, 2015, and 2014 respectively. The increase in cash used in operating activities during 2016 as compared to 2015 is primarily due to an increase in mortgage loans held for sale at December 31, 2016 as compared to December 31, 2015. The increase in cash provided by operating activities in 2015 as compared to 2014 is primarily due to a decrease in mortgage loans held for sale at December 31, 2015 as compared to December 31, 2014.

Investing activities

Net cash used in investing activities was $34.7 million during 2016, a reduction from $563.1 million in 2015 due to large purchases of MSRs and advances made to PMT under a note receivable during 2015 that did not recur during 2016. Net cash provided by investing activities was $6.8 million during the year ended December 31, 2014. The net cash provided by investing activities was primarily a result of a decrease in short-term investments.

Financing activities

Net cash provided by financing activities was $967.2 million during the year ended December 31, 2016, primarily from net proceeds from sales of assets under agreements to repurchase of $569.5 million, net proceeds from issuances of mortgage loan participation certificates of $436.7 million and net proceeds from advances on notes payable of $89.3 million to finance growth in our inventory of mortgage loans held for sale and investments in MSRs. The increases were partially offset by repayments of ESS totaling $129.0 million.

Net cash provided by financing activities was $539.2 million during the year ended December 31, 2015, primarily due to net financing proceeds of $260.0 million related to new and existing debt facilities and net proceeds of ESS activity of $193.0 million. Cash provided by financing activities also includes net proceeds of $91.3 million received from two mortgage loan participation and sale agreements used to finance the growth in our inventory of mortgage loans held for sale and proceeds of $13.6 million related to the financing of certain fixed assets structured under a financing lease. These net cash inflows were offset by $18.9 million of cash outflows related to debt issuance costs and distributions made by PennyMac to its members.

Net cash provided by financing activities was $617.8 million during the year ended December 31, 2014, primarily due to an increase in loans sold under agreements to repurchase and a mortgage loan participation agreement used to finance the growth in our inventory of mortgage loans held for sale. Cash provided by financing activities also reflects the proceeds received from sales of ESS of $95.9 million in 2014 and increased financing related to growth in our

government MSRs.

Liquidity and Capital Resources

Our liquidity reflects our ability to meet our current obligations (including our operating expenses and, when applicable, the retirement of, and margin calls relating to, our debt, and margin calls relating to hedges on our commitments to purchase or originate mortgage loans and on our MSR investments), fund new originations and purchases, and make investments as we identify them. We expect our primary sources of liquidity to be through cash flows from business activities, proceeds from bank borrowings, proceeds from and issuance of ESS and/or equity or debt offerings. We believe that our liquidity is sufficient to meet our current liquidity needs.

Our current leverage strategy is to finance our assets where we believe such borrowing is prudent, appropriate and available. Our borrowing activities are in the form of sales of assets under agreements to repurchase, sales of mortgage loan participation certificates, ESS financing, notes payable (including a revolving credit agreement) and a capital lease. All of our borrowings other than ESS and our obligation under capital lease have short-term maturities and provide for terms of approximately one year. We will continue to finance most of our assets on a short-term basis until long-term financing becomes more available. Because a significant portion of our current debt facilities consists of short-

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term borrowings, we expect to renew these facilities in advance of maturity in order to ensure our ongoing liquidity and access to capital or otherwise allow ourselves sufficient time to replace any necessary financing.

Our repurchase agreements represent the sales of assets together with agreements for us to buy back the assets at a later date. The table below presents the average outstanding, maximum and ending balances for years ended December 31, 2016, 2015 and 2014:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Repurchase agreements outstanding:			
Average balance	$ 1,438,181	$ 823,490	$ 529,832
Maximum daily balance	$ 2,661,746	$ 1,976,744	$ 1,073,073
Balance at year end	$ 1,736,922	$ 1,167,405	$ 822,252

Our secured financing agreements at PLS require us to comply with various financial covenants. The most significant financial covenants currently include the following:

- positive net income during each calendar quarter;
- a minimum in unrestricted cash and cash equivalents of $20 million;
- a minimum tangible net worth of $200 million;
- a maximum ratio of total liabilities to tangible net worth of 10:1; and
- at least one other warehouse or repurchase facility that finances amounts and assets that are similar to those being financed under certain of our existing secured financing agreements.

With respect to servicing performed for PMT, PLS is also subject to certain covenants under PMT’s debt agreements. Covenants in PMT’s debt agreements are equally, or sometimes less, restrictive than the covenants described above.

In addition to the covenants noted above, PennyMac's revolving credit agreement and capital lease contain additional financial covenants including, but not limited to,

· a minimum of cash and carried interest equal to the amount borrowed under the revolving credit agreement;

· a minimum of unrestricted cash and cash equivalents equal to $25 million;

· a minimum of tangible net worth of $500 million;

· a minimum asset coverage ratio (the ratio of the total asset amount to the total commitment) of 2.5; and

· a maximum ratio of total indebtedness to tangible net worth ratio of 5:1.

Although these financial covenants limit the amount of indebtedness that we may incur and affect our liquidity through minimum cash reserve requirements, we believe that these covenants currently provide us with sufficient flexibility to successfully operate our business and obtain the financing necessary to achieve that purpose.

Our debt financing agreements also contain margin call provisions that, upon notice from the applicable lender at its option, require us to transfer cash or, in some instances, additional assets in an amount sufficient to eliminate any

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margin deficit. A margin deficit will generally result from any decline in the market value (as determined by the applicable lender) of the assets subject to the related financing agreement. Upon notice from the applicable lender, we will generally be required to satisfy the margin call on the day of such notice or within one business day thereafter, depending on the timing of the notice.

We are also subject to liquidity and net worth requirements established by FHFA for Agency seller/servicers and Ginnie Mae for single-family issuers. FHFA and Ginnie Mae have established minimum liquidity requirements and revised their net worth requirements for their approved non-depository single-family sellers/servicers in the case of Fannie Mae, Freddie Mac, and Ginnie Mae for its approved single-family issuers, as summarized below:

- FHFA liquidity requirement is equal to 0.035% (3.5 basis points) of total Agency servicing UPB plus an incremental 200 basis points of the amount by which total nonperforming Agency servicing UPB exceeds 6% of the applicable Agency servicing UPB; allowable assets to satisfy liquidity requirement include cash and cash equivalents (unrestricted), certain investment-grade securities that are available for sale or held for trading including Agency mortgage-backed securities, obligations of Fannie Mae or Freddie Mac, and U.S. Treasury obligations, and unused and available portions of committed servicing advance lines;

- FHFA net worth requirement is a minimum net worth of $2.5 million plus 25 basis points of UPB for total 1-4 unit residential mortgage loans serviced and a tangible net worth/total assets ratio greater than or equal to 6%;

- Ginnie Mae single-family issuer minimum liquidity requirement is equal to the greater of $1.0 million or 0.10% (10 basis points) of the issuer’s outstanding Ginnie Mae single-family securities, which must be met with cash and cash equivalents; and

- Ginnie Mae net worth requirement is equal to $2.5 million plus 0.35% (35 basis points) of the issuer’s outstanding Ginnie Mae single-family obligations.

We believe that we are currently in compliance with the applicable Agency requirements.

We have purchased portfolios of MSRs and have financed them in part through the sale to PMT of the right to receive ESS. The outstanding amount of the ESS financing is based on the current valuation of such ESS and amounts received on the underlying mortgage loans.

We continue to explore a variety of means of financing our continued growth, including debt financing through bank warehouse lines of credit, bank loans, repurchase agreements, securitization transactions and corporate debt. However, there can be no assurance as to how much additional financing capacity such efforts will produce, what form the financing will take or whether such efforts will be successful.

Off Balance Sheet Arrangements and Aggregate Contractual Obligations

Off Balance Sheet Arrangements

As of December 31, 2016, we have not entered into any off-balance sheet arrangements or guarantees.

Contractual Obligations

As of December 31, 2016, we had contractual obligations aggregating $7.5 billion, comprised of borrowings, commitments to purchase and originate mortgage loans, a payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement, and anticipated payments related to excess servicing spread financing. We also lease our office facilities under agreements and license certain software to support our loan servicing operations.

All agreements to repurchase assets and mortgage loan participation and sale agreements that matured between December 31, 2016 and the date of this Report have been renewed, extended or repaid and are described in Note 15—Borrowings in the accompanying consolidated financial statements.

Payment obligations under these agreements are summarized below:

Contractual obligations	Payments due by period Total (in thousands)	Less than 1 year	1-3 years	3-5 years	More than 5 years
Commitments to purchase and originate mortgage loans	$ 4,279,611	$ 4,279,611	$ —	$ —	$ —
Assets sold under agreements to repurchase	1,736,922	1,736,922	—	—	—
Mortgage loan participation and sale agreements	671,562	671,562	—	—	—
Notes payable	151,935	151,935	—	—	—
Obligations under capital lease	23,424	10,176	13,248	—	—
Excess servicing spread financing at fair value payable to PennyMac Mortgage Investment Trust (1)	288,669	—	—	—	288,669
Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement	75,954	7,746	11,931	10,013	46,264
Anticipated interest payments related to excess servicing spread financing at fair value	115,256	17,211	27,941	21,038	49,066
Software licenses (2)	41,437	14,625	26,812	—	—
Office leases	100,786	9,516	25,929	24,189	41,152
Total	$ 7,485,556	$ 6,899,304	$ 105,861	$ 55,240	$ 425,151

(1) The ESS financing obligation payable to PMT does not have a stated contractual maturity date and will pay down as the underlying MSRs receive the excess servicing fee rate due to PMT.

(2) Software licenses include both volume and activity based fees that are dependent on the number of loans serviced during each period and include a base fee of approximately $1.2 million per month. Estimated payments for such software licenses are based on the number of loans currently serviced by us, which totaled approximately 1.0 million at December 31, 2016. Future amounts due may significantly fluctuate based on changes in the number of loans serviced by us. For the year ended December 31, 2016, software license fees totaled $32.0 million.

The amount at risk (the fair value of the assets pledged plus the related margin deposit, less the amount advanced by the counterparty and accrued interest) relating to our assets sold under agreements to repurchase is summarized by counterparty below as of December 31, 2016:

Counterparty	Amount at risk (in thousands)	Weighted average maturity of advances under repurchase agreement	Facility Maturity
Credit Suisse First Boston Mortgage Capital LLC	$ 36,579	March 4, 2017	March 30, 2017
Credit Suisse First Boston Mortgage Capital LLC	$ 1,072,322	December 19, 2017	December 19, 2017
Bank of America, N.A.	$ 26,932	March 19, 2017	March 28, 2017
Morgan Stanley Bank, N.A.	$ 11,741	February 18, 2017	August 25, 2017
JP Morgan Chase Bank, N.A.	$ 8,076	March 20, 2017	August 18, 2017
Citibank, N.A.	$ 5,338	January 28, 2017	February 2, 2017
Barclays Bank PLC	$ 2,351	March 17, 2017	December 1, 2017
Royal Bank of Canada	$ —		September 18, 2017

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Debt Obligations

As described further above in "Liquidity and Capital Resources," we currently finance certain of our assets through borrowings with major financial institution counterparties in the form of sales of assets under agreements to repurchase, mortgage loan participation and sale agreements, notes payable (including a revolving credit agreement) and a capital lease. The borrower under each of these facilities is PLS with two exceptions where the borrower is PennyMac: the revolving credit agreement, which is classified as a note payable and the capital lease. All PLS obligations as previously noted are guaranteed by PennyMac.

All of our non-ESS financing borrowings discussed above have short-term maturities that expire as follows:

Lender	Outstanding indebtedness (1)	Total facility size (2)	Committed facility (2)	Maturity date (2)
	(dollar amounts in thousands)			
Assets sold under agreements to repurchase				
Credit Suisse First Boston Mortgage Capital LLC	$ 553,988	$ 820,000	$ 707,000	March 30, 2017
Credit Suisse First Boston Mortgage Capital LLC (3)	$ 407,000	$ 407,000	$ —	December 19, 2017
Bank of America, N.A.	$ 342,769	$ 500,000	$ 225,000	March 28, 2017
Morgan Stanley Bank, N.A.	$ 188,851	$ 300,000	$ 175,000	August 25, 2017
JP Morgan Chase Bank, N.A.	$ 135,322	$ 200,000	$ 50,000	August 18, 2017
Citibank, N.A.	$ 80,525	$ 400,000	$ 200,000	March 2, 2018
Barclays Bank PLC (4)	$ 28,467	$ 220,000	$ —	December 1, 2017
Royal Bank of Canada	$ —	$ 135,000	$ 75,000	September 18, 2017
Mortgage loan participation and sale agreements				
JP Morgan Chase Bank, N.A.	$ 475,476	500,000	$ —	October 31, 2017
Bank of America, N.A.	$ 196,086	$ 250,000	$ —	March 28, 2017
Notes payable				
Barclays Bank PLC (4)	$ 76,935	$ 80,000	$ 80,000	December 1, 2017
Credit Suisse AG	$ 75,000	$ 150,000	$ 150,000	November 17, 2017
Obligations under capital lease				
Banc of America Leasing and Capital LLC	$ 23,424	$ 25,000	$ —	November 3, 2019

(1) Outstanding indebtedness as of December 31, 2016.

(2) Total facility size, committed facility and maturity date include contractual changes through the date of this Report.

(3) The borrowing of $407 million with Credit Suisse First Boston Mortgage Capital LLC is in the form of sales of a variable funding note under an agreement to repurchase.

(4) The borrowings with Barclays Bank PLC are subject to a total aggregate facility amount of $300 million, of which $80 million represents the maximum amount for MSRs.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Market risk is the exposure to loss resulting from changes in interest rates, foreign currency exchange rates, commodity prices, equity prices, real estate values and other market based risks. The primary market risks that we are exposed to are interest rate risk, prepayment risk, credit risk and fair value risk.

Interest Rate Risk

Interest rate risk is highly sensitive to many factors, including governmental monetary and tax policies, domestic and international economic and political considerations, and other factors beyond our control. Changes in interest rates affect both the fair value of, and interest income we earn from, our mortgage related investments and our derivative financial instruments. This effect is most pronounced with fixed rate mortgage assets. In general, rising

interest rates negatively affect the fair value of our IRLCs, inventory of mortgage loans held for sale and ESS financing and positively affect the fair value of our MSRs.

Our operating results will depend, in part, on differences between the income from our investments and our financing costs. Presently our debt financing is based on a floating rate of interest calculated on a fixed spread over the relevant index, as determined by the particular financing arrangement.

We engage in interest rate risk management activities in an effort to reduce the variability of income caused by changes in interest rates. To manage this price risk resulting from interest rate risk, we use derivative financial instruments acquired with the intention of moderating the risk that changes in market interest rates will result in unfavorable changes in the fair value of our IRLCs, inventory of mortgage loans held for sale and MSRs. We do not use derivative financial instruments other than IRLCs for purposes other than in support of our risk management activities.

Prepayment Risk

To the extent that the actual prepayment rate on the mortgage loans underlying our MSRs differs from what we projected when we initially recognized the MSRs, MSLs, and ESS financing and when we measured fair value as of the end of each reporting period, the carrying value of our investment in MSRs will be affected. In general, a decrease in the principal balances of the mortgage loans underlying our MSRs or an increase in prepayment expectations will accelerate the amortization and may result in impairments of our MSRs accounted for using the amortization method and decrease our estimates of the fair value of both the MSRs accounted for using the amortization method and those accounted for using the fair value method, thereby reducing net servicing income, partially offset by the beneficial effect on net servicing income of a corresponding reduction in the fair value of our MSLs.

Credit Risk

We are subject to credit risk in connection with our mortgage loan sales activities. Our mortgage loan sales are generally made with contractual representations and warranties, which, if breached, can require us to repurchase the mortgage loan or reimburse the investor for any losses incurred due to such breach. These breaches are generally evidenced when the borrower defaults on a mortgage loan.

The amount of our liability for losses due to representations and warranties to the mortgage loans’ investors is not limited. However, we believe that the current UPB of mortgage loans sold by us to date represents the maximum exposure to repurchases related to representations and warranties. We include a provision for potential losses due to

the representations and warranties we make as part of our recognition of mortgage loan sales, based initially on our estimate of the fair value of such obligation. We review our loss experience relating to representations and warranties and adjust our liability estimate when necessary.

In the event of developments affecting the credit performance of mortgage loans we have sold subject to representations and warranties, such as a significant increase in unemployment or a significant deterioration in real estate values in markets where properties securing mortgage loans we produce are located, defaults could increase and result in credit losses arising from claims under our representations and warranties, which could materially and adversely affect our business, financial condition and results of operations.

Fair Value Risk

Our IRLCs, mortgage loans held for sale, a portion of our MSRs, MSLs and ESS financing are reported at their estimated fair values. The fair value of these assets fluctuates primarily due to changes in interest rates.

The following sensitivity analyses are limited in that they were performed at a particular point in time; only contemplate the movements in the indicated variables; do not incorporate changes to other variables; are subject to the accuracy of various models and assumptions used; and do not incorporate other factors that would affect our overall financial performance in such scenarios, including operational adjustments made by management to account for changing circumstances. For these reasons, the following estimates should not be viewed as earnings forecasts.

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Mortgage Servicing Rights

The following tables summarize the estimated change in fair value of MSRs accounted for using the amortization method as of December 31, 2016, given several shifts in pricing spreads, prepayment speed and annual per-loan cost of servicing:

Pricing spread shift in %	-20%	-10%	-5%	+5%	+10%	+20%
	(dollar amounts in thousands)					
Fair value	$ 1,211,649	$ 1,159,896	$ 1,135,609	$ 1,089,920	$ 1,068,413	$ 1,027,837
Change in fair value:						
$	$ 99,348	$ 47,595	$ 23,307	$ (22,382)	$ (43,889)	$ (84,464)
%	8.9 %	4.3 %	2.1 %	(2.0) %	(4.0) %	(7.6) %

Prepayment speed shift in %	-20%	-10%	-5%	+5%	+10%	+20%
	(dollar amounts in thousands)					
Fair value	$ 1,184,620	$ 1,147,246	$ 1,129,485	$ 1,095,666	$ 1,079,551	$ 1,048,789
Change in fair value:						
$	$ 72,318	$ 34,944	$ 17,184	$ (16,636)	$ (32,750)	$ (63,513)
%	6.5 %	3.1 %	1.5 %	(1.5) %	(2.9) %	(5.7) %

er-loan servicing cost shift in %	-20%	-10%	-5%	+5%	+10%	+20%
	(dollar amounts in thousands)					
air value	$ 1,147,864	$ 1,130,083	$ 1,121,192	$ 1,103,411	$ 1,094,521	$ 1,076,740
hange in fair value:						
	$ 35,562	$ 17,781	$ 8,890	$ (8,890)	$ (17,781)	$ (35,562)
	3.2 %	1.6 %	0.8 %	(0.8) %	(1.6) %	(3.2) %

The following tables summarize the estimated change in fair value of MSRs accounted for using the fair value method as of December 31, 2016, given several shifts in pricing spreads, prepayment speed and annual per loan cost of servicing:

Pricing spread shift in %	-20%	-10%	-5%	+5%	+10%	+20%
	(dollar amounts in thousands)					
Fair value	$ 555,897	$ 535,156	$ 525,361	$ 506,828	$ 498,053	$ 481,408
Change in fair value:						
$	$ 39,972	$ 19,231	$ 9,437	$ (9,097)	$ (17,872)	$ (34,516)
%	7.8 %	3.7 %	1.8 %	(1.8) %	(3.5) %	(6.7) %

Prepayment speed shift in %	-20%	-10%	-5%	+5%	+10%	+20%
	(dollar amounts in thousands)					
Fair value	$ 554,535	$ 534,525	$ 525,058	$ 507,107	$ 498,588	$ 482,392
Change in fair value:						
$	$ 38,610	$ 18,601	$ 9,134	$ (8,818)	$ (17,336)	$ (33,533)
%	7.5 %	3.6 %	1.8 %	(1.7) %	(3.4) %	(6.5) %

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Per-loan servicing cost shift in %	-20%	-10%	-5%	+5%	+10%	+20%
	(dollar amounts in thousands)					
Fair value	$ 538,375	$ 527,150	$ 521,537	$ 510,312	$ 504,700	$ 493,475
Change in fair value:						
$	$ 22,450	$ 11,225	$ 5,612	$ (5,612)	$ (11,225)	$ (22,450)
%	4.4 %	2.2 %	1.1 %	(1.1) %	(2.2) %	(4.4) %

Excess Servicing Spread Financing

The following tables summarize the estimated change in fair value of our excess servicing spread financing accounted for using the fair value method as of December 31, 2016, given several shifts in pricing spread and prepayment speed (decrease in the liabilities' values increases net income):

Pricing spread shift in %	-20%	-10%	-5%	+5%	+10%	+20%
	(dollar amounts in thousands)					
Fair value	$ 300,198	$ 294,323	$ 291,469	$ 285,921	$ 283,224	$ 277,978
Change in fair value:						
$	$ 11,529	$ 5,654	$ 2,800	$ (2,748)	$ (5,445)	$ (10,691)
%	4.0 %	2.0 %	1.0 %	(1.0) %	(1.9) %	(3.7) %

Prepayment speed shift in %	-20%	-10%	-5%	+5%	+10%	+20%
	(dollar amounts in thousands)					
Fair value	$ 317,099	$ 302,270	$ 295,325	$ 282,283	$ 276,153	$ 264,601
Change in fair value:						
$	$ 28,430	$ 13,602	$ 6,657	$ (6,386)	$ (12,516)	$ (24,067)
%	9.9 %	4.7 %	2.3 %	(2.2) %	(4.3) %	(8.3) %

Item 8. Financial Statements and Supplementary Data

The information called for by this Item 8 is hereby incorporated by reference from our Financial Statements and Auditors' Report in Part IV of this Report.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in our reports filed under the Securities Exchange Act of 1934, as amended (the “Exchange Act”) is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosures. However, no matter how well a control system is designed and operated, it can provide only reasonable, not absolute, assurance that it will detect or uncover failures within the Company to disclose material information otherwise required to be set forth in our periodic reports.

Our management has conducted an evaluation, with the participation of our Chief Executive Officer and Chief Financial Officer, of the effectiveness of our disclosure controls and procedures as of the end of the period covered by

this Report as required by paragraph (b) of Rule 13a-15 under the Exchange Act. Based on our evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that our disclosure controls and procedures were effective, as of the end of the period covered by this Report, to provide reasonable assurance that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the applicable rules and forms, and that it is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

Internal Control over Financial Reporting

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Exchange Act Rule 13a-15(f). Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. Management assessed the effectiveness of its internal control over financial reporting based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control—Integrated Framework (2013). Based on those criteria, management concluded that our internal control over financial reporting was effective as of December 31, 2016.

The effectiveness of our internal control over financial reporting as of December 31, 2016 has been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report which appears herein.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of

PennyMac Financial Services, Inc.

3043 Townsgate Rd

Westlake Village, CA 91361

We have audited the internal control over financial reporting of PennyMac Financial Services, Inc. and subsidiaries (“the Company”) as of December 31, 2016, based on criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management’s Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit.

We conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

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

Because of the inherent limitations of internal control over financial reporting, including the possibility of collusion or improper management override of controls, material misstatements due to error or fraud may not be prevented or detected on a timely basis. Also, projections of any evaluation of the effectiveness of the internal control over financial reporting to future periods are subject to the risk that the controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on the criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated financial statements as of and for the year ended December 31, 2016 of the Company and our report dated March 9, 2017 expressed an unqualified opinion on those financial statements.

/s/ DELOITTE & TOUCHE LLP

Los Angeles, California

March 9, 2017

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Changes in Internal Control over Financial Reporting

There has been no change in our internal control over financial reporting during the year ended December 31, 2016, that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None.

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PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this Item 10 is hereby incorporated by reference from our definitive proxy statement, or will be contained in an amendment to this Report, in either case to be filed by May 1, 2017, which is within 120 days after the end of fiscal year 2016.

Item 11. Executive Compensation

The information required by this Item 11 is hereby incorporated by reference from our definitive proxy statement, or will be contained in an amendment to this Report, in either case to be filed by May 1, 2017, which is within 120 days after the end of fiscal year 2016.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item 12 is hereby incorporated by reference from our definitive proxy statement, or will be contained in an amendment to this Report, in either case to be filed by May 1, 2017, which is within 120 days after the end of fiscal year 2016.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this Item 13 is hereby incorporated by reference from our definitive proxy statement, or will be contained in an amendment to this Report, in either case to be filed by May 1, 2017, which is within 120 days after the end of fiscal year 2016.

Item 14. Principal Accounting Fees and Services

The information required by this Item 14 is hereby incorporated by reference from our definitive proxy statement, or will be contained in an amendment to this Report, in either case to be filed May 1, 2017, which is within 120 days after the end of fiscal year 2016.

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PART IV

Item 15. Exhibits and Financial Statement Schedules

Exhibit Number	Exhibit Description
3.1	Amended and Restated Certificate of Incorporation of PennyMac Financial Services, Inc. (incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on May 14, 2013).
3.2	Amended and Restated Bylaws of PennyMac Financial Services, Inc. (incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on August 19, 2013).
4.1	Specimen Class A Common Stock Certificate (incorporated by reference to Exhibit 4.1 of the Registrant's Amendment No. 4 to Form S-1 Registration Statement as filed with the SEC on April 29, 2013).
10.1	Fourth Amended and Restated Limited Liability Company Agreement of Private National Mortgage Acceptance Company, LLC, dated as of May 8, 2013 (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on May 14, 2013).
10.2	Exchange Agreement, dated as of May 8, 2013, between PennyMac Financial Services, Inc. and Private National Mortgage Acceptance Company, LLC and the Company Unitholders (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K as filed with the SEC on May 14, 2013).
10.3	Tax Receivable Agreement, dated as of May 8, 2013, between PennyMac Financial Services, Inc. Private National Mortgage Acceptance Company, LLC and each of the Members (incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K as filed with the SEC on May 14, 2013).
10.4	Registration Rights Agreement, dated as of May 8, 2013, between PennyMac Financial Services, Inc. and the Holders (incorporated by reference to Exhibit 10.4 of the Registrant's Current Report on Form 8-K as filed with the SEC on May 14, 2013).
10.5	Stockholder Agreement, dated as of May 8, 2013, between PennyMac Financial Services, Inc. and BlackRock Mortgage Ventures, LLC (incorporated by reference to Exhibit 10.5 of the Registrant's Current Report on Form 8-K as filed with the SEC on May 14, 2013).
10.6	Stockholder Agreement, dated as of May 8, 2013, between PennyMac Financial Services, Inc. and HC Partners LLC (incorporated by reference to Exhibit 10.6 of the Registrant's Current Report on Form 8-K as filed with the SEC on May 14, 2013).
10.7†	PennyMac Financial Services, Inc. 2013 Equity Incentive Plan (incorporated by reference to Exhibit 99.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on May 14, 2013).
10.8†	PennyMac Financial Services, Inc. 2013 Equity Incentive Plan Form of Restricted Stock Unit Award Agreement for Non-Employee Directors (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on May 16, 2013).

10.9†	PennyMac Financial Services, Inc. 2013 Equity Incentive Plan Form of Restricted Stock Unit Award Agreement for Executive Officers (incorporated by reference to Exhibit 10.9 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2015).
10.10†	PennyMac Financial Services, Inc. 2013 Equity Incentive Plan Form of Restricted Stock Unit Award Agreement for Other Eligible Participants (incorporated by reference to Exhibit 10.10 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2015).

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Exhibit Number	Exhibit Description
10.11†	PennyMac Financial Services, Inc. 2013 Equity Incentive Plan Form of Stock Option Award Agreement (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on June 17, 2013).
10.12†	Form of PennyMac Financial Services, Inc. Indemnification Agreement (incorporated by reference to Exhibit 10.8 of the Registrant's Amendment No. 2 to Form S-1 Registration Statement as filed with the SEC on April 5, 2013).
10.13†	Employment Agreement, dated December 8, 2015, among Stanford L. Kurland, Private National Mortgage Acceptance Company, LLC and PennyMac Financial Services, Inc. (incorporated by reference to Exhibit 10.5 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 14, 2015).
10.14†	Employment Agreement, dated December 8, 2015, among David A. Spector, Private National Mortgage Acceptance Company, LLC and PennyMac Financial Services, Inc. (incorporated by reference to Exhibit 10.6 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 14, 2015).
10.15	Second Amended and Restated Management Agreement, dated as of September 12, 2016, by and among PennyMac Mortgage Investment Trust, PennyMac Operating Partnership, L.P. and PNMAC Capital Management, LLC (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on September 12, 2016).
10.16	Third Amended and Restated Flow Servicing Agreement, dated as of September 12, 2016, by and between PennyMac Operating Partnership, L.P. and PennyMac Loan Services, LLC (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K as filed with the SEC on September 12, 2016).
10.17	Amended and Restated Mortgage Banking Services Agreement, dated as of September 12, 2016, by and between PennyMac Loan Services, LLC and PennyMac Corp. (incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K as filed with the SEC on September 12, 2016)
10.18	Amended and Restated MSR Recapture Agreement, dated as of September 12, 2016, by and between PennyMac Loan Services, LLC and PennyMac Corp. (incorporated by reference to Exhibit 10.4 of the Registrant's Current Report on Form 8-K as filed with the SEC on September 12, 2016)
10.19	Amended and Restated Underwriting Fee Reimbursement Agreement, dated as of February 1, 2013, by and among PennyMac Mortgage Investment Trust, PennyMac Operating Partnership, L.P. and PNMAC Capital Management, LLC (incorporated by reference to Exhibit 10.13 of the Registrant's Form S-1 Registration Statement as filed with the SEC on February 7, 2013).
10.20	Master Spread Acquisition and MSR Servicing Agreement, dated as of December 19, 2014, among PennyMac Loan Services, LLC, PennyMac Operating Partnership, L.P., and PennyMac Holdings, LLC (incorporated by reference to Exhibit 1.01 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 24, 2014).

10.21	Amendment No. 1 to Master Spread Acquisition and MSR Servicing Agreement, dated as of March 3, 2015, among PennyMac Loan Services, LLC, PennyMac Operating Partnership, L.P., and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.38 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2015).

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Exhibit Number	Exhibit Description
10.22	Second Amended and Restated Master Spread Acquisition and MSR Servicing Agreement, dated as of December 19, 2016, by and between PennyMac Loan Services, LLC, and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.7 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.23	Second Amended and Restated Flow Servicing Agreement, dated as of August 1, 2008, as amended effective as of January 1, 2012, by and between PNMAC Mortgage Opportunity Fund Investors, LLC and PennyMac Loan Services, LLC (incorporated by reference to Exhibit 10.15 of the Registrant's Form S-1 Registration Statement as filed with the SEC on February 7, 2013).
10.24	Amendment No. 1 to the Second Amended and Restated Flow Servicing Agreement, dated as of December 5, 2014, by and among PennyMac Loan Services, LLC and PNMAC Mortgage Opportunity Fund Investors, LLC (incorporated by reference to Exhibit 10.43 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2015).
10.25	Amended and Restated Flow Servicing Agreement, by and between PNMAC Mortgage Co., LLC and PennyMac Loan Services, LLC, dated August 1, 2010 (incorporated by reference to Exhibit 10.14 of the Registrant's Amendment No. 1 to Form S-1 Registration Statement as filed with the SEC on March 26, 2013).
10.26	Amendment No. 1 to the Amended and Restated Flow Servicing Agreement, dated as of December 4, 2014, by and among PennyMac Loan Services, LLC and PNMAC Mortgage Co., LLC (incorporated by reference to Exhibit 10.41 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2015).
10.27	Amended and Restated Flow Servicing Agreement, dated as of August 1, 2010, by and between PNMAC Mortgage Opportunity Fund, LP and PennyMac Loan Services, LLC (incorporated by reference to Exhibit 10.27 of the Registrant's Amendment No. 1 to Form S-1 Registration Statement as filed with the SEC on March 26, 2013).
10.28	Amendment No. 1 to the Amended and Restated Flow Servicing Agreement, dated as of December 4, 2014, by and among PennyMac Loan Services, LLC and PNMAC Mortgage Opportunity Fund, L.P. (incorporated by reference to Exhibit 10.45 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2015).
10.29	Investment Management Agreement, dated as of August 1, 2008, between PNMAC Mortgage Opportunity Fund Investors, LLC and PNMAC Capital Management, LLC (incorporated by reference to Exhibit 10.17 of the Registrant's Form S-1 Registration Statement as filed with the SEC on February 7, 2013).
10.30	Investment Management Agreement, as amended and restated May 26, 2011, by and between PNMAC Mortgage Opportunity Fund, L.P. and PNMAC Capital Management, LLC (incorporated by reference to Exhibit 10.16 of the Registrant's Form S-1 Registration Statement as filed with the SEC on February 7, 2013).
10.31	Master Repurchase Agreement, dated as of March 17, 2011, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated

	by reference to Exhibit 10.18 of the Registrant's Form S-1 Registration Statement as filed with the SEC on February 7, 2013).
10.32	Amendment No. 1 to Master Repurchase Agreement, dated as of July 21, 2011, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibits 10.19 of the Registrant's Amendment No. 3 to Form S-1 Registration Statement as filed with the SEC on April 22, 2013).

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Exhibit Number	Exhibit Description
10.33	Amendment No. 2 to Master Repurchase Agreement, dated as of March 23, 2012, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibits 10.19 of the Registrant’s Amendment No. 3 to Form S-1 Registration Statement as filed with the SEC on April 22, 2013).
10.34	Amendment No. 3 to Master Repurchase Agreement, dated as of August 28, 2012, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibits 10.19 of the Registrant’s Amendment No. 3 to Form S-1 Registration Statement as filed with the SEC on April 22, 2013).
10.35	Amendment No. 4 to Master Repurchase Agreement, dated as of January 3, 2013, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibits 10.19 of the Registrant’s Amendment No. 3 to Form S-1 Registration Statement as filed with the SEC on April 22, 2013).
10.36	Amendment No. 5 to Master Repurchase Agreement, dated as of March 28, 2013, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibits 10.19 of the Registrant’s Amendment No. 3 to Form S-1 Registration Statement as filed with the SEC on April 22, 2013).
10.37	Amendment No. 6 to Master Repurchase Agreement, dated as of January 31, 2014, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on February 6, 2014).
10.38	Amendment No. 7 to Master Repurchase Agreement, dated as of March 27, 2014, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.44 of the Registrant’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2014).
10.39	Amendment No. 8 to Master Repurchase Agreement, dated as of August 13, 2014, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.48 of the Registrant’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2014).
10.40	Amendment No. 9 to Master Repurchase Agreement, dated as of January 30, 2015, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.49 of the Registrant’s Annual Report on Form 10-K for the year ended December 31, 2014).
10.41	Amendment No. 10 to Master Repurchase Agreement, dated as of March 29, 2016, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.62 of the Registrant’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2016).

10.42	Guaranty, dated as of March 17, 2011, by Private National Mortgage Acceptance Company, LLC in favor of Bank of America, N.A (incorporated by reference to Exhibit 10.50 of the Registrant's Annual Report on Form 10-K for the year ended December 31, 2014).

Exhibit Number	Exhibit Description
10.43	Master Repurchase Agreement, dated as of June 26, 2012, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.20 of the Registrant's Form S-1 Registration Statement as filed with the SEC on February 7, 2013).
10.44	Amendment Number One to the Master Repurchase Agreement, dated as of December 31, 2012, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.21 of the Registrant's Form S-1 Registration Statement as filed with the SEC on February 7, 2013).
10.45	Amendment Number Two to the Master Repurchase Agreement, dated April 17, 2013, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.40 of the Registrant's Form S-1 Registration Statement as filed with the SEC on October 1, 2013).
10.46	Amendment Number Three to the Master Repurchase Agreement, dated June 25, 2013, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.41 of the Registrant's Form S-1 Registration Statement as filed with the SEC on October 1, 2013).
10.47	Amendment Number Four to the Master Repurchase Agreement, dated July 25, 2013, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.42 of the Registrant's Form S-1 Registration Statement as filed with the SEC on October 1, 2013).
10.48	Amendment Number Five to the Master Repurchase Agreement, dated February 5, 2014, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.50 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2014).
10.49	Amendment Number Six to the Master Repurchase Agreement, dated February 25, 2014, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.51 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2014).
10.50	Amendment Number Seven to the Master Repurchase Agreement, dated July 24, 2014, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.54 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2014).
10.51	Amendment Number Eight to the Master Repurchase Agreement, dated August 7, 2014, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.55 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2014).
10.52	Amendment Number Nine to the Master Repurchase Agreement, dated September 8, 2014, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.58 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2014).
10.53	Amendment Number Ten to the Master Repurchase Agreement, dated July 6, 2015, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.69 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2015).
10.54	Amendment Number Eleven to the Master Repurchase Agreement, dated August 3, 2015, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on August 5, 2015).

10.55	Amendment Number Twelve to the Master Repurchase Agreement, dated September 7, 2015, by and between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.72 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2015).

Exhibit Number	Exhibit Description
10.56	Amendment Number Thirteen to the Master Repurchase Agreement, dated October 22, 2015, between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on October 28, 2015).
10.57	Amendment Number Fourteen to the Master Repurchase Agreement, dated July 25, 2016, between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.70 of the Registrant’s Quarterly Report on Form 10-Q for the quarter ended June 30, 2016).
10.58	Amendment Number Fifteen to the Master Repurchase Agreement, dated September 26, 2016, between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on September 30, 2016).
10.59	Amendment Number Sixteen to the Master Repurchase Agreement, dated October 14, 2016, between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on October 20, 2016)
10.60	Amendment Number Seventeen to the Master Repurchase Agreement, dated October 20, 2016, between PennyMac Loan Services, LLC and Citibank, N.A. (incorporated by reference to Exhibit 10.2 of the Registrant’s Current Report on Form 8-K as filed with the SEC on October 20, 2016)
10.61	Amendment Number Eighteen to the Master Repurchase Agreement, dated December 2, 2016, between PennyMac Loan Services, LLC and Citibank, N.A.
10.62	Amendment Number Nineteen to the Master Repurchase Agreement, dated February 2, 2017, between PennyMac Loan Services, LLC and Citibank, N.A.
10.63	Guaranty Agreement, dated as of June 26, 2012, by Private National Mortgage Acceptance Company, LLC in favor of Citibank, N.A (incorporated by reference to Exhibit 10.61 of the Registrant’s Annual Report on Form 10-K for the year ended December 31, 2014).
10.64	Amended and Restated Master Spread Participation Agreement, dated as of November 10, 2015, by and among PennyMac Loan Services, LLC and PennyMac Loan Services, LLC as the Initial Participant (incorporated by reference to Exhibit 10.189 of the Registrant’s Annual Report on Form 10-K for the quarter ended December 31, 2015).
10.65	Loan and Security Agreement, dated as of April 30, 2015, among PennyMac Loan Services, LLC and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on May 6, 2015).
10.66	Amendment No. 1 to Loan and Security Agreement, dated as of October 30, 2015, by and between PennyMac Loan Services, LLC and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.87 of the Registrant’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2015).
10.67	Amendment No. 2 to Loan and Security Agreement, dated as of November 10, 2015, by and among Credit Suisse First Boston Mortgage Capital LLC, PennyMac Loan Services, LLC, and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.92 of the Registrant’s Annual Report on Form 10-K for the quarter ended December 31, 2015).

10.68	Amendment No. 3 to Loan and Security Agreement, dated as of December 15, 2015, by and among Credit Suisse First Boston Mortgage Capital LLC, PennyMac Loan Services, LLC, and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.93 of the Registrant's Annual Report on Form 10-K for the quarter ended December 31, 2015).

Exhibit Number	Exhibit Description
10.69	Amendment No. 4 to Loan and Security Agreement, dated as of January 28, 2016, by and among Credit Suisse First Boston Mortgage Capital LLC, PennyMac Loan Services, LLC, and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.94 of the Registrant's Annual Report on Form 10-K for the quarter ended December 31, 2015).
10.70	Amendment No. 5 to Loan and Security Agreement, dated as of March 31, 2016, by and among Credit Suisse First Boston Mortgage Capital LLC, PennyMac Loan Services, LLC, and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.96 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2016).
10.71	Amendment No. 6 to Loan and Security Agreement, dated as of September 26, 2016, by and among Credit Suisse First Boston Mortgage Capital LLC, PennyMac Loan Services, LLC, and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.71 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 31, 2016).
10.72	Third Amended and Restated Guaranty (Participation Certificates and Servicing), dated as of November 10, 2015, by Private National Mortgage Acceptance Company, LLC in favor of Credit Suisse First Boston Mortgage Capital LLC (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K as filed with the SEC on November 16, 2015).
10.73	Master Repurchase Agreement (Participation Certificates and Servicing), dated as of November 10, 2015, among Credit Suisse First Boston Mortgage Capital LLC, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed with the SEC on November 16, 2015).
10.74	Amendment No. 1 to Master Repurchase Agreement, dated as of December 19, 2016, among Credit Suisse First Boston Mortgage Capital LLC, Credit Suisse AG, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC.
10.75	Second Amended and Restated Master Repurchase Agreement, dated as of March 31, 2016, by and among Credit Suisse First Boston Mortgage Capital LLC, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on April 6, 2016).
10.76	Amendment No. 1 to Second Amended and Restated Master Repurchase Agreement, dated as of September 9, 2016, by and among Credit Suisse First Boston Mortgage Capital LLC, Credit Suisse AG, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC.
10.77	Amendment No. 2 to Second Amended and Restated Master Repurchase Agreement, dated as of December 19, 2016, by and among Credit Suisse First Boston Mortgage Capital LLC, Credit Suisse AG, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC.
10.78	Guaranty, dated as of August 14, 2009, by Private National Mortgage Acceptance Company, LLC in favor of Credit Suisse First Boston Mortgage Capital LLC (incorporated by reference to Exhibit 10.77 of the Registrant's Annual Report on Form 10-K for the year ended December 31, 2014).

10.79	Master Repurchase Agreement, dated as of July 2, 2013, by and between PennyMac Loan Services, LLC and Morgan Stanley Bank, N.A. (incorporated by reference to Exhibit 1.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on July 8, 2013).

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Exhibit Number	Exhibit Description
10.80	Amendment Number One to the Master Repurchase Agreement, dated as of August 26, 2013, by and between PennyMac Loan Services, LLC and Morgan Stanley Bank, N.A. (incorporated by reference to Exhibit 10.49 of the Registrant's Form S-1 Registration Statement as filed with the SEC on October 1, 2013).
10.81	Amendment Number Two to the Master Repurchase Agreement, dated as of January 28, 2014, by and between PennyMac Loan Services, LLC and Morgan Stanley Bank, N.A. (incorporated by reference to Exhibit 10.63 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2014).
10.82	Amendment Number Three to the Master Repurchase Agreement, dated as of June 30, 2014, by and between PennyMac Loan Services, LLC and Morgan Stanley Bank, N.A. (incorporated by reference to Exhibit 10.70 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2014).
10.83	Amendment Number Four to the Master Repurchase Agreement, dated as of June 29, 2015, by and between PennyMac Loan Services, LLC and Morgan Stanley Bank, N.A. (incorporated by reference to Exhibit 10.98 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2015).
10.84	Amendment Number Five to the Master Repurchase Agreement, dated as of July 27, 2015, by and between PennyMac Loan Services, LLC and Morgan Stanley Bank, N.A. (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on July 27, 2015).
10.85	Amendment Number Six to the Master Repurchase Agreement, dated as of November 9, 2015, by and between PennyMac Loan Services, LLC and Morgan Stanley Bank, N.A. (incorporated by reference to Exhibit 10.118 of the Registrant's Annual Report on Form 10-K for the quarter ended December 31, 2015).
10.86	Amendment Number Seven to the Master Repurchase Agreement, dated July 26, 2016, by and between PennyMac Loan Services, LLC and Morgan Stanley Bank, N.A. (incorporated by reference to Exhibit 10.91 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2016).
10.87	Amendment Number Eight to the Master Repurchase Agreement, dated August 26, 2016, by and between PennyMac Loan Services, LLC, Morgan Stanley Bank, N.A. and Morgan Stanley Mortgage Capital Holdings LLC (incorporated by reference to Exhibit 10.84 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 31, 2016).
10.88	Guaranty Agreement, dated as of July 2, 2013, by Private National Mortgage Acceptance Company, LLC in favor of Morgan Stanley Bank, N.A. (incorporated by reference to Exhibit 1.2 of the Registrant's Current Report on Form 8-K as filed with the SEC on July 8, 2013).
10.89	Mortgage Loan Participation Purchase and Sale Agreement, dated as of August 13, 2014, by and among PennyMac Loan Services, LLC, Private National Mortgage Acceptance Company, LLC and Bank of America, N.A. (incorporated by reference to Exhibit 10.72 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2014).
10.90	Amendment No. 1 to Mortgage Loan Participation Purchase and Sale Agreement, dated as of January 30, 2015, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.84 of the Registrant's Annual Report on Form 10-K for the year ended December 31, 2014).

10.91	Amendment No. 2 to Mortgage Loan Participation Purchase and Sale Agreement, dated as of December 22, 2015, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.122 of the Registrant's Annual Report on Form 10-K for the quarter ended December 31, 2015).

Exhibit Number	Exhibit Description
10.92	Amendment No. 3 to Mortgage Loan Participation Purchase and Sale Agreement, dated as of March 29, 2016, by and among Bank of America, N.A., PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.96 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2016).
10.93	Amended and Restated Guaranty, dated as of August 13, 2014, by Private National Mortgage Acceptance Company, LLC in favor of Bank of America, N.A. (incorporated by reference to Exhibit 10.73 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2014).
10.94	Mortgage Loan Purchase Agreement, dated as of September 25, 2012, by and between PennyMac Loan Services, LLC and PennyMac Corp. (incorporated by reference to Exhibit 10.124 of the Registrant's Annual Report on Form 10-K for the quarter ended December 31, 2015).
10.95	Flow Sale Agreement, dated as of June 16, 2015, by and between PennyMac Corp. and PennyMac Loan Services, LLC (incorporated by reference to Exhibit 10.104 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2015).
10.96	Amended and Restated Flow Commercial Mortgage Loan Purchase Agreement, dated as of June 1, 2016, by and between PennyMac Loan Services, LLC and PennyMac Corp. (incorporated by reference to Exhibit 10.100 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2016).
10.97	Servicing Agreement, dated as of July 13, 2015, between PennyMac Corp., PennyMac Holdings, LLC, any other parties signing this Agreement as owner of Mortgage Loans listed in Schedule I and any New Owners, PennyMac Loan Services, LLC, and Midland Loan Services, a division of PNC Bank, National Association (incorporated by reference to Exhibit 10.127 of the Registrant's Annual Report on Form 10-K for the quarter ended December 31, 2015).
10.98	Amended and Restated Commercial Mortgage Servicing Oversight Agreement, dated as of June 1, 2016, among PennyMac Corp., PennyMac Holdings, LLC, and PennyMac Loan Services, LLC (incorporated by reference to Exhibit 10.102 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2016).
10.99	Master Repurchase Agreement, dated as of December 4, 2015, among Barclays Bank PLC, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 10, 2015).
10.100	Amendment Number One to Master Repurchase Agreement, dated as of September 29, 2016, among Barclays Bank PLC, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.97 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 31, 2016).
10.101	Amendment Number Two to Master Repurchase Agreement, dated as of December 2, 2016, among Barclays Bank PLC, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC.

10.102	Mortgage Loan Participation Purchase and Sale Agreement, dated as of December 4, 2015, between PennyMac Loan Services, LLC and Barclays Bank PLC (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 10, 2015).
10.103	Amendment Number One to Mortgage Loan Participation Purchase and Sale Agreement, dated as of December 2, 2016, between PennyMac Loan Services, LLC and Barclays Bank PLC.

Exhibit Number	Exhibit Description
10.104	Loan and Security Agreement, dated as of December 4, 2015, among PennyMac Loan Services, LLC, Private National Mortgage Acceptance Company, LLC and Barclays Bank PLC (incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 10, 2015).
10.105	Amendment Number One to the Loan and Security Agreement, dated as of February 26, 2016, among Barclays Bank PLC, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on March 3, 2016)
10.106	Amendment Number Two to the Loan and Security Agreement, dated as of December 2, 2016, among Barclays Bank PLC, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC.
10.107	Amendment Number Three to the Loan and Security Agreement, dated as of January 30, 2017, among Barclays Bank PLC, PennyMac Loan Services, LLC and Private National Mortgage Acceptance Company, LLC.
10.108	Master Lease Agreement No. 30350-90000, dated as of December 9, 2015, among Private National Mortgage Acceptance Company, LLC and Banc of America Leasing & Capital, LLC (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 14, 2015).
10.109	Addendum to Master Lease Agreement No. 30350-90000, dated as of December 9, 2015, among Private National Mortgage Acceptance Company, LLC and Banc of America Leasing & Capital, LLC (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 14, 2015).
10.110	Schedule Number 001 to Master Lease Agreement, dated as of December 9, 2015, among Private National Mortgage Acceptance Company, LLC and Banc of America Leasing & Capital, LLC (incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 14, 2015).
10.111	Schedule Number 002 to Master Lease Agreement, dated as of May 4, 2016, among Private National Mortgage Acceptance Company, LLC and Banc of America Leasing & Capital, LLC (incorporated by reference to Exhibit 10.140 of the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2016).
10.112	Schedule Number 003 to Master Lease Agreement, dated as of November 3, 2016, among Private National Mortgage Acceptance Company, LLC and Banc of America Leasing & Capital, LLC (incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K as filed with the SEC on November 4, 2016).
10.113	Guaranty, dated as of December 9, 2015, by PennyMac Loan Services, LLC in favor of Banc of America Leasing & Capital, LLC (incorporated by reference to Exhibit 10.4 of the Registrant's Current Report on

	Form 8-K as filed with the SEC on December 14, 2015).
10.114	Amended and Restated Credit Agreement, dated November 18, 2016, by and among Private National Mortgage Acceptance Company, LLC, the lenders that are parties thereto, Credit Suisse AG and Credit Suisse Securities (USA) LLC (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on November 22, 2016).

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Exhibit Number	Exhibit Description
10.115	Amended and Restated Collateral and Guaranty Agreement, dated November 18, 2016, by and among Private National Mortgage Acceptance Company, LLC, Credit Suisse AG, Cayman Islands Branch, PennyMac Financial Services, Inc., PNMAC Capital Management, LLC, PennyMac Loan Services, LLC and PNMAC Opportunity Fund Associates, LLC (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on November 22, 2016).
10.116	Master Repurchase Agreement, dated as of August 19, 2016, between PennyMac Loan Services, LLC and JPMorgan Chase Bank, N.A. (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on August 23, 2016).
10.117	Guaranty, dated as of August 19, 2016, by Private National Mortgage Acceptance Company, LLC in favor of JPMorgan Chase Bank. N.A. (incorporated by reference to Exhibit 10.2 of the Registrant’s Current Report on Form 8-K as filed with the SEC on August 23, 2016).
10.118	Master Repurchase Agreement, dated as of September 19, 2016, between Royal Bank of Canada and PennyMac Loan Services, LLC (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on September 22, 2016).
10.119	Base Indenture, dated as of December 19, 2016, by and among PNMAC GMSR ISSUER TRUST, Citibank, N.A., PennyMac Loan Services, LLC, Credit Suisse First Boston Mortgage Capital LLC, and Pentalpha Surveillance LLC (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.120	Amended and Restated Base Indenture, dated as of February 16, 2017, by and among PNMAC GMSR ISSUER TRUST, Citibank, N.A., PennyMac Loan Services, LLC, Credit Suisse First Boston Mortgage Capital LLC, and Pentalpha Surveillance LLC (incorporated by reference to Exhibit 10.1 of the Registrant’s Current Report on Form 8-K as filed with the SEC on February 23, 2017).
10.121	Series 2016-MSRVF1 Indenture Supplement to Indenture, dated as of December 19, 2016, by and among PNMAC GMSR ISSUER TRUST, Citibank, N.A., PennyMac Loan Services, LLC, and Credit Suisse First Boston Mortgage Capital LLC (incorporated by reference to Exhibit 10.2 of the Registrant’s Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.122	Series 2016-MBSADV1 Indenture Supplement to Indenture, dated as of December 19, 2016, by and among PNMAC GMSR ISSUER TRUST, Citibank, N.A., PennyMac Loan Services, LLC, and Credit Suisse First Boston Mortgage Capital LLC.
10.123	Omnibus Amendment No. 1 to the Series 2016-MSRVF1 Indenture Supplement and Series 2016-MBSADV1 Indenture Supplement, dated as of February 16, 2017, by and among PNMAC GMSR ISSUER TRUST, Citibank, N.A., PennyMac Loan Services, LLC, and Credit Suisse First Boston Mortgage Capital LLC (incorporated by reference to Exhibit 10.3 of the Registrant’s Current Report on Form 8-K as filed with the SEC on February 23, 2017).
10.124	Series 2017-GT1 Indenture Supplement, dated as of February 16, 2017, to Amended and Restated Base Indenture, dated as of February 16, 2017, by and among PNMAC GMSR ISSUER TRUST, Citibank,

N.A., PennyMac Loan Services, LLC, Credit Suisse First Boston Mortgage Capital LLC (incorporated by reference to Exhibit 10.2 of the Registrant's Current Report on Form 8-K as filed with the SEC on February 23, 2017).

Exhibit Number	Exhibit Description
10.125	Master Repurchase Agreement, dated as of December 19, 2016, by and among PNMAC GMSR ISSUER TRUST, PennyMac Loan Services, LLC, and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.3 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.126	Amendment No. 1 to Master Repurchase Agreement, dated as of February 16, 2017, by and among PNMAC GMSR ISSUER TRUST, PennyMac Loan Services, LLC, and Private National Mortgage Acceptance Company, LLC and consented to by Citibank, N.A., Credit Suisse AG, Cayman Islands Branch, and Credit Suisse First Boston Mortgage Capital LLC (incorporated by reference to Exhibit 10.4 of the Registrant's Current Report on Form 8-K as filed with the SEC on February 23, 2017).
10.127	Guaranty, dated as of December 19, 2016, made by Private National Mortgage Acceptance Company, LLC, in favor of PNMAC GMSR ISSUER TRUST (incorporated by reference to Exhibit 10.4 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.128	Amendment No. 1 to Guaranty, dated as of February 16, 2017, by and between PNMAC GMSR ISSUER TRUST and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.5 of the Registrant's Current Report on Form 8-K as filed with the SEC on February 23, 2017).
10.129	Master Repurchase Agreement, dated as of December 19, 2016, by and among PennyMac Holdings, LLC, PennyMac Loan Services, LLC, and PennyMac Mortgage Investment Trust, (incorporated by reference to Exhibit 10.5 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.130	Guaranty, dated as of December 19, 2016, by PennyMac Mortgage Investment Trust, in favor of PennyMac Loan Services, LLC (incorporated by reference to Exhibit 10.6 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.131	Subordination, Acknowledgment and Pledge Agreement, dated as of December 19, 2016, between PNMAC GMSR ISSUER TRUST and PennyMac Holdings, LLC (incorporated by reference to Exhibit 10.8 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.132	Master Repurchase Agreement, dated as of December 19, 2016, by and among, Credit Suisse First Boston Mortgage Capital LLC, Credit Suisse AG, Cayman Islands Branch, and PennyMac Loan Services, LLC (incorporated by reference to Exhibit 10.8 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.133	Guaranty, dated as of December 19, 2016, by Private National Mortgage Acceptance Company, LLC in favor of Credit Suisse First Boston Mortgage Capital LLC (incorporated by reference to Exhibit 10.9 of the Registrant's Current Report on Form 8-K as filed with the SEC on December 21, 2016).
10.134	Master Repurchase Agreement, dated as of November 1, 2016, among JPMorgan Chase Bank, National Association, PennyMac Loan Services, LLC, and Private National Mortgage Acceptance Company, LLC (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K as filed with the SEC on November 4, 2016).
10.135	Guaranty, dated as of November 1, 2016, by Private National Mortgage Acceptance Company, LLC, in favor of JPMorgan Chase Bank, National Association (incorporated by reference to Exhibit 10.2 of the

	Registrant’s Current Report on Form 8-K as filed with the SEC on November 4, 2016).
21.1	Subsidiaries of PennyMac Financial Services, Inc.
23.1	Consent of Deloitte & Touche LLP.

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Exhibit Number	Exhibit Description
31.1	Certification of David A. Spector pursuant to Rule 13a-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Andrew S. Chang pursuant to Rule 13a-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1*	Certification of David A. Spector pursuant to Rule 13a-14(b) and 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2*	Certification of Andrew S. Chang pursuant to Rule 13a-14(b) and 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101	Interactive data files pursuant to Rule 405 of Regulation S-T: (i) the Consolidated Balance Sheets as of December 31, 2016 and December 31, 2015 (ii) the Consolidated Statements of Income for the years ended December 31, 2016 and December 31, 2015, (iii) the Consolidated Statements of Changes in Stockholders' Equity for the years ended December 31, 2016 and December 31, 2015, (iv) the Consolidated Statements of Cash Flows for the years ended December 31, 2016 and December 31, 2015 and (v) the Notes to the Consolidated Financial Statements.

* The certifications attached hereto as Exhibits 32.1 and 32.2 are furnished to the SEC pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 and shall not be deemed filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933, except as shall be expressly set forth by specific reference in such filing.

† Indicates management contract or compensatory plan or arrangement.

Item 16. Form 10-K Summary

None.

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PENNYMAC FINANCIAL SERVICES, INC.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of

PennyMac Financial Services, Inc.

3043 Townsgate Road

Westlake Village, CA 91361

We have audited the accompanying consolidated balance sheets of PennyMac Financial Services, Inc. and subsidiaries (the ‘‘Company’’) as of December 31, 2016 and 2015, and the related consolidated statements of income, changes in stockholders’ equity, and cash flows for each of the three years in the period ended December 31, 2016. These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on these financial statements based on our audits.

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

In our opinion, such consolidated financial statements present fairly, in all material respects, the financial position of PennyMac Financial Services, Inc. and subsidiaries at December 31, 2016 and 2015, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2016, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the Company's internal control over financial reporting as of December 31, 2016, based on the criteria established in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated March 9, 2017 expressed an unqualified opinion on the Company's internal control over financial reporting.

/s/ DELOITTE & TOUCHE LLP

Los Angeles, California

March 9, 2017

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PENNYMAC FINANCIAL SERVICES, INC.

CONSOLIDATED BALANCE SHEETS

	December 31, 2016	December 31, 2015
	(in thousands, except share amounts)	
ASSETS		
Cash (includes $91,788 and $93,757 pledged to creditors)	$ 99,367	$ 105,472
Short-term investments at fair value	85,964	46,319
Mortgage loans held for sale at fair value (includes $2,125,174 and $1,079,489 pledged to creditors)	2,172,815	1,101,204
Derivative assets	82,905	50,280
Servicing advances, net (includes valuation allowance of $45,425 and $33,458; $81,306 and $68,507 pledged to creditors)	348,306	299,354
Carried Interest due from Investment Funds pledged to creditors	70,906	69,926
Investment in PennyMac Mortgage Investment Trust at fair value	1,228	1,145
Mortgage servicing rights (includes $515,925 and $660,247 at fair value; $1,617,671 and $803,560 pledged to creditors)	1,627,672	1,411,935
Real estate acquired in settlement of loans	1,418	—
Furniture, fixtures, equipment and building improvements, net (includes $25,134 and $14,034 pledged to creditors)	31,321	16,311
Capitalized software, net (includes $515 and $783 pledged to creditors)	11,205	3,025
Financing receivable from PennyMac Mortgage Investment Trust (pledged to creditors at December 31, 2016)	150,000	150,000
Receivable from PennyMac Mortgage Investment Trust	16,416	18,965
Receivable from Investment Funds	1,219	1,316
Deferred tax asset	—	18,378
Mortgage loans eligible for repurchase	382,268	166,070
Other	50,892	45,594
Total assets	$ 5,133,902	$ 3,505,294
LIABILITIES		
Assets sold under agreements to repurchase	$ 1,735,114	$ 1,166,731
Mortgage loan participation and sale agreements	671,426	234,872
Notes payable	150,942	61,136
Obligations under capital lease	23,424	13,579
Excess servicing spread financing payable to PennyMac Mortgage Investment Trust at fair value	288,669	412,425
Derivative liabilities	22,362	9,083
Accounts payable and accrued expenses	134,611	89,915
Mortgage servicing liabilities at fair value	15,192	1,399
Payable to Investment Funds	20,393	30,429
Payable to PennyMac Mortgage Investment Trust	170,036	162,379
Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement	75,954	74,315

Income taxes payable	25,088	—
Liability for mortgage loans eligible for repurchase	382,268	166,070
Liability for losses under representations and warranties	19,067	20,611
Total liabilities	3,734,546	2,442,944
Commitments and contingencies		
STOCKHOLDERS’ EQUITY		
Class A common stock—authorized 200,000,000 shares of $0.0001 par value; issued and outstanding, 22,426,779 and 21,990,831 shares, respectively	2	2
Class B common stock—authorized 1,000 shares of $0.0001 par value; issued and outstanding, 49 and 51 shares, respectively	—	—
Additional paid-in capital	182,772	172,354
Retained earnings	164,549	98,470
Total stockholders' equity attributable to PennyMac Financial Services, Inc. common stockholders	347,323	270,826
Noncontrolling interest in Private National Mortgage Acceptance Company, LLC	1,052,033	791,524
Total stockholders' equity	1,399,356	1,062,350
Total liabilities and stockholders’ equity	$ 5,133,902	$ 3,505,294

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

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PENNYMAC FINANCIAL SERVICES, INC.

CONSOLIDATED STATEMENTS OF INCOME

	Year ended December 31,		
	2016	2015	2014
	(in thousands, except earnings per share)		
Revenues			
Net gains on mortgage loans held for sale at fair value:			
From non-affiliates	$ 539,872	$ 328,551	$ 174,861
Recapture payable to PennyMac Mortgage Investment Trust	(8,092)	(7,836)	(7,837)
	531,780	320,715	167,024
Mortgage loan origination fees	125,534	91,520	41,576
Fulfillment fees from PennyMac Mortgage Investment Trust	86,465	58,607	48,719
Net mortgage loan servicing fees:			
Mortgage loan servicing fees:			
From non-affiliates	385,633	290,474	173,005
From PennyMac Mortgage Investment Trust	50,615	46,423	52,522
From Investment Funds	2,583	2,636	6,425
Ancillary and other fees	46,910	43,139	26,469
	485,741	382,672	258,421
Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities	(324,198)	(156,939)	(70,165)
Change in fair value of excess servicing spread payable to PennyMac Mortgage Investment Trust	23,923	3,810	28,663
	(300,275)	(153,129)	(41,502)
Net mortgage loan servicing fees	185,466	229,543	216,919
Management fees:			
From PennyMac Mortgage Investment Trust	20,657	24,194	35,035
From Investment Funds	2,089	4,043	7,473
	22,746	28,237	42,508
Carried Interest from Investment Funds	980	2,628	6,156
Net interest expense:			
Interest income:			
From non-affiliates	73,297	45,812	27,771
From PennyMac Mortgage Investment Trust	7,830	3,343	—
	81,127	49,155	27,771
Interest expense:			
To non-affiliates	83,605	43,172	23,965
To PennyMac Mortgage Investment Trust	22,601	25,365	13,292
	106,206	68,537	37,257
Net interest expense	(25,079)	(19,382)	(9,486)
Change in fair value of investment in and dividends received from PennyMac Mortgage Investment Trust	224	(230)	(6)
Results of real estate acquired in settlement of loans	(82)	—	—
Other	3,853	1,472	4,867
Total net revenue	931,887	713,110	518,277

Expenses			
Compensation	342,153	274,262	190,707
Servicing	85,857	68,085	48,430
Technology	35,322	25,164	15,439
Loan origination	22,528	17,396	9,554
Professional services	18,078	15,473	11,108
Other	44,866	33,537	20,006
Total expenses	548,804	433,917	295,244
Income before provision for income taxes	383,083	279,193	223,033
Provision for income taxes	46,103	31,635	26,722
Net income	336,980	247,558	196,311
Less: Net income attributable to noncontrolling interest	270,901	200,330	159,469
Net income attributable to PennyMac Financial Services, Inc. common stockholders	$ 66,079	$ 47,228	$ 36,842
Earnings per share			
Basic	$ 2.98	$ 2.17	$ 1.73
Diluted	$ 2.94	$ 2.17	$ 1.73
Weighted average common shares outstanding			
Basic	22,161	21,755	21,250
Diluted	76,629	76,104	75,955

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

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PENNYMAC FINANCIAL SERVICES, INC.

CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY

	Class A Common Stock				Noncontrolling interest in Private National Mortgage	
	Number of shares (in thousands)	Par value	Additional paid-in capital	Retained earnings	Acceptance Company, LLC	Total
Balance at December 31, 2013	20,813	$ 2	$ 153,000	$ 14,400	$ 461,802	$ 629,204
Net income	—	—	—	36,842	159,469	196,311
Stock and unit-based compensation	33	—	2,895	—	7,436	10,331
Distributions	—	—	—	—	(28,298)	(28,298)
Issuance of common stock in settlement of directors' fees	14	—	222	—	—	222
Exchange of Class A units of Private National Mortgage Acceptance Company, LLC to Class A common stock of PennyMac Financial Services, Inc.	718	—	7,107	—	(7,107)	—
Tax effect of exchange of Class A units of Private National Mortgage Acceptance Company, LLC to Class A common stock of PennyMac Financial Services, Inc.	—	—	(504)	—	—	(504)
Balance at December 31, 2014	21,578	2	162,720	51,242	593,302	807,266
Net income	—	—	—	47,228	200,330	247,558
Stock and unit-based compensation	77	—	5,017	—	12,504	17,521
Distributions	—	—	—	—	(9,630)	(9,630)
Issuance of common stock in settlement of directors' fees	17	—	297	—	—	297
Exchange of Class A units of Private National Mortgage Acceptance Company, LLC to Class A common stock of PennyMac Financial Services, Inc.	319	—	4,982	—	(4,982)	—
Tax effect of exchange of Class A units of Private National Mortgage Acceptance	—	—	(662)	—	—	(662)

Company, LLC to Class A common stock of PennyMac Financial Services, Inc.						
Balance at December 31, 2015	21,991	2	172,354	98,470	791,524	1,062,350
Net income	—	—	—	66,079	270,901	336,980
Stock and unit-based compensation	111	—	4,646	—	11,701	16,347
Distributions	—	—	—	—	(15,216)	(15,216)
Issuance of common stock in settlement of directors' fees	24	—	313	—	—	313
Exchange of Class A units of Private National Mortgage Acceptance Company, LLC to Class A common stock of PennyMac Financial Services, Inc.	301	—	6,877	—	(6,877)	—
Tax effect of exchange of Class A units of Private National Mortgage Acceptance Company, LLC to Class A common stock of PennyMac Financial Services, Inc.	—	—	(1,418)	—	—	(1,418)
Balance of December 31, 2016	22,427	$ 2	$ 182,772	$ 164,549	$ 1,052,033	$ 1,399,356

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

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PENNYMAC FINANCIAL SERVICES, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Cash flow from operating activities			
Net income	$ 336,980	$ 247,558	$ 196,311
Adjustments to reconcile net income to net cash (used in) provided by operating activities:			
Net gains on mortgage loans held for sale at fair value	(531,780)	(320,715)	(167,024)
Accrual of servicing rebate payable to Investment Funds	306	1,269	2,206
Amortization, impairment and change in fair value of mortgage servicing rights and excess servicing spread	300,275	153,129	41,502
Carried Interest from Investment Funds	(980)	(2,628)	(6,156)
Capitalization of interest on mortgage loans held for sale at fair value	(29,234)	(16,875)	—
Amortization of debt issuance costs and commitment fees relating to financing facilities	11,052	7,775	5,989
Accrual of interest on excess servicing spread financing	22,601	25,365	13,292
Change in fair value of investment in common shares of PennyMac Mortgage Investment Trust	(83)	437	140
Results of real estate acquired in settlement in loans	82	—	—
Stock and unit-based compensation expense	16,198	17,521	10,331
Provision for servicing advance losses	35,503	29,782	18,686
Depreciation and amortization	5,849	2,423	1,365
Revaluation of payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement	(551)	1,695	(1,378)
Purchase of mortgage loans held for sale from PennyMac Mortgage Investment Trust	(42,051,505)	(31,490,920)	(16,431,338)
Originations of mortgage loans held for sale	(6,491,107)	(4,143,240)	(1,951,070)
	(2,168,685)	(1,116,700)	(1,049,838)

Purchase of mortgage loans from Ginnie Mae securities and early buyout investors for modification and subsequent sale			
Sale and principal payments of mortgage loans held for sale	49,633,909	36,679,638	18,785,683
Sale of mortgage loans held for sale to PennyMac Mortgage Investment Trust	21,541	28,445	8,081
Repurchase of mortgage loans subject to representations and warranties	(19,248)	(22,601)	(4,089)
Increase in servicing advances	(85,955)	(100,506)	(98,401)
Increase in receivable from Investment Funds	(209)	(294)	(1,582)
Decrease in receivable from PennyMac Mortgage Investment Trust	2,969	7,637	1,280
Decrease in deferred tax asset	18,668	29,726	21,922
Payments to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement	—	(5,132)	—
Increase in other assets	(19,282)	(18,100)	(31,921)
Increase in accounts payable and accrued expenses	33,041	26,307	16,437
Decrease in payable to Investment Funds	(10,036)	(5,479)	(1,029)
Increase in payable to PennyMac Mortgage Investment Trust	5,589	37,627	41,647
Increase in income taxes payable	25,570	—	—
Net cash (used in) provided by operating activities	(938,522)	53,144	(578,954)
Cash flow from investing activities			
(Increase) decrease in short-term investments	(39,645)	(24,632)	120,895
Advance on financing receivable from PennyMac Mortgage Investment Trust	—	(168,546)	—
Repayment of financing receivable from PennyMac Mortgage Investment Trust	—	18,546	—
Purchase of mortgage servicing rights	(146)	(382,824)	(135,480)
Sale of mortgage servicing rights	—	—	10,916
Net settlement of derivative financial instruments used for hedging	(27,315)	2,033	18,620
Purchase of furniture, fixtures, equipment and leasehold improvements	(21,852)	(9,122)	(4,613)
Acquisition of capitalized software	(8,537)	(2,782)	(123)
Decrease (increase) in margin deposits and restricted cash	62,756	4,185	(3,463)
Net cash (used in) provided by investing activities	(34,739)	(563,142)	6,752
Cash flow from financing activities			
Sale of assets under agreements to repurchase	45,925,047	33,125,237	17,217,767
Repurchase of assets sold under agreements to repurchase	(45,355,531)	(33,187,830)	(16,866,738)

Issuance of mortgage loan participation certificates	32,336,793	17,722,964	2,817,616
Repayment of mortgage loan participation certificates	(31,900,130)	(17,631,704)	(2,673,978)
Advances on notes payable	122,920	352,243	274,636
Repayment of notes payable	(33,661)	(29,411)	(179,935)
Issuance of excess servicing spread financing	—	271,554	95,892
Repayment of excess servicing spread financing	(69,992)	(78,578)	(39,256)
Settlement of excess servicing spread financing	(59,045)	—	—
Advances of obligations under capital lease	16,952	13,579	—
Repayment of obligations under capital lease	(7,107)	—	—
Payment of debt issuance costs	(11,747)	(9,210)	—
Consideration received for acceptance of mortgage servicing liability	10,139	—	—
Proceeds from common stock options exercised	149	—	—
Distribution to Private National Mortgage Acceptance Company, LLC members	(7,631)	(9,630)	(28,185)
Net cash provided by financing activities	967,156	539,214	617,819
Net (decrease) increase in cash	(6,105)	29,216	45,617
Cash at beginning of year	105,472	76,256	30,639
Cash at end of year	$ 99,367	$ 105,472	$ 76,256

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

PENNYMAC FINANCIAL SERVICES, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1—Organization

PennyMac Financial Services, Inc. ("PFSI" or the "Company") was formed as a Delaware corporation on December 31, 2012. Pursuant to a reorganization, the Company became a holding corporation and its primary asset is an equity interest in Private National Mortgage Acceptance Company, LLC ("PennyMac"). The Company is the managing member of PennyMac, and it operates and controls all of the businesses and affairs of PennyMac, subject to the consent rights of other members under certain circumstances, and consolidates the financial results of PennyMac and its subsidiaries.

PennyMac is a Delaware limited liability company which, through its subsidiaries, engages in mortgage banking and investment management activities. PennyMac's mortgage banking activities consist of residential mortgage loan production and mortgage loan servicing. PennyMac's investment management activities and a portion of its mortgage loan servicing activities are conducted on behalf of investment vehicles that invest in residential mortgage loans and related assets. PennyMac's primary wholly owned subsidiaries are:

· PNMAC Capital Management, LLC ("PCM")—a Delaware limited liability company registered with the Securities and Exchange Commission ("SEC") as an investment adviser under the Investment Advisers Act of 1940, as amended. PCM enters into investment management agreements with entities that invest in residential mortgage loans and related assets.

Presently, PCM has management agreements with PNMAC Mortgage Opportunity Fund, LLC and PNMAC Mortgage Opportunity Fund, L.P., (the "Master Fund"), both registered under the Investment Company Act of 1940, as amended, an affiliate of these registered funds, PNMAC Mortgage Opportunity Fund Investors, LLC (collectively, the "Investment Funds"), and PennyMac Mortgage Investment Trust ("PMT"), a publicly held real estate investment trust ("REIT"). Together, the Investment Funds and PMT are referred to as the "Advised Entities."

· PennyMac Loan Services, LLC ("PLS")—a Delaware limited liability company that services portfolios of residential mortgage loans on behalf of non-affiliates and the Advised Entities, purchases, originates and sells new prime credit quality residential mortgage loans and engages in other mortgage banking activities for its own account and the account of PMT.

PLS is approved as a seller/servicer of mortgage loans by the Federal National Mortgage Association ("Fannie Mae") and the Federal Home Loan Mortgage Corporation ("Freddie Mac") and as an issuer of securities guaranteed by the Government National Mortgage Association ("Ginnie Mae"). PLS is a licensed Federal Housing Administration Nonsupervised Title II Lender with the U.S. Department of Housing and Urban Development ("HUD") and a

lender/servicer with the Veterans Administration ("VA") and U.S. Department of Agriculture ("USDA") (each an "Agency" and collectively the "Agencies").

· PNMAC Opportunity Fund Associates, LLC ("PMOFA")—a Delaware limited liability company and the general partner of the Master Fund. PMOFA is entitled to incentive fees representing allocations of profits ("Carried Interest") from the Master Fund.

Note 2—Concentration of Risk

A substantial portion of the Company's activities relate to the Advised Entities. Revenues generated from these entities (generally comprised of management fees, mortgage loan servicing fees, Carried Interest and fulfillment fees) totaled 18%, 16% and 32% of total net revenues for the years ended December 31, 2016, 2015 and 2014, respectively.

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Note 3—Significant Accounting Policies

A description of the Company's significant accounting policies applied in the preparation of the accompanying consolidated financial statements follows.

Basis of Presentation

The Company's consolidated financial statements have been prepared in compliance with accounting principles generally accepted in the United States ("GAAP") as codified in the Financial Accounting Standards Board's ("FASB") Accounting Standards Codification (the "ASC" or the "Codification").

Principles of Consolidation

The consolidated financial statements include the accounts of PFSI, PennyMac and all of its wholly owned subsidiaries. Intercompany accounts and transactions have been eliminated.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make judgments and estimates that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Actual results will likely differ from those estimates.

Fair Value

The Company groups its assets and liabilities at fair value in three levels, based on the markets in which the assets and liabilities are traded and the observability of the inputs used to determine fair value. These levels are:

· Level 1—Quoted prices in active markets for identical assets or liabilities.

- Level 2—Prices determined or determinable using other significant observable inputs. Observable inputs are inputs that other market participants would use in pricing an asset or liability and are developed based on market data obtained from sources independent of the Company. These may include quoted prices for similar assets and liabilities, interest rates, prepayment speeds, credit risk and other inputs.

- Level 3—Prices determined using significant unobservable inputs. In situations where observable inputs are unavailable, unobservable inputs may be used. Unobservable inputs reflect the Company's own judgments about the factors that market participants use in pricing an asset or liability, and are based on the best information available in the circumstances.

As a result of the difficulty in observing certain significant valuation inputs affecting "Level 3" fair value assets and liabilities, the Company is required to make judgments regarding their fair values. Different persons in possession of the same facts may reasonably arrive at different conclusions as to the inputs to be applied in valuing these assets and liabilities and their fair values. Likewise, due to the general illiquidity of some of these assets and liabilities, subsequent transactions may be at values significantly different from those reported.

Short Term Investments

Short term investments, which represent investments in accounts with a depository institution, are carried at fair value. Changes in fair value are recognized in current period income. The Company classifies its short term investments as "Level 1" fair value assets.

Mortgage Loans Held for Sale at Fair Value

Management has elected to account for mortgage loans held for sale at fair value, with changes in fair value recognized in current period income, to more timely reflect the Company's performance. All changes in fair value, including changes arising from the passage of time, are recognized as a component of Net gains on mortgage loans held for sale at fair value. The Company classifies most of the mortgage loans held for sale at fair value as "Level 2" fair value assets. Certain of the Company's mortgage loans held for sale may not be readily saleable due to identified defects or delinquency. Such mortgage loans are classified as "Level 3" fair value assets.

Sale Recognition

The Company recognizes transfers of mortgage loans as sales when it surrenders control over the mortgage loans. Control over transferred mortgage loans is deemed to be surrendered when (i) the mortgage loans have been isolated from the Company, (ii) the transferee has the right (free of conditions that constrain it from taking advantage of that right) to pledge or exchange the transferred mortgage loans, and (iii) the Company does not maintain effective control over the transferred mortgage loans through either (a) an agreement that entitles and obligates the Company to repurchase or redeem them before their maturity or (b) the ability to unilaterally cause the holder to return the specific mortgage loans.

Interest Income Recognition

Interest income on mortgage loans held for sale at fair value is recognized over the life of the mortgage loans using their contractual interest rates. Income recognition is suspended and the unpaid interest receivable is reversed against interest income when mortgage loans become 90 days delinquent, or when, in management's opinion, a full recovery of interest and principal becomes doubtful. Income recognition is resumed when the mortgage loan becomes contractually current.

Derivative Financial Instruments

The Company is exposed to price risk relative to its mortgage loans held for sale as well as to the commitments it makes to loan applicants to originate or to PMT to acquire mortgage loans at specified interest rates ("interest rate lock commitments" or "IRLCs"). The Company bears price risk from the time a commitment to fund a mortgage loan is made to a borrower or to purchase a mortgage loan from PMT, to the time the mortgage loan is sold. During this period, the Company is exposed to losses if mortgage market interest rates increase, because the fair value of the purchase commitment or prospective mortgage loan decreases. The Company also is exposed to risk relative to the fair value of

its mortgage servicing rights ("MSRs"). The Company is exposed to loss in fair value of its MSRs when interest rates decrease.

The Company engages in interest rate risk management activities in an effort to reduce the variability of earnings caused by changes in market interest rates. To manage this fair value risk resulting from interest rate risk, the Company uses derivative financial instruments acquired with the intention of reducing the risk that changes in market interest rates will result in unfavorable changes in the fair value of the Company's IRLCs, inventory of mortgage loans held for sale and MSRs.

IRLCs are accounted for as derivative financial instruments. The Company manages the risk created by IRLCs relating to mortgage loans held for sale by entering into forward sale agreements to sell the mortgage loans and by the purchase and sale of mortgage backed securities ("MBS") options and futures. Such agreements are also accounted for as derivative financial instruments. These instruments and other interest-rate derivatives are also used to manage the risk created by changes in prepayment speeds on certain of the MSRs the Company holds. The Company classifies its IRLCs as "Level 3" fair value assets and liabilities and the derivative financial instruments it acquires to manage the risks created by IRLCs, mortgage loans held for sale and MSRs as "Level 1" or "Level 2" fair value assets and liabilities.

The Company does not use derivative financial instruments for purposes other than in support of its risk management activities. The Company accounts for its derivative financial instruments as free standing derivatives. The

Company does not designate its derivative financial instruments for hedge accounting. All derivative financial instruments are recognized on the consolidated balance sheet at fair value with changes in the fair values being reported in current period income. Changes in fair value of derivative financial instruments hedging IRLCs, mortgage loans held for sale at fair value and MSRs are included in Net gains on mortgage loans held for sale at fair value or in Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities, as applicable, in the Company's consolidated statements of income.

When the Company has multiple derivative financial instruments with the same counterparty under a master netting arrangement, it offsets the amounts recorded as assets and liabilities and amounts recognized for the right to reclaim cash collateral it has deposited with the counterparty or the obligation to return cash collateral it has collected from the counterparty arising from that master netting arrangement. Such offset amounts are presented as either a net asset or liability by counterparty on the Company's consolidated balance sheets.

Servicing Advances

Servicing advances represent advances made on behalf of borrowers and the mortgage loans' investors to fund delinquent balances for property taxes and insurance premiums and out-of-pocket collection costs (e.g., preservation and restoration of mortgaged or real estate owned property, legal fees, and appraisals). Servicing advances are made in accordance with the Company's servicing agreements and, when made, are deemed recoverable. The Company periodically reviews servicing advances for collectability and provides a valuation allowance for amounts estimated to be uncollectable. Servicing advances are written off when they are deemed uncollectable.

Carried Interest Due from Investment Funds

Carried Interest, in general terms, is the share of any profits in excess of specified levels that the general partners receive as compensation. The Company has a general partnership interest or other Carried Interest arrangement with the Investment Funds, and earns Carried Interest thereunder. The amount of Carried Interest to be recorded each period is based on the cash flows that would be realized by all partners assuming liquidation of the Investment Funds' remaining investments as of the measurement date.

Investment in PennyMac Mortgage Investment Trust at Fair Value

Common shares of beneficial interest in PMT are carried at their fair value with changes in fair value recognized in current period income. Fair value for purposes of the Company's holdings in PMT is based on the published closing price of the shares as of period end. The Company classifies its investment in common shares of PMT as a "Level 1" fair

value asset.

Mortgage Servicing Rights and Mortgage Servicing Liabilities

MSRs and MSLs arise from contractual agreements between the Company and investors (or their agents) in mortgage securities and mortgage loans. Under these contracts, the Company performs mortgage loan servicing functions in exchange for fees and other remuneration. The servicing functions typically performed include, among other responsibilities, collecting and remitting loan payments; responding to borrower inquiries; accounting for principal and interest; holding custodial (impound) funds for payment of property taxes and insurance premiums; counseling delinquent mortgagors; supervising the acquisition of real estate in settlement of loans ("REO") and property disposition. REO represents real estate that collateralized the mortgage loans before the properties were acquired in settlement of loans.

The fair value of MSRs and MSLs is derived from the net positive or negative, respectively, cash flows associated with the servicing contracts. The Company receives a servicing fee ranging generally from 0.19% to 0.57% annually, net of related guarantee fees, on the remaining outstanding principal balances of the mortgage loans subject to the servicing contracts. The servicing fees are collected from the monthly payments made by the mortgagors. The Company is contractually entitled to receive other remuneration including rights to various mortgagor contracted fees such as late charges and collateral reconveyance charges, and the Company is generally entitled to retain the interest

earned on funds held pending remittance related to its collection of mortgagor payments. The Company also generally has the right to solicit the mortgagors for other products and services as well as for new mortgages for those considering refinancing or purchasing a new home.

The Company recognizes MSRs and MSLs initially at fair value, either as proceeds from or liabilities incurred in, sales of mortgage loans where the Company assumes the obligation to service the mortgage loan in the sale transaction, or from the purchase of MSRs or receipt of cash for acceptance of the MSLs.

The Company's subsequent accounting for MSRs and MSLs is based on the class of MSR or MSL. The Company has identified three classes of MSRs: originated MSRs backed by mortgage loans with initial interest rates of less than or equal to 4.5%; MSRs backed by mortgage loans with initial interest rates of more than 4.5%; and purchased MSRs financed in part through the transfer of the right to receive excess servicing spread ("ESS") cash flows. Originated MSRs backed by mortgage loans with initial interest rates of less than or equal to 4.5% are accounted for using the amortization method. Originated MSRs backed by loans with initial interest rates of more than 4.5% and purchased MSRs financed in part by ESS are accounted for at fair value with changes in fair value recorded in current period income. MSLs are carried at fair value with changes in fair value recorded in current period income.

The fair value of MSRs and MSLs is difficult to determine because MSRs and MSLs are not actively traded in observable stand alone markets. Considerable judgment is required to estimate the fair values of MSRs and MSLs and the exercise of such judgment can significantly affect the Company's income. Therefore, the Company classifies its MSRs and MSLs as "Level 3" fair value assets and liabilities.

MSRs and MSLs are generally subject to reduction in fair value when mortgage interest rates decrease. Decreasing mortgage interest rates normally encourage increased mortgage refinancing activity. Increased refinancing activity reduces the expected life of the mortgage loans underlying the MSRs and MSLs, thereby reducing their fair value. Reductions in the fair value of MSRs and MSLs affect earnings primarily through change in fair value and impairment charges. For MSRs backed by mortgage loans with historically low mortgage interest rates, factors other than interest rates (such as housing price changes) take on increasing influence on prepayment behavior of the underlying mortgage loans.

MSRs Accounted for Using the Amortization Method

The Company amortizes MSRs that are accounted for using the amortization method. MSR amortization is determined by applying the ratio of the net MSR cash flows projected for the current period to the estimated total remaining projected net MSR cash flows. The estimated total net MSR cash flows are determined at the beginning of each month using prepayment inputs applicable at that time.

MSRs accounted for using the amortization method are periodically evaluated for impairment. Impairment occurs when the current fair value of the MSRs decreases below the asset's amortized cost. If MSRs are impaired, the impairment is recognized in current period income and the carrying value (carrying value is the MSR's amortized cost reduced by any related valuation allowance) of the MSRs is adjusted through a valuation allowance. If the fair value of impaired MSRs subsequently increases, the increase in fair value is recognized in current period income. When an increase in fair value of MSR is recognized, the valuation allowance is adjusted to increase the carrying value of the MSRs only to the extent of the valuation allowance.

For impairment evaluation purposes, the Company stratifies its MSRs by predominant risk characteristic when evaluating for impairment. For purposes of performing its MSR impairment evaluation, the Company stratifies its servicing portfolio on the basis of certain risk characteristics including mortgage loan type (fixed rate or adjustable rate) and note interest rate. Fixed rate mortgage loans are stratified into note rate pools of 50 basis points for note rates between 3.0% and 4.5% and a single pool for note rates of less than or equal to 3.0%. If the fair value of MSRs in any of the note interest rate pools is below the carrying value of the MSRs for that pool, impairment is recognized to the extent of the difference between the estimated fair value and the carrying value of that pool.

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Management periodically reviews the various impairment strata to determine whether the fair value of the impaired MSRs in a given stratum is likely to recover. When management deems recovery of the fair value to be unlikely in the foreseeable future, a write down of the cost of the MSRs for that stratum to its estimated recoverable value is charged to the valuation allowance.

Both amortization and changes in the amount of the MSR valuation allowance are recorded in current period income in Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities in the consolidated statements of income.

MSRs and MSLs Accounted for at Fair Value

Changes in fair value of MSLs and MSRs accounted for at fair value are recognized in current period income in Amortization, impairment and change in fair value of mortgage servicing rights in the consolidated statements of income.

Furniture, Fixtures, Equipment and Building Improvements

Furniture, fixtures, equipment and building improvements are stated at historical cost less accumulated depreciation and amortization. Depreciation and amortization are computed using the straight line method over the estimated useful lives of the various classes of assets, which range from five to seven years for furniture and equipment and the lesser of the asset's estimated useful life or the remaining lease term for fixtures and building improvements.

Capitalized Software

The Company capitalizes certain consulting, payroll, and payroll related costs related to computer software developed for internal use. Once development is complete and the software is placed in service, the Company amortizes the capitalized costs over five years using the straight line method.

The Company also periodically assesses capitalized software for recoverability when events or changes in circumstances indicate that their carrying amount may not be recoverable. If management identifies an indicator of impairment, it assesses recoverability by comparing the carrying amount of the asset to the sum of the undiscounted cash flows expected to result from the use and the eventual disposal of the asset. An impairment loss is recognized when the carrying amount is not recoverable and is measured as the excess of carrying value over fair value. No such

impairment was recorded during the three years ended December 31, 2016.

Mortgage Loans Eligible for Repurchase

The terms of the Ginnie Mae MBS program allow, but do not require, the Company to repurchase mortgage loans when the borrower has made no payments for three consecutive months. As a result of this right, the Company recognizes the mortgage loans in Mortgage loans eligible for repurchase at their unpaid principal balances and records a corresponding liability in Liability for mortgage loans eligible for repurchase on its consolidated balance sheets.

Margin Deposits

Margin deposits represents deposits that serve as collateral for various agreements the Company has entered into, such as derivative contracts and certain repurchase agreements. Margin deposits are included in Other assets in the Company's consolidated balance sheets.

Borrowings

The carrying value of borrowings other than ESS are based on the accrued cost of the agreements. The costs of creating the facilities underlying the agreements are included in the carrying value of the agreements and are amortized to Interest expense over the terms of the respective borrowing facilities.

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Excess Servicing Spread Financing at Fair Value

The Company finances certain of its purchases of Agency MSRs through the sale to PMT of the right to receive the excess of the servicing fee rate over a specified rate of the underlying MSRs. This excess is referred to as the ESS. ESS is carried at its fair value. Changes in fair value are recognized in current period income in Change in fair value of excess servicing spread payable to PennyMac Mortgage Investment Trust.

Interest expense for ESS is accrued using the interest method based upon the expected cash flows from the ESS through the expected life of the underlying mortgage loans.

Liability for Losses Under Representations and Warranties

The Company provides for its estimate of the losses that it expects to incur in the future as a result of its breach of the representations and warranties that it provides to the purchasers and insurers of the mortgage loans it has sold. The Company's agreements with the Agencies and other investors include representations and warranties related to the mortgage loans the Company sells to the Agencies and other investors. The representations and warranties require adherence to Agency and other investor origination and underwriting guidelines, including but not limited to the validity of the lien securing the mortgage loan, property eligibility, borrower credit, income and asset requirements, and compliance with applicable federal, state and local law.

In the event of a breach of its representations and warranties, the Company may be required to either repurchase the mortgage loans with the identified defects or indemnify the investor or insurer. In such cases, the Company bears any subsequent credit loss on the mortgage loans. The Company's credit loss may be reduced by any recourse it may realize from correspondent mortgage loan sellers that, in turn, had sold such mortgage loans to PMT and breached similar or other representations and warranties. In such event, the Company has the right to seek a recovery of related repurchase losses from that correspondent mortgage loan sellers, through PMT.

The Company records a provision for losses relating to representations and warranties as part of its mortgage loan sale transactions. The method used to estimate the liability for representations and warranties is a function of the representations and warranties given and considers a combination of factors, including, but not limited to, estimated future defaults and mortgage loan repurchase rates, the estimated severity of loss in the event of default and the probability of reimbursement by the correspondent mortgage loan seller. The Company establishes a liability at the time mortgage loans are sold and periodically updates its liability estimate. The level of the liability for representations and warranties is reviewed and approved by the Company's management credit committee.

The level of the liability for representations and warranties is difficult to estimate and requires considerable management judgment. The level of mortgage loan repurchase losses is dependent on economic factors, investor repurchase demand or insurer claim denial strategies, and other external conditions that may change over the lives of the underlying mortgage loans. The Company's representations and warranties are generally not subject to stated limits of exposure. However, the Company believes that the current unpaid principal balance of mortgage loans sold to date represents the maximum exposure to repurchases related to representations and warranties. The Company believes the range of reasonably possible losses in relation to the recorded liability is not material to its financial condition or income.

Mortgage Loan Servicing Fees

Mortgage loan servicing fees and other remuneration are received by the Company for servicing residential mortgage loans. Mortgage loan servicing fees are recorded net of Agency guarantee fees paid by the Company. Mortgage loan servicing fees are recognized as earned over the life of the mortgage loans in the servicing portfolio.

Stock Based Compensation

The Company's 2013 Equity Incentive Plan provides for awards of nonstatutory and incentive stock options, time based restricted stock units, performance based restricted stock units, stock appreciation rights, performance units

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and stock grants. The Company establishes the cost of its share-based awards at the awards' fair values at the grant date of the awards. The Company estimates the fair value of time based restricted stock units and performance based restricted stock units awarded with reference to the fair value of its underlying common stock on the date of the award. The Company estimates the fair value of its stock option awards with reference to the expected volatility of its shares of common stock and risk-free interest rate for the period that exercisable stock options are expected to be outstanding.

Compensation costs are fixed, except for performance based restricted stock units, as of the award date as all grantees are employees of PennyMac or directors of the Company. The cost of performance share units is adjusted in each reporting period after the grant for changes in expected performance attainment until the performance share units vest. The Company amortizes the cost of stock based awards to compensation expense over the vesting period using the graded vesting method. Expense relating to awards is included in Compensation expense in the consolidated statements of income.

Income Taxes

The Company is subject to federal and state income taxes. Income taxes are provided using the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using the enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled.

The effect on deferred taxes of a change in tax rates is recognized in income in the period in which the change occurs. A valuation allowance is established if, in management's judgment, it is not more likely than not that a deferred tax asset will be realized.

The Company recognizes tax benefits relating to its tax positions only if, in the opinion of management, it is more likely than not that the tax position will be sustained upon examination by the appropriate taxing authority. A tax position that meets this standard is recognized as the largest amount that is greater than 50% likely to be realized upon ultimate settlement with the appropriate taxing authority. The Company will classify any penalties and interest as a component of provision for income taxes.

As a result of the PennyMac recapitalization and reorganization, the Company expects to benefit from amortization and other tax deductions due to increases in the tax basis of PennyMac's assets from the exchange of PennyMac Class A units. Those deductions will be allocated to the Company and will be taken into account in reporting the Company's taxable income. The Company has entered into an agreement with the unitholders of PennyMac that will provide for the additional payment by the Company to exchanging unitholders of PennyMac equal to 85% of the

amount of cash savings, if any, in U.S. federal, state and local income tax that PFSI realizes due to (i) increases in tax basis resulting from exchanges of the then existing unitholders and (ii) certain other tax benefits related to PFSI entering into the tax receivable agreement, including tax benefits attributable to payments under the tax receivable agreement.

Variable Interest Held in Unconsolidated Variable Interest Entities

A Variable Interest Entity ("VIE") is an entity having either a total equity investment that is insufficient to finance its activities without additional subordinated financial support or equity investors at risk that lack the ability to control the entity's activities. Variable interests are investments or other interests that will absorb portions of a VIE's expected losses or receive portions of the VIE's expected residual returns.

PFSI consolidates the assets and liabilities of VIEs of which the Company is the primary beneficiary. The primary beneficiary is the party that has both the power to direct the activities that most significantly impact the VIE and holds a variable interest that could potentially be significant to the VIE. To determine whether a variable interest the Company holds could potentially be significant to the VIE, the Company considers both quantitative and qualitative factors regarding the nature, size and form of its involvement with the VIE. The Company assesses whether it is the primary beneficiary of a VIE on an ongoing basis.

PMOFA is the general partner of the Master Fund. The Master Fund wholly owns PennyMac Mortgage Co. Funding, LLC ("Funding, LLC") and PennyMac Mortgage Co., LLC. Funding LLC is the majority interest holder in PennyMac Loan Trust 2015 NPL1 (the "Trust"), which holds the mortgage loans for Funding LLC.

PLS provides mortgage loan servicing for the mortgage loans held by the Trust as well as for mortgage loans held by the Mortgage Co. The related party group constituting the Company and its affiliates (including PMOFA) has an equity interest in the Master Fund, the ultimate parent of the Trust, Mortgage Co and Funding, LLC. The direct equity holders in the Trust, Mortgage Co and Funding, LLC, however, do not have power to direct the activities of the respective entities and as such, both the Trust and Mortgage Co are considered to be VIEs as defined in the Consolidations topic of the Codification.

The Company is not the primary beneficiary in these VIEs, given it does not represent the enterprise within the related party group that is most closely associated with these VIEs and, as such, the Company does not consolidate these VIEs. Exposure to loss of the related party group from the unconsolidated VIEs is limited to the contributed capital of the related party group in the Master Fund totaling $2,000 which represents the general partnership interest held by PMOFA in the Master Fund.

Note 4—Transactions with Affiliates

Transactions with PMT

Operating Activities

Mortgage Loan Production Activities and MSR Recapture

Before September 12, 2016, the Company was entitled to a fulfillment fee based on the type of mortgage loan that PMT acquires and equal to a percentage of the UPB of such mortgage loan. The applicable fulfillment fee percentages were (i) 0.50% for conventional mortgage loans, (ii) 0.88% for loans sold in accordance with the Ginnie Mae Mortgage Backed Securities Guide, and (iii) 0.50% for all other mortgage loans not contemplated above; provided, however, that the Company was permitted, in its sole discretion, to reduce the amount of the applicable fulfillment fee and credit the amount of such reduction to the reimbursement otherwise due as described below. This reduction was only credited to the reimbursement applicable to the month in which the related mortgage loan was funded.

Effective September 12, 2016, the applicable fulfillment fee percentages are (i) 0.35% for mortgage loans sold or delivered to Fannie Mae or Freddie Mac, and (ii) 0.85% for all other mortgage loans; provided however, that no fulfillment fee shall be due or payable to the Company with respect to any Ginnie Mae mortgage loans. PMT does not hold the Ginnie Mae approval required to issue Ginnie Mae MBS and act as a servicer. Accordingly, under the MBS agreement, the Company currently purchases mortgage loans underwritten in accordance with the Ginnie Mae Mortgage-Backed Securities Guide "as is" and without recourse of any kind from PMT at PMT's cost less an administrative fee plus accrued interest and a sourcing fee ranging from two to three and one-half basis points, generally based on the average number of calendar days mortgage loans are held by PMT prior to purchase by the Company.

In consideration for the mortgage banking services provided by the Company with respect to PMT's acquisition of mortgage loans under the Company's early purchase program, The Company is entitled to fees accruing (i) at a rate equal to $1,500 per year per early purchase facility administered by the Company, and (ii) in the amount of $35 for each mortgage loan that PMT acquires thereunder.

Pursuant to the terms of an amended and restated MSR recapture agreement, effective September 12, 2016, if the Company refinances through its consumer direct lending business mortgage loans for which PMT previously held the MSRs, the Company is generally required to transfer and convey to one of PMT's wholly owned subsidiaries without cost to PMT, the MSRs with respect to new mortgage loans originated in those refinancings (or, under certain circumstances, other mortgage loans) that have an aggregate UPB that is not less than 30% of the aggregate UPB of all the mortgage loans so originated.

Where the fair value of the aggregate MSRs to be transferred for the applicable month is less than $200,000, the Company may, at its option, pay cash to PMT in an amount equal to such fair value instead of transferring such MSRs. The MSR recapture agreement expires, unless terminated earlier in accordance with the agreement, on September 12, 2020, subject to automatic renewal for additional 18-month periods, unless terminated earlier in accordance with the terms of the agreement.

Following is a summary of loan production activities and MSR recapture between the Company and PMT:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Mortgage servicing rights and excess servicing spread recapture incurred included in Net gains on mortgage loans for sale at fair value	$ 8,092	$ 7,836	$ 7,837
Fulfillment fee revenue	$ 86,465	$ 58,607	$ 48,719
Unpaid principal balance of mortgage loans fulfilled for PMT	$ 23,188,386	$ 14,014,603	$ 11,476,448
Sourcing fees paid to PMT	$ 11,976	$ 8,966	$ 4,676
Unpaid principal balance of mortgage loans purchased from PMT	$ 39,908,163	$ 29,867,580	$ 16,431,338
Proceeds from sale of mortgage loans held for sale to PMT	$ 21,541	$ 28,445	$ 8,081
Tax service fees received from PMT included in Mortgage loan origination fees	$ 6,690	$ 4,390	$ 2,080
Early purchase program fees earned from PMT included in Mortgage loan servicing fees	$ 30	$ —	$ —

Mortgage Loan Servicing

The Company has a loan servicing agreement with PMT. The servicing agreement provides for servicing fees of per loan monthly amounts based on the delinquency, bankruptcy and/or foreclosure status of the serviced mortgage loan or the REO. The Company also remains entitled to customary ancillary income and market-based fees and charges, including boarding and deboarding fees, liquidation and disposition fees, assumption, modification and origination fees and late charges relating to mortgage loans it services for the PMT. The servicing agreement was amended and restated as of September 12, 2016; however, the fee structure was not amended in any material respect.

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The base servicing fee rates for distressed whole mortgage loans range from $30 per month for current loans up to $100 per month for loans where the borrower has declared bankruptcy. The base servicing fee rate for REO is $75 per month. To the extent the Company facilitates rentals of PMT's REO under its REO rental program, the Company collects an REO rental fee of $30 per month per REO, an REO property lease renewal fee of $100 per lease renewal, and a property management fee in an amount equal to the Company's cost if property management services and/or any related software costs are outsourced to a third-party property management firm or 9% of gross rental income if the Company provides property management services directly. The Company is also entitled to retain any tenant paid application fees and late rent fees and seek reimbursement for certain third-party vendor fees.

- The base servicing fees for non-distressed mortgage loans are calculated through a monthly per-loan dollar amount, with the actual dollar amount for each loan based on whether the mortgage loan is a fixed-rate or adjustable-rate loan. The base servicing fee rates are $7.50 per month and $8.50 per month for fixed-rate loans and adjustable-rate loans, respectively.

- The Company is also entitled to certain activity-based fees for distressed whole mortgage loans that are charged based on the achievement of certain events. These fees range from 0.50% for a streamline modification to 1.50% for a liquidation and $500 for a deed-in-lieu of foreclosure. The Company is not entitled to earn more than one liquidation fee, reperformance fee or modification fee in any 18-month period.

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· Because PMT has limited employees and infrastructure, the Company is required to provide a range of services and activities significantly greater in scope than the services provided in connection with a customary servicing arrangement. For these services, the Company receives a supplemental servicing fee of $25 per month for each distressed whole mortgage loan. The Company is entitled to reimbursement for all customary, good faith reasonable and necessary out-of-pocket expenses incurred by the Company in performance of its servicing obligations.

· Except as otherwise provided in the MSR recapture agreement, when the Company effects a refinancing of a mortgage loan on behalf of PMT and not through a third-party lender and the resulting mortgage loan is readily saleable, or the Company originates a loan to facilitate the disposition of the real estate acquired by PMT in settlement of a mortgage loan, the Company is entitled to receive from PMT market-based fees and compensation consistent with pricing and terms the Company offers unaffiliated parties on a retail basis.

· The Company is entitled to retain any incentive payments made to it and to which it is entitled under HAMP; provided, however, that with respect to any such incentive payments paid to the Company in connection with a mortgage loan modification for which PMT previously paid the Company a modification fee, the Company is required to reimburse PMT an amount equal to the incentive payments.

The servicing agreement expires on September 12, 2020, subject to automatic renewal for additional 18-month periods, unless terminated earlier in accordance with the terms of the agreement.

Following is a summary of mortgage loan servicing fees earned from PMT:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Mortgage loans acquired for sale at fair value:			
Base and supplemental	$ 330	$ 260	$ 103
Activity-based	733	371	149
	1,063	631	252
Mortgage loans at fair value:			
Base and supplemental	11,078	16,123	18,953
Activity-based	18,521	12,437	19,608
	29,599	28,560	38,561
Mortgage servicing rights:			
Base and supplemental	19,461	16,911	13,515
Activity-based	492	321	194
	19,953	17,232	13,709
	$ 50,615	$ 46,423	$ 52,522

Investment Management Activities

The Company has a management agreement with PMT. The management agreement provides that:

- The base management fee is calculated quarterly and is equal to the sum of (i) 1.5% per year of PMT's average shareholders' equity up to $2 billion, (ii) 1.375% per year of PMT's average shareholders' equity in excess of $2 billion and up to $5 billion, and (iii) 1.25% per year of PMT's average shareholders' equity in excess of $5 billion.

- The performance incentive fee is calculated at a defined annualized percentage of the amount by which PMT's "net income," on a rolling four quarter basis and before deducting the incentive fee, exceeds certain levels of return on "equity."

The performance incentive fee is calculated quarterly and is equal to the sum of: (a) 10% of the amount by which PMT's net income for the quarter exceeds (i) an 8% return on equity plus the "high watermark," up to (ii) a 12% return on PMT's equity; plus (b) 15% of the amount by which PMT's net income for the quarter exceeds (i) a 12% return on PMT's equity plus the "high watermark," up to (ii) a 16% return on PMT's equity; plus (c) 20% of the amount by which PMT's net income for the quarter exceeds a 16% return on equity plus the "high watermark."

For the purpose of determining the amount of the performance incentive fee:

"Net income" is defined as net income or loss computed in accordance with GAAP adjusted for certain other non cash charges determined after discussions between the Company and PMT's independent trustees and approval by a majority of PMT's independent trustees.

"Equity" is the weighted average of the issue price per common share of all of PMT's public offerings, multiplied by the weighted average number of common shares outstanding (including restricted share units) in the rolling four quarter period.

The "high watermark" starts at zero and is adjusted quarterly. The quarterly adjustment reflects the amount by which the net income (stated as a percentage of return on equity) in that quarter exceeds or falls short of the lesser of 8% and the average Fannie Mae 30 year MBS yield (the "Target Yield") for the four quarters then ended. If the net income is lower than the Target Yield, the high watermark is increased by the difference. If the net income is higher than the Target Yield, the high watermark is reduced by the difference. Each time a performance incentive fee is earned, the high watermark returns to zero. As a result, the threshold amounts required for the Company to earn a performance incentive fee are adjusted cumulatively based on the performance of PMT's net income over (or under) the Target Yield, until the net income in excess of the Target Yield exceeds the then current cumulative high watermark amount, and a performance incentive fee is earned.

The base management fee and the performance incentive fee are both receivable quarterly in arrears. The performance incentive fee may be paid in cash or a combination of cash and PMT's common shares (subject to a limit of no more than 50% paid in common shares), at PMT's option.

The management agreement expires on September 12, 2020, subject to automatic renewal for additional 18-month periods, unless terminated earlier in accordance with the terms of the agreement. In the event of termination of the management agreement between PMT and the Company, the Company may be entitled to a termination fee in certain circumstances. The termination fee is equal to three times the sum of (a) the average annual base management fee, and (b) the average annual performance incentive fee earned by the Company, in each case during the 24-month period immediately preceding the date of termination.

Following is a summary of the base management and performance incentive fees earned from PMT:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Base management	$ 20,657	$ 22,851	$ 23,330
Performance incentive	—	1,343	11,705
	$ 20,657	$ 24,194	$ 35,035

Expense Reimbursement

Under the management agreement, PMT reimburses the Company for its organizational and operating expenses, including third-party expenses, incurred on PMT's behalf, it being understood that the Company and its affiliates shall allocate a portion of their personnel's time to provide certain legal, tax and investor relations services for the direct benefit of PMT. With respect to the allocation of the Company's and its affiliates personnel, from and after

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September 12, 2016, the Company shall be reimbursed $120,000 per fiscal quarter, such amount to be reviewed annually and not preclude reimbursement for any other services performed by the Company or its affiliates.

PMT is also required to pay its pro rata portion of rent, telephone, utilities, office furniture, equipment, machinery and other office, internal and overhead expenses of the Company and its affiliates required for PMT's and its subsidiaries' operations. These expenses will be allocated based on the ratio of PMT's proportion of gross assets compared to all remaining gross assets managed by the Company as calculated at each fiscal quarter end.

The Company received reimbursements from PMT for expenses as follows:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Reimbursement of:			
Common overhead incurred by the Company	$ 7,898	$ 10,742	$ 10,850
Expenses incurred on (the Company's) PMT's behalf, net	(163)	582	792
	$ 7,735	$ 11,324	$ 11,642
Payments and settlements during the period (1)	$ 143,542	$ 99,967	$ 99,987

(1) Payments and settlements include payments for management fees and correspondent production activities itemized in the preceding tables and netting settlements made pursuant to master netting agreements between the Company and PMT.

Conditional Reimbursement of Underwriting Fees

In connection with the IPO of PMT's common shares on August 4, 2009, the Company entered into an agreement with PMT pursuant to which PMT agreed to reimburse the Company for the $2.9 million payment that it made to the underwriters in such offering if PMT satisfied certain performance measures over a specified period (the "Conditional Reimbursement"). Effective February 1, 2013, the parties amended the terms of the reimbursement agreement to provide for the reimbursement to the Company of the Conditional Reimbursement if PMT is required to pay the Company performance incentive fees under the management agreement at a rate of $10 in reimbursement for every $100 of performance incentive fees earned. The reimbursement of the Conditional Reimbursement is subject to a maximum reimbursement in any particular 12 month period of $1.0 million and the maximum amount that may be reimbursed under the agreement is $2.9 million. The Company received Conditional Reimbursements totaling $0, $237,000 and $651,000 during the years ended December 31, 2016, 2015 and 2014, respectively.

In the event a termination fee is payable to the Company under the management agreement, and the Company has not received the full amount of the reimbursements and payments under the reimbursement agreement, such amount will be paid in full. The term of the reimbursement agreement expires on February 1, 2019.

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Amounts due from and payable to PMT are summarized below:

	December 31,	
	2016	2015
	(in thousands)	
Receivable from PMT:		
Servicing fees	$ 5,465	$ 3,682
Management fees	5,081	5,670
Correspondent production fees	2,371	2,729
Fulfillment fees	1,300	1,082
Allocated expenses and expenses incurred on PMT's behalf	1,046	4,490
Conditional Reimbursement	900	900
Interest on financing receivable	253	412
	$ 16,416	$ 18,965
Payable to PMT:		
Deposits made by PMT to fund servicing advances	$ 162,945	$ 153,573
Mortgage servicing rights recapture payable	707	781
Other	6,384	8,025
	$ 170,036	$ 162,379

Investing Activities

Financing Receivable from PMT

On December 19, 2016, the Company, through PLS, entered into a master repurchase agreement with one of PMT's wholly-owned subsidiaries, PennyMac Holdings, LLC ("PMH") (the "PMH Repurchase Agreement"), pursuant to which PMH may borrow from the Company for the purpose of financing PMH's participation certificates representing beneficial ownership in ESS. PLS then re-pledges such participation certificates to PNMAC GMSR ISSUER TRUST (the "Issuer Trust") under a master repurchase agreement by and among PLS, the Issuer Trust and PennyMac, as guarantor (the "PC Repurchase Agreement"). The Issuer Trust was formed for the purpose of allowing PLS to finance MSRs and ESS relating to such MSRs (the "GNMA MSR Facility").

In connection with the GNMA MSR Facility, PLS pledges and/or sells to the Issuer Trust participation certificates representing beneficial interests in MSRs and ESS pursuant to the terms of the PC Repurchase Agreement. In return, the Issuer Trust (a) has issued to PLS, pursuant to the terms of an indenture, the Series 2016-MSRVF1 Variable Funding Note, dated December 19, 2016, known as the "PNMAC GMSR ISSUER TRUST MSR Collateralized Notes, Series 2016-MSRVF1" (the "VFN"), and (b) may, from time to time pursuant to the terms of any supplemental indenture,

issue to institutional investors additional term notes ("Term Notes"), in each case secured on a pari passu basis by the participation certificates relating to the MSRs and ESS. The maximum principal balance of the VFN is $1,000,000,000.

The principal amount paid by PLS for the participation certificates under the PMH Repurchase Agreement is based upon a percentage of the market value of the underlying ESS. Upon PMH's repurchase of the participation certificates, PMH is required to repay PLS the principal amount relating thereto plus accrued interest (at a rate reflective of the current market and consistent with the weighted average note rate of the VFN and any outstanding Term Notes) to the date of such repurchase. PLS is then required to repay the Issuer Trust the corresponding amount under the PC Repurchase Agreement.

Prior to the Company's entry into the PMH Repurchase Agreement and PC Repurchase Agreement in connection with the GNMA MSR facility, the Company was a party to a repurchase agreement with Credit Suisse First Boston Mortgage Capital LLC ("CSFB") (the "MSR Repo"), pursuant to which it financed Ginnie Mae MSRs and servicing advance receivables and pledged to CSFB all of its rights and interests in any Ginnie Mae MSRs it owned or

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acquired, and a separate acknowledgement agreement with respect thereto, by and among Ginnie Mae, CSFB and the Company.

In connection with the MSR Repo described above, the Company and PMT entered into an underlying loan and security agreement, dated as of April 30, 2015, pursuant to which PMT was able to borrow up to $150 million from the Company for the purpose of financing ESS (the "Underlying LSA"). In order to secure its borrowings, PMT pledged its ESS to the Company under the Underlying LSA and the Company, in turn, re-pledged such ESS to CSFB under the MSR Repo. The principal amount of the borrowings under the Underlying LSA was based upon a percentage of the market value of the ESS pledged by PMT, subject to the $150 million sublimit described above. Pursuant to the Underlying LSA, PMT granted to the Company a security interest in all of its right, title and interest in, to and under the ESS pledged to secure the borrowings.

The Company and PMT agreed in connection with the Underlying LSA that PMT was required to repay the Company the principal amount of borrowings plus accrued interest to the date of such repayment, and the Company was required to repay CSFB the corresponding amount under the MSR Repo. Interest accrued on PMT's note relating to the Underlying LSA at a rate based on CSFB's cost of funds under the MSR Repo. PMT was also required to pay the Company a fee for the structuring of the Underlying LSA in an amount equal to the portion of the corresponding fee paid by the Company to CSFB and allocable to the $150 million relating to the ESS financing. The note receivable was replaced by the PMH Repurchase Agreement upon the closing of the GNMA MSR facility.

Following is a summary of investing activities between the Company and PMT:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Repurchase agreement with PennyMac Mortgage Investment Trust:			
Activity during the year:			
Refinancing of note receivable from PennyMac Mortgage Investment Trust	$ 150,000	$ —	$ —
Interest income	$ 253	$ —	$ —
Balance at end of year	$ 150,000	$ —	$ —
Note receivable from PennyMac Mortgage Investment Trust:			
Activity during the year:			
Advances to PennyMac Mortgage Investment Trust	$ —	$ 168,546	$ —
Repayments and refinancing with repurchase agreement from PennyMac Mortgage Investment Trust	$ (150,000)	$ (18,546)	$ —
Interest income	$ 7,577	$ 3,343	$ —
Balance at end of year	$ —	$ 150,000	$ —
Common shares of beneficial interest of PennyMac Mortgage Investment Trust:			
Activity during the year:			

Dividends received from PennyMac Mortgage Investment Trust	$ 141	$ 207	$ 134
Change in fair value of investment in common shares of PennyMac Mortgage Investment Trust	83	(437)	(140)
	$ 224	$ (230)	$ (6)
Balance at end of year:			
Fair value	$ 1,228	$ 1,145	
Number of shares	75	75	

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Financing Activities

Spread Acquisition and MSR Servicing Agreements

Effective February 1, 2013, the Company entered into a master spread acquisition and MSR servicing agreement (the "2/1/13 Spread Acquisition Agreement"), pursuant to which it sold to PMT or one of its wholly-owned subsidiaries the rights to receive certain ESS from MSRs acquired by the Company from banks and other third party financial institutions. The Company was generally required to service or subservice the related mortgage loans for the applicable Agency or investor. The terms of each transaction under the 2/1/13 Spread Acquisition Agreement were subject to the terms thereof, as modified and supplemented by the terms of a confirmation executed in connection with such transaction.

To the extent the Company refinanced any of the mortgage loans relating to the ESS sold to PMT, the 2/1/13 Spread Acquisition Agreement contained recapture provisions requiring that the Company transfer to PMT, at no cost, the ESS relating to a certain percentage of the UPB of the newly originated mortgage loans. To the extent the fair value of the aggregate ESS to be transferred for the applicable month was less than $200,000, the Company was, at its option, permitted to pay cash to PMT in an amount equal to such fair value instead of transferring such ESS.

On February 29, 2016, the parties terminated the 2/1/13 Spread Acquisition Agreement and all amendments thereto. In connection with the termination of the 2/1/13 Spread Acquisition Agreement, PLS reacquired from PMH all of its right, title and interest in and to all of the Fannie Mae ESS previously sold by PLS to PMH and then subject to such 2/1/13 Spread Acquisition Agreement.

On December 19, 2014, the Company entered into a second master spread acquisition and MSR servicing agreement with PMT (the "12/19/14 Spread Acquisition Agreement"). The terms of the 12/19/14 Spread Acquisition Agreement are substantially similar to the terms of the 2/1/13 Spread Acquisition Agreement, except that the Company only intends to sell ESS relating to Freddie Mac MSRs under the 12/19/14 Spread Acquisition Agreement.

To the extent the Company refinances any of the mortgage loans relating to the ESS it sells to PMT, the 12/19/14 Spread Acquisition Agreement also contains recapture provisions requiring that the Company transfer to PMT, at no cost, the ESS relating to a certain percentage of the UPB of the newly originated mortgage loans. To the extent the fair market value of the aggregate ESS to be transferred for the applicable month is less than $200,000, the Company may, at its option, pay cash to PMT in an amount equal to such fair market value in lieu of transferring such ESS.

On February 29, 2016, PLS also reacquired from PMT all of its right, title and interest in and to all of the Freddie Mac ESS previously sold by PLS to PMT and then subject to such 12/19/14 Spread Acquisition Agreement. The 12/19/14

Spread Acquisition Agreement remains in full force and effect.

On December 19, 2016, the Company amended and restated a third master spread acquisition and MSR servicing agreement with PMT (the "12/19/16 Spread Acquisition Agreement"). The terms of the 12/19/16 Spread Acquisition Agreement are substantially similar to the terms of the 2/1/13 Spread Acquisition Agreement and the 12/19/14 Spread Acquisition Agreement, except that the Company only intends to sell ESS relating to Ginnie Mae MSRs under the 12/19/16 Spread Acquisition Agreement. Pursuant to the 12/19/16 Spread Acquisition Agreement, the Company may sell to PMT, from time to time, the right to receive participation certificates representing beneficial ownership in ESS arising from Ginnie Mae MSRs acquired by the Company, in which case the Company generally would be required to service or subservice the related mortgage loans for Ginnie Mae. The primary purpose of the amendment and restatement was to facilitate the continued financing of the ESS owned by PMT in connection with the parties' participation in the GNMA MSR Facility.

To the extent the Company refinances any of the mortgage loans relating to the ESS it has acquired, the 12/19/16 Spread Acquisition Agreement also contains recapture provisions requiring that the Company transfer to PMT, at no cost, the ESS relating to a certain percentage of the unpaid principal balance of the newly originated mortgage loans. However, under the 12/19/16 Spread Acquisition Agreement, in any month where the transferred ESS relating to newly originated Ginnie Mae mortgage loans is not equivalent to at least 90% of the product of the excess servicing fee rate

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and the unpaid principal balance of the refinanced mortgage loans, the Company is also required to transfer additional ESS or cash in the amount of such shortfall. Similarly, in any month where the transferred ESS relating to modified Ginnie Mae mortgage loans is not equivalent to at least 90% of the product of the excess servicing fee rate and the unpaid principal balance of the modified mortgage loans, the 12/19/16 Spread Acquisition Agreement contains provisions that require the Company to transfer additional ESS or cash in the amount of such shortfall. To the extent the fair market value of the aggregate ESS to be transferred for the applicable month is less than $200,000, the Company may, at its option, wire cash to PMT in an amount equal to such fair market value in lieu of transferring such ESS.

Following is a summary of financing activity between the Company and PMT:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Excess servicing spread financing:			
Issuance:			
Cash	$ -	$ 271,554	$ 99,728
Pursuant to recapture agreement	$ 6,603	$ 6,728	7,342
Repayment	$ (69,992)	$ (78,578)	$ (39,256)
Settlement	$ (59,045)	$ -	$ -
Change in fair value	$ (23,923)	$ (3,810)	$ (28,663)
Interest expense	$ 22,601	$ 25,365	$ 13,292
Recapture incurred pursuant to refinancings by the Company of mortgage loans subject to excess servicing spread financing included in Net gains on mortgage loans held for sale at fair value	$ 6,529	$ 7,049	$ 7,828

Investment Funds

The Company has investment management agreements with the Investment Funds pursuant to which it receives management fees consisting of base management fees and carried interest. The management fees are based on the lesser of the funds' net asset values or aggregate capital contributions. The base management fees accrue at annual rates ranging from 1.5% to 2.0% of the applicable amounts on which they are based.

The Carried Interest that the Company recognizes from the Investment Funds is determined by the Investment Funds' performance and its contractual rights to share in the Investments Funds' returns in excess of the preferred returns, if any, accruing to the funds' investors. The Company recognizes Carried Interest as a participation in the profits in the Investment Funds after the investors in the Investment Funds have achieved a preferred return as defined in the fund agreements. After the investors have achieved the preferred returns specified in the respective fund agreements, a "catch up" return accrues to the Company until it receives a specified percentage of the preferred return. Thereafter, the Company participates in future returns in excess of the preferred return at the rates specified in the fund agreements.

The amount of the Carried Interest that the Company receives depends on the Investment Funds' future performance. As a result, the amount of Carried Interest recorded by the Company at period end is subject to adjustment based on future results of the Investment Funds and may be reduced as a result of subsequent performance. However, the Company is not required to pay guaranteed returns to the Investment Funds and the amount of Carried Interest will only be reversed to the extent of amounts previously recognized.

The Investment Funds will continue in existence through December 31, 2017, subject to two one-year extensions at the Company's discretion, in accordance with the terms of the limited liability company and limited partnership agreements that govern the Investment Funds.

The Company also has loan servicing agreements with the Investment Funds. The loan servicing to be provided by the Company under the loan servicing agreements with the Investment Funds includes collecting principal, interest and escrow account payments, if any, with respect to mortgage loans, as well as managing loss mitigation, which may include, among other things, collection activities, loan workouts, modifications, foreclosures and short sales. The Company may also engage in certain loan origination activities that include refinancing mortgage loans and arranging financings that facilitate sales of real estate owned properties.

The loan servicing agreements with the Investment Funds generally provide for fee revenue, which varies depending on the type and quality of the loans being serviced. The Company is also entitled to certain customary market-based fees and charges. This arrangement was modified, effective January 1, 2012, with respect to one of the Investment Funds. At that time, the Company settled its accrued servicing fee rebate and amended its loan servicing agreement with such fund to charge scheduled servicing fees in place of the previous "at cost" servicing arrangement.

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Amounts due from and payable to the Investment Funds are summarized below:

	December 31,	
	2016	2015
	(in thousands)	
Carried Interest due from Investment Funds:		
PNMAC Mortgage Opportunity Fund, LLC	$ 42,427	$ 41,893
PNMAC Mortgage Opportunity Fund Investors, LLC	28,479	28,033
	$ 70,906	$ 69,926
Receivable from Investment Funds:		
Management fees	$ 500	$ 655
Mortgage loan servicing fee rebate deposit	250	224
Expense reimbursements	238	45
Mortgage loan servicing fees	231	392
	$ 1,219	$ 1,316
Payable to Investment Funds:		
Deposits received to fund servicing advances	$ 20,221	$ 30,065
Other	172	364
	$ 20,393	$ 30,429

Exchanged Private National Mortgage Acceptance Company, LLC Unitholders

As discussed in Note 3, Significant Accounting Policies, the Company entered into a tax receivable agreement with PennyMac's existing unitholders on the date of the Company's initial public offering that will provide for the payment by the Company to PennyMac's exchanged unitholders in an amount equal to 85% of the amount of the benefits, if any, that the Company is deemed to realize as a result of (i) increases in tax basis resulting from such unitholders' exchanges and (ii) certain other tax benefits related to entering into the tax receivable agreement, including tax benefits attributable to payments under the tax receivable agreement.

Following is a summary of activity in Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Activity during the year:			
Liability resulting from unit exchanges	$ 2,190	$ 2,728	$ 5,346
Payments under tax receivable agreement	$ -	$ (5,132)	$ -
Revaluation of liability	$ (551)	$ 1,695	$ (1,378)
Balance at end of year	$ 75,954	$ 74,315	

Note 5—Earnings Per Share of Common Stock

Basic earnings per share of common stock is determined using net income attributable to the Company's common stockholders divided by the weighted average number of shares of common stock outstanding during the year. Diluted earnings per share of common stock is determined by dividing net income attributable to the Company's common stockholders by the weighted average number of dilutive shares of common stock outstanding during the year.

The Company applies the treasury stock method to determine the dilutive weighted average shares of common stock represented by the unvested stock-based compensation awards and the exchangeable PennyMac Class A units. The diluted earnings per share calculation assumes the exchange of these PennyMac Class A units for shares of common stock. Accordingly, earnings attributable to the Company's common stockholders is also adjusted to include the earnings allocated to the PennyMac Class A units after taking into account the income taxes applicable to the earnings attributable to the shares of common stock assumed to be exchanged.

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The following table summarizes the basic and diluted earnings per share calculations:

	Year ended December 31,		
	2016	2015	2014
	(in thousands, except per share data)		
Basic earnings per share of common stock:			
Net income attributable to PennyMac Financial Services, Inc. common stockholders	$ 66,079	$ 47,228	$ 36,842
Weighted average shares of common stock outstanding	22,161	21,755	21,250
Basic earnings per share of common stock	$ 2.98	$ 2.17	$ 1.73
Diluted earnings per share of common stock:			
Net income attributable to PennyMac Financial Services, Inc. common stockholders	$ 66,079	$ 47,228	$ 36,842
Effect of net income attributable to PennyMac Class A units exchangeable to common stock, net of income taxes	159,570	119,697	95,283
Diluted net income attributable to common stockholders	$ 225,649	$ 166,925	$ 132,125
Weighted average shares of common stock outstanding	22,161	21,755	21,250
Dilutive shares:			
PennyMac Class A units exchangeable to common stock	53,951	53,803	53,550
Non-vested PennyMac Class A units issuable under unit-based stock compensation plan and exchangeable to common stock	—	427	1,083
Common shares issuable under stock-based compensation plan	517	119	72
Diluted weighted average shares of common stock outstanding	76,629	76,104	75,955
Diluted earnings per share of common stock	$ 2.94	$ 2.17	$ 1.73

The following table summarizes the anti-dilutive weighted-average number of outstanding stock options and performance-based restricted stock units ("RSUs"):

	Year ended December 31,		
	2016	2015	2014
	(in thousands, except exercise price data)		
Stock options (1)	1,829	1,748	976
Performance-based RSUs (2)	2,054	2,358	1,055
Total anti-dilutive stock-based compensation units	3,883	4,106	2,031
Weighted-average exercise price of anti-dilutive stock options (1)	$ 15.81	$ 18.17	$ 18.23

(1) Certain stock options were outstanding but not included in the computation of diluted earnings per share because the weighted-average exercise prices were above the average stock prices during the year.

(2) Certain performance-based RSUs were outstanding but not included in the computation of earnings per share because the performance thresholds included in such RSUs have not been achieved.

Note 6—Loan Sales and Servicing Activities

The Company originates or purchases and sells mortgage loans in the secondary mortgage market without recourse for credit losses. However, the Company maintains continuing involvement with the mortgage loans in the form of servicing arrangements and the liability under representations and warranties it makes to purchasers and insurers of the mortgage loans.

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The following table summarizes cash flows between the Company and transferees as a result of the sale of mortgage loans in transactions where the Company maintains continuing involvement as servicer with the mortgage loans:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Cash flows:			
Sales proceeds	$ 49,633,909	$ 36,679,638	$ 18,793,619
Servicing fees received (1)	$ 261,163	$ 140,767	$ 113,364
Net servicing advances	$ 8,274	$ 9,842	$ 16,796
Year end information:			
Unpaid principal balance of mortgage loans outstanding at end of year	$ 89,516,155	$ 60,687,246	$ 36,564,434
Delinquencies:			
30-89 days	$ 2,545,970	$ 1,561,483	$ 852,826
90 days or more:			
Not in foreclosure	$ 735,263	$ 361,515	$ 181,522
In foreclosure	$ 137,856	$ 106,264	$ 20,180
Foreclosed	$ 2,552	$ 755	$ 591
Bankruptcy	$ 256,471	$ 120,761	$ 60,382

(1) Net of guarantees paid to the Agencies

The Company's mortgage servicing portfolio in UPB is summarized as follows:

	December 31, 2016		
	Servicing rights owned	Contract servicing and subservicing	Total mortgage loans serviced
	(in thousands)		
Investor:			
Non-affiliated entities	$ 131,252,002	$ —	$ 131,252,002
Affiliated entities	—	60,886,717	60,886,717
Mortgage loans held for sale	2,101,283	—	2,101,283
	$ 133,353,285	$ 60,886,717	$ 194,240,002
Commercial real estate loans subserviced for the Company	$ —	$ 22,338	$ 22,338
Delinquent mortgage loans:			
30 days	$ 3,240,640	$ 407,177	$ 3,647,817

60 days	1,035,871	145,720	1,181,591
90 days or more:			
Not in foreclosure	2,203,895	566,496	2,770,391
In foreclosure	937,204	685,001	1,622,205
Foreclosed	28,943	448,017	476,960
	$ 7,446,553	$ 2,252,411	$ 9,698,964
Bankruptcy	$ 793,517	$ 280,459	$ 1,073,976
Custodial funds managed by the Company (1)	$ 3,097,365	$ 736,398	$ 3,833,763

(1) Borrower and investor custodial cash accounts relate to mortgage loans serviced under the servicing agreements and are not recorded on the Company’s consolidated balance sheets. The Company earns placement fees on certain of the custodial funds it manages on behalf of the mortgage loans’ investors, which is recorded as part of the Interest income in the Company’s consolidated statements of income.

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	December 31, 2015		
	Servicing rights owned (in thousands)	Contract servicing and subservicing	Total mortgage loans serviced
Investor:			
Non-affiliated entities	$ 111,409,601	$ —	$ 111,409,601
Affiliated entities	—	47,810,632	47,810,632
Mortgage loans held for sale	1,052,485	—	1,052,485
	$ 112,462,086	$ 47,810,632	$ 160,272,718
Commercial real estate loans subserviced for the Company	$ —	$ 14,454	$ 14,454
Delinquent mortgage loans:			
30 days	$ 2,666,435	$ 349,859	$ 3,016,294
60 days	834,617	136,924	971,541
90 days or more:			
Not in foreclosure	1,270,236	788,410	2,058,646
In foreclosure	656,617	1,180,014	1,836,631
Foreclosed	23,372	542,031	565,403
	$ 5,451,277	$ 2,997,238	$ 8,448,515
Bankruptcy	$ 457,192	$ 342,132	$ 799,324
Custodial funds managed by the Company (1)	$ 2,242,146	$ 502,751	$ 2,744,897

(1) Borrower and investor custodial cash accounts relate to mortgage loans serviced under the servicing agreements and are not recorded on the Company’s consolidated balance sheets. The Company earns placement fees on certain of the custodial funds it manages on behalf of the mortgage loans’ investors, which is recorded as part of the Interest income in the Company’s consolidated statements of income.

Following is a summary of the geographical distribution of mortgage loans included in the Company’s servicing portfolio for the top five and all other states as measured by UPB:

State	December 31, 2016 (in thousands)	2015
California	$ 42,303,952	$ 39,007,363

Texas	16,037,426	12,191,722
Virginia	13,143,510	9,816,114
Florida	12,817,627	9,709,940
Maryland	8,564,923	6,151,945
All other states	101,372,564	83,395,634
	$ 194,240,002	$ 160,272,718

Note 7—Netting of Financial Instruments

The Company uses derivative financial instruments to manage exposure to interest rate risk for the IRLCs it makes to purchase or originate mortgage loans at specified interest rates, its inventory of mortgage loans held for sale and MSRs. The Company has elected to present net derivative asset and liability positions, and cash collateral obtained from (or posted to) its counterparties when subject to a master netting arrangement that is legally enforceable on all counterparties in the event of default. The derivatives that are not subject to a master netting arrangement are IRLCs.

Following are summaries of derivative assets and related netting amounts.

Offsetting of Derivative Assets

	December 31, 2016			December 31, 2015		
	Gross amount of recognized assets (in thousands)	Gross amount offset in the consolidated balance sheet	Net amount of assets in the consolidated balance sheet	Gross amount of recognized assets	Gross amount offset in the consolidated balance sheet	Net amount of assets in the consolidated balance sheet
Derivatives not subject to master netting arrangements - Interest rate lock commitments	$ 65,848	$ —	$ 65,848	$ 45,885	$ —	$ 45,885
Derivatives subject to a master netting arrangements:						
Forward purchase contracts	77,905	—	77,905	4,181	—	4,181
Forward sale contracts	28,324	—	28,324	4,965	—	4,965
MBS put options	3,934	—	3,934	404	—	404
MBS call options	217		217	—	—	—
Put options on interest rate futures purchase contracts	3,109	—	3,109	1,832	—	1,832
Call options on interest rate futures purchase contracts	203	—	203	1,555	—	1,555
Netting	—	(96,635)	(96,635)	—	(8,542)	(8,542)
	113,692	(96,635)	17,057	12,937	(8,542)	4,395
	$ 179,540	$ (96,635)	$ 82,905	$ 58,822	$ (8,542)	$ 50,280

Derivative Assets, Financial Assets, and Collateral Held by Counterparty

The following table summarizes by significant counterparty the amount of derivative asset positions after considering master netting arrangements and financial instruments or cash pledged that do not meet the accounting guidance qualifying for netting.

	December 31, 2016				December 31, 2015			
		Gross amount not offset in the consolidated balance sheet				Gross amount not offset in the consolidated balance sheet		
	Net amount of assets in the consolidated balance sheet	Financial instruments	Cash collateral received	Net amount	Net amount of assets in the consolidated balance sheet	Financial instruments	Cash collateral received	Net amount
	(in thousands)							
Interest rate lock commitments	$ 65,848	$ —	$ —	$ 65,848	$ 45,885	$ —	$ —	$ 45,885
Barclays Capital	12,002	—	—	12,002	72	—	—	72
RJ O'Brien	2,750	—	—	2,750	2,246	—	—	2,246
Jefferies & Co.	540	—	—	540	888	—	—	888
Goldman Sachs	—	—	—	—	471	—	—	471
Federal National Mortgage Association	—	—	—	—	453	—	—	453
Others	1,765	—	—	1,765	265	—	—	265
	$ 82,905	$ —	$ —	$ 82,905	$ 50,280	$ —	$ —	$ 50,280

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Offsetting of Derivative Liabilities and Financial Liabilities

Following is a summary of net derivative liabilities and assets sold under agreements to repurchase and related netting amounts. As discussed above, all derivatives with the exception of IRLCs are subject to master netting arrangements. The assets sold under agreements to repurchase do not qualify for netting.

	December 31, 2016			December 31, 2015		
	Gross amount of recognized liabilities (in thousands)	Gross amount offset in the consolidated balance sheet	Net amount of liabilities in the consolidated balance sheet	Gross amount of recognized liabilities	Gross amount offset in the consolidated balance sheet	Net amount of liabilities in the consolidated balance sheet
Derivatives not subject to master netting arrangements - IRLCs	$ 6,457	$ —	$ 6,457	$ 2,112	$ —	$ 2,112
Derivatives subject to a master netting arrangement:						
Forward purchase contracts	16,914	—	16,914	9,004	—	9,004
Forward sale contracts	85,035	—	85,035	7,497	—	7,497
Put options on interest rate futures purchase contracts	—	—	—	203	—	203
Call options on interest rate futures purchase contracts	—	—	—	47	—	47
Netting	—	(86,044)	(86,044)	—	(9,780)	(9,780)
	101,949	(86,044)	15,905	16,751	(9,780)	6,971
Total derivatives	108,406	(86,044)	22,362	18,863	(9,780)	9,083

Mortgage loans sold under agreements to repurchase:						
Amount outstanding	1,736,922	—	1,736,922	1,167,405	—	1,167,405
Unamortized debt issuance costs	(1,808)	—	(1,808)	(674)	—	(674)
	1,735,114	—	1,735,114	1,166,731	—	1,166,731
	$ 1,843,520	$ (86,044)	$ 1,757,476	$ 1,185,594	$ (9,780)	$ 1,175,814

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Derivative Liabilities, Financial Liabilities, and Collateral Held by Counterparty

The following table summarizes by significant counterparty the amount of derivative liabilities and assets sold under agreements to repurchase after considering master netting arrangements and financial instruments or cash pledged that does not qualify under the accounting guidance for netting. All assets sold under agreements to repurchase are secured by sufficient collateral or have fair value that exceeds the liability amount recorded on the consolidated balance sheets.

	December 31, 2016				December 31, 2015			
		Gross amounts not offset in the consolidated balance sheet				Gross amounts not offset in the consolidated balance sheet		
	Net amount of liabilities in the consolidated balance sheet (in thousands)	Financial instruments	Cash collateral pledged	Net amount	Net amount of liabilities in the consolidated balance sheet	Financial instruments	Cash collateral pledged	Net amount
Interest rate lock commitments	$ 6,457	$ —	$ —	$ 6,457	$ 2,112	$ —	$ —	$ 2,112
Credit Suisse First Boston Mortgage Capital LLC	961,533	(960,988)	—	545	795,179	(794,470)	—	709
Bank of America, N.A.	349,638	(342,769)	—	6,869	271,130	(269,510)	—	1,620
Morgan Stanley Bank, N.A.	189,756	(188,851)	—	905	49,763	(49,521)	—	242
JP Morgan Chase Bank, N.A.	135,322	(135,322)	—	—	672	—	—	672
Citibank, N.A.	81,555	(80,525)	—	1,030	55,948	(53,904)	—	2,044
Barclays Capital	28,467	(28,467)	—	—	—	—	—	—
Royal Bank of Canada	2,937	—	—	2,937	—	—	—	—
BNP Paribas	1,151	—	—	1,151	738	—	—	738
Federal National Mortgage Association	1,033	—	—	1,033	—	—	—	—

Goldman Sachs	823	—	—	823	—	—	—	—
Others	612	—	—	612	946	—	—	946
	$ 1,759,284	$ (1,736,922)	$ —	$ 22,362	$ 1,176,488	$ (1,167,405)	$ —	$ 9,083

Note 8—Fair Value

The Company's consolidated financial statements include assets and liabilities that are measured based on their fair values. The application of fair value may be on a recurring or nonrecurring basis depending on the accounting principles applicable to the specific asset or liability and whether management has elected to carry the item at its fair value as discussed in the following paragraphs.

Fair Value Accounting Elections

Management identified all of its non-cash financial assets, its originated MSRs relating to loans with initial interest rates of more than 4.5%, its purchased MSRs and its MSLs to be accounted for at fair value so changes in fair value will be reflected in income as they occur and more timely reflect the results of the Company's performance. Management has also identified its ESS financing to be accounted for at fair value as a means of hedging the related MSRs' fair value risk.

The Company's subsequent accounting for MSRs and MSLs is based on the class of MSR or MSL. Originated MSRs backed by mortgage loans with initial interest rates of less than or equal to 4.5% are accounted for using the amortization method. Originated MSRs backed by loans with initial interest rates of more than 4.5% and purchased MSRs financed in part by ESS are accounted for at fair value with changes in fair value recorded in current period income. MSLs are carried at fair value with changes in fair value recorded in current period income.

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Assets and Liabilities Measured at Fair Value on a Recurring Basis

Following is a summary of assets and liabilities that are measured at fair value on a recurring basis:

	December 31, 2016			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets:				
Short-term investments	$ 85,964	$ —	$ —	$ 85,964
Mortgage loans held for sale at fair value	—	2,125,544	47,271	2,172,815
Derivative assets:				
Interest rate lock commitments	—	—	65,848	65,848
Forward purchase contracts	—	77,905	—	77,905
Forward sales contracts	—	28,324	—	28,324
MBS put options	—	3,934	—	3,934
MBS call options	—	217	—	217
Put options on interest rate futures purchase contracts	3,109	—	—	3,109
Call options on interest rate futures purchase contracts	203	—	—	203
Total derivative assets before netting	3,312	110,380	65,848	179,540
Netting	—	—	—	(96,635)
Total derivative assets	3,312	110,380	65,848	82,905
Investment in PennyMac Mortgage Investment Trust	1,228	—	—	1,228
Mortgage servicing rights at fair value	—	—	515,925	515,925
	$ 90,504	$ 2,235,924	$ 629,044	$ 2,858,837
Liabilities:				
Excess servicing spread financing at fair value payable to PennyMac Mortgage Investment Trust	$ —	$ —	$ 288,669	$ 288,669
Derivative liabilities:				
Interest rate lock commitments	—	—	6,457	6,457
Forward purchase contracts	—	16,914	—	16,914
Forward sales contracts	—	85,035	—	85,035
Total derivative liabilities before netting	—	101,949	6,457	108,406
Netting	—	—	—	(86,044)
Total derivative liabilities	—	101,949	6,457	22,362
Mortgage servicing liabilities at fair value	—	—	15,192	15,192
	$ —	$ 101,949	$ 310,318	$ 326,223

	December 31, 2015			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets:				
Short-term investments	$ 46,319	$ —	$ —	$ 46,319
Mortgage loans held for sale at fair value	—	1,052,673	48,531	1,101,204
Derivative assets:				
Interest rate lock commitments	—	—	45,885	45,885
Forward purchase contracts	—	4,181	—	4,181
Forward sales contracts	—	4,965	—	4,965
MBS put options	—	404	—	404
Put options on interest rate futures purchase contracts	1,832	—	—	1,832
Call options on interest rate futures purchase contracts	1,555	—	—	1,555
Total derivative assets before netting	3,387	9,550	45,885	58,822
Netting	—	—	—	(8,542)
Total derivative assets	3,387	9,550	45,885	50,280
Investment in PennyMac Mortgage Investment Trust	1,145	—	—	1,145
Mortgage servicing rights at fair value	—	—	660,247	660,247
	$ 50,851	$ 1,062,223	$ 754,663	$ 1,859,195
Liabilities:				
Excess servicing spread financing at fair value payable to PennyMac Mortgage Investment Trust	$ —	$ —	$ 412,425	$ 412,425
Derivative liabilities:				
Interest rate lock commitments	—	—	2,112	2,112
Forward purchase contracts	—	9,004	—	9,004
Forward sales contracts	—	7,497	—	7,497
Put options on interest rate futures purchase contracts	203	—	—	203
Call options on interest rate futures purchase contracts	47	—	—	47
Total derivative liabilities before netting	250	16,501	2,112	18,863
Netting	—	—	—	(9,780)
Total derivative liabilities	250	16,501	2,112	9,083
Mortgage servicing liabilities at fair value	—	—	1,399	1,399
	$ 250	$ 16,501	$ 415,936	$ 422,907

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As shown above, certain of the Company's mortgage loans held for sale, IRLCs, MSRs at fair value, ESS financing at fair value and MSLs are measured using Level 3 fair value inputs. Following are roll forwards of these items for each of the three years ended December 31, 2016 where Level 3 fair value inputs were used:

	Year ended December 31, 2016			
	Mortgage loans held for sale	Net interest rate lock commitments (1)	Mortgage servicing rights	Total
	(in thousands)			
Assets:				
Balance, December 31, 2015	$ 48,531	$ 43,773	$ 660,247	$ 752,551
Purchases	1,608,627	—	146	1,608,773
Sales	(1,164,201)	—	—	(1,164,201)
Repayments	(38,420)	—	—	(38,420)
Interest rate lock commitments issued, net	—	429,598	—	429,598
Mortgage servicing rights resulting from mortgage loan sales	—	—	17,319	17,319
Changes in fair value included in income arising from:				
Changes in instrument-specific credit risk	3,469	—	—	3,469
Other factors	—	143,867	(161,787)	(17,920)
	3,469	143,867	(161,787)	(14,451)
Transfers of mortgage loans held for sale from Level 3 to Level 2 (2)	(410,735)	—	—	(410,735)
Transfers of interest rate lock commitments to mortgage loans held for sale	—	(557,847)	—	(557,847)
Balance, December 31, 2016	$ 47,271	$ 59,391	$ 515,925	$ 622,587
Changes in fair value recognized during the year relating to assets still held at December 31, 2016	$ 936	$ 59,391	$ (161,787)	$ (101,460)

(1) For the purpose of this table, the interest rate lock asset and liability positions are shown net.

(2) Mortgage loans held for sale are transferred from "Level 3" to "Level 2" as a result of the mortgage loan becoming saleable into active mortgage markets pursuant to a loan modification, borrower reperformance or resolution of deficiencies found in the borrowers' credit files.

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	Year ended December 31, 2016		
	Excess servicing spread financing	Mortgage servicing liabilities	Total
	(in thousands)		
Liabilities:			
Balance, December 31, 2015	$ 412,425	$ 1,399	$ 413,824
Issuance of excess servicing spread financing:			
For cash	—	—	—
Pursuant to a recapture agreement with PennyMac Mortgage Investment Trust	6,603	—	6,603
Accrual of interest	22,601	—	22,601
Repayments	(69,992)	—	(69,992)
Settlement	(59,045)	—	(59,045)
Mortgage servicing liabilities accepted for cash	—	10,139	10,139
Mortgage servicing liabilities resulting from mortgage loan sales	—	14,991	14,991
Changes in fair value included in income	(23,923)	(11,337)	(35,260)
Balance, December 31, 2016	$ 288,669	$ 15,192	$ 303,861
Changes in fair value recognized during the year relating to liabilities still outstanding at December 31, 2016	$ (16,713)	$ (11,337)	$ (28,050)

	Year ended December 31, 2015			
	Mortgage loans held for sale	Net interest rate lock commitments (1)	Mortgage servicing rights	Total
	(in thousands)			
Assets:				
Balance, December 31, 2014	$ 209,908	$ 32,401	$ 325,383	$ 567,692
Purchases	911,124	—	382,824	1,293,948
Sales	(803,424)	—	—	(803,424)
Repayments	(40,995)	—	—	(40,995)
Interest rate lock commitments issued, net	—	271,692	—	271,692
Mortgage servicing rights resulting from mortgage loan sales	—	—	18,013	18,013
Changes in fair value included in income arising from:				
Changes in instrument-specific credit risk	4,233	—	—	4,233
Other factors	—	73,068	(65,973)	7,095
	4,233	73,068	(65,973)	11,328
	(232,315)	—	—	(232,315)

Transfers of mortgage loans held for sale from Level 3 to Level 2 (2)				
Transfers of interest rate lock commitments to mortgage loans held for sale	—	(333,388)	—	(333,388)
Balance, December 31, 2015	$ 48,531	$ 43,773	$ 660,247	$ 752,551
Changes in fair value recognized during the year relating to assets still held at December 31, 2015	$ 4,305	$ 43,773	$ (65,973)	$ (17,895)

(1) For the purpose of this table, the interest rate lock asset and liability positions are shown net.

(2) Mortgage loans held for sale are transferred from "Level 3" to "Level 2" as a result of the mortgage loan becoming saleable into active mortgage markets pursuant to a loan modification, borrower reperformance or resolution of deficiencies found in the borrowers' credit files.

	Year ended December 31, 2015		
	Excess servicing spread financing	Mortgage servicing liabilities	Total
	(in thousands)		
Liabilities:			
Balance, December 31, 2014	$ 191,166	$ 6,306	$ 197,472
Issuance of excess servicing spread financing:			
For cash	271,554	—	271,554
Pursuant to a recapture agreement with PennyMac Mortgage Investment Trust	6,728	—	6,728
Mortgage servicing liabilities resulting from mortgage loan sales	—	20,442	20,442
Accrual of interest	25,365	—	25,365
Repayments	(78,578)	—	(78,578)
Changes in fair value included in income	(3,810)	(25,349)	(29,159)
Balance, December 31, 2015	$ 412,425	$ 1,399	$ 413,824
Changes in fair value recognized during the year relating to liabilities still outstanding at December 31, 2015	$ (3,810)	$ (25,349)	$ (29,159)

	Year ended December 31, 2014			
	Mortgage loans held for sale	Net interest rate lock commitments (1)	Mortgage servicing rights	Total
	(in thousands)			
Assets:				
Balance December 31, 2013	$ 3,933	$ 6,761	$ 224,913	$ 235,607
Purchases	1,049,838	—	135,480	1,185,318
Sales	(577,968)	—	(10,881)	(588,849)
Repayments	(22,016)	—	—	(22,016)
Interest rate lock commitments issued, net	—	181,159	—	181,159
Mortgage servicing rights resulting from mortgage loan sales	—	—	22,733	22,733
Changes in fair value included in income arising from:				
Changes in instrument-specific credit risk	—	—	—	—
Other factors	(3,534)	22,741	(46,862)	(27,655)
	(3,534)	22,741	(46,862)	(27,655)
Transfers of mortgage loans held for sale from Level 3 to Level 2 (2)	(240,345)	—	—	(240,345)
Transfers of interest rate lock commitments to mortgage loans held for sale	—	(178,260)	—	(178,260)

Balance, December 31, 2014	$ 209,908	$ 32,401	$ 325,383	$ 567,692
Changes in fair value recognized during the year relating to assets still held at December 31, 2014	$ (3,377)	$ 32,401	$ (47,618)	$ (18,594)

(1) For the purpose of this table, the interest rate lock asset and liability positions are shown net.

(2) Mortgage loans held for sale are transferred from "Level 3" to "Level 2" as a result of the mortgage loan becoming saleable into active mortgage markets pursuant to a loan modification, borrower reperformance or resolution of deficiencies found in the borrowers' credit files.

	Year ended December 31, 2014		
	Excess servicing spread financing	Mortgage servicing liabilities	Total
	(in thousands)		
Liabilities:			
Balance December 31, 2013	$ 138,723	$ —	$ 138,723
Issuance of excess servicing spread financing:			
For cash	99,728	—	99,728
Pursuant to a recapture agreement with PennyMac Mortgage Investment Trust	7,342	—	7,342
Mortgage servicing liabilities resulting from mortgage loan sales	—	1,965	1,965
Accrual of interest	13,292	—	13,292
Repayments	(39,256)	—	(39,256)
Changes in fair value included in income	(28,663)	4,341	(24,322)
Balance, December 31, 2014	$ 191,166	$ 6,306	$ 197,472
Changes in fair value recognized during the year relating to liabilities still outstanding at December 31, 2014	$ (28,663)	$ 4,341	$ (24,322)

The information used in the preceding roll forwards represents activity for any assets and liabilities measured at fair value on a recurring basis and identified as using "Level 3" significant fair value inputs at either the beginning or the end of the periods presented. The Company had transfers among the fair value levels arising from transfers of IRLCs to mortgage loans held for sale at fair value upon purchase or funding of the respective mortgage loans and from the return to salability in the active secondary market of certain mortgage loans held for sale.

Assets and Liabilities Measured at Fair Value under the Fair Value Option

Net changes in fair values included in income for assets and liabilities carried at fair value as a result of management's election of the fair value option by income statement line item are summarized below:

Year ended December 31,								
2016			2015			2014		
Net gains on mortgage loans held for sale at fair value	Net mortgage loan servicing fees	Total	Net gains on mortgage loans held for sale at fair value	Net mortgage loan servicing fees	Total	Net gains on mortgage loans held for sale at fair value	Net mortgage loan servicing fees	Total

	(in thousands)								
ts:									
gage held le at alue	$ 513,331	$ —	$ 513,331	$ 372,139	$ —	$ 372,139	$ 264,312	$ —	$ 264
gage cing s at alue	—	(161,787)	(161,787)	—	(65,973)	(65,973)	—	(54,205)	(54
	$ 513,331	$ (161,787)	$ 351,544	$ 372,139	$ (65,973)	$ 306,166	$ 264,312	$ (54,205)	$ 210
lities:									
ss cing d cing at alue ble to yMac gage tment	$ —	$ 23,923	$ 23,923	$ —	$ 3,810	$ 3,810	$ —	$ 28,663	$ 28,(
gage cing ities at alue	—	11,337	11,337	—	25,349	25,349	—	(4,341)	(4,3
	$ —	$ 35,260	$ 35,260	$ —	$ 29,159	$ 29,159	$ —	$ 24,322	$ 24,3

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Following are the fair value and related principal amounts due upon maturity of assets accounted for under the fair value option:

	December 31, 2016		
	Fair value	Principal amount due upon maturity	Difference
	(in thousands)		
Mortgage loans held for sale:			
Current through 89 days delinquent	$ 2,148,947	$ 2,077,034	$ 71,913
90 days or more delinquent:			
Not in foreclosure	19,227	19,399	(172)
In foreclosure	4,641	4,850	(209)
	$ 2,172,815	$ 2,101,283	$ 71,532

	December 31, 2015		
	Fair value	Principal amount due upon maturity	Difference
	(in thousands)		
Mortgage loans held for sale:			
Current through 89 days delinquent	$ 1,068,548	$ 1,016,314	$ 52,234
90 days or more delinquent:			
Not in foreclosure	26,399	26,999	(600)
In foreclosure	6,257	6,598	(341)
	$ 1,101,204	$ 1,049,911	$ 51,293

Assets Measured at Fair Value on a Nonrecurring Basis

Following is a summary of assets that are measured at fair value on a nonrecurring basis:

	December 31, 2016			
	Level 1	Level 2	Level 3	Total
	(in thousands)			

Mortgage servicing rights at lower of amortized cost or fair value	$ —	$ —	$ 1,093,242	$ 1,093,242
Real estate acquired in settlement of loans	—	—	1,152	1,152
	$ —	$ —	$ 1,094,394	$ 1,094,394

	December 31, 2015			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Mortgage servicing rights at lower of amortized cost or fair value	$ —	$ —	$ 202,991	$ 202,991
	$ —	$ —	$ 202,991	$ 202,991

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The following table summarizes the total gains (losses) on assets measured at fair values on a nonrecurring basis:

	Year ended December 31,		
	2016	2015	2014
Mortgage servicing rights at lower of amortized cost or fair value	$ (60,487)	$ (37,437)	$ (5,178)
Real estate acquired in settlement of loans	(86)	—	—
	$ (60,573)	$ (37,437)	$ (5,178)

Fair Value of Financial Instruments Carried at Amortized Cost

The Company's Financing receivable from PMT, Assets sold under agreements to repurchase, Mortgage loan participation and sale agreements, Notes payable, Obligations under capital lease and amounts receivable from and payable to the Advised Entities are carried at amortized cost.

The Company's borrowings carried at amortized cost do not have observable inputs and the fair value is measured using management's estimate of fair value, where the inputs into the determination of fair value require significant management judgment or estimation. The Company has classified these financial instruments as "Level 3" fair value liabilities due to the lack of observable inputs to estimate their fair values.

The Company has concluded that the fair value of the Financing receivable from PMT and the receivables from and payables to the Advised Entities approximate the carrying value due to their short terms and/or variable interest rates.

Valuation Techniques and Inputs

Most of the Company's financial assets, a portion of its MSRs and its ESS financing and MSLs are carried at fair value with changes in fair value recognized in current period income. Certain of the Company's financial assets and all of its MSRs, ESS and MSLs are "Level 3" fair value assets and liabilities which require the use of unobservable inputs that are significant to the estimation of the items' fair values. Unobservable inputs reflect the Company's own judgments about the factors that market participants use in pricing an asset or liability, and are based on the best information available under the circumstances.

Due to the difficulty in estimating the fair values of “Level 3” fair value assets and liabilities, management has assigned the responsibility for estimating the fair value of these items to specialized staff and subjects the valuation process to significant senior management oversight. The Company’s Financial Analysis and Valuation group (the “FAV group”) is the Company’s specialized staff responsible for estimating the fair values of “Level 3” fair value assets and liabilities other than IRLCs.

With respect to the non-IRLC “Level 3” valuations, the FAV group reports to the Company’s senior management valuation committee, which oversees and approves the valuations. The FAV group monitors the models used for valuation of the Company’s “Level 3” fair value assets and liabilities, including the models’ performance versus actual results, and reports those results to the Company’s senior management valuation committee. During 2016, the Company’s senior management valuation committee included the Company’s chief executive, financial, business development, risk and asset/liability management officers.

The FAV group is responsible for reporting to the Company’s senior management valuation committee on a monthly basis on the changes in the valuation of the “Level 3” fair value assets and liabilities, including major factors affecting the valuation and any changes in model methods and inputs. To assess the reasonableness of its valuations, the FAV group presents an analysis of the effect on the valuation of changes to the significant inputs to the models.

With respect to IRLCs, the Company has assigned responsibility for developing fair values to its Capital Markets Risk Management staff. The fair values developed by the Capital Markets Risk Management staff are reviewed

by the Company's Capital Markets Operations group.

Following is a description of the techniques and inputs used in estimating the fair values of "Level 2" and "Level 3" fair value assets and liabilities.

Mortgage Loans Held for Sale

Most of the Company's mortgage loans held for sale at fair value are saleable into active markets and are therefore categorized as "Level 2" fair value assets and their fair values are determined using their quoted market or contracted selling price or market price equivalent.

Certain of the Company's mortgage loans held for sale may become non-saleable into active markets due to identification of a defect by the Company or to the repurchase by the Company of a mortgage loan with an identified defect. The Company may also purchase certain delinquent government guaranteed or insured mortgage loans from Ginnie Mae guaranteed pools in its mortgage loan servicing portfolio.

The Company's right to purchase delinquent government guaranteed or insured mortgage loans arises as the result of the borrower's failure to make payments for at least three consecutive months preceding the month of repurchase by the Company and provides an alternative to the Company's obligation to continue advancing principal and interest at the coupon rate of the related Ginnie Mae security. Such repurchased mortgage loans may be resold to third-party investors and thereafter may be repurchased to the extent eligible for resale into a new Ginnie Mae guaranteed pool.

To the extent such mortgage loans have not become saleable into another Ginnie Mae guaranteed security by becoming current either through the borrower's reperformance or through completion of a modification of the mortgage loan's terms, the Company measures such mortgage loans along with mortgage loans with identified defects using "Level 3" fair value inputs.

The significant unobservable inputs used in the fair value measurement of the Company's "Level 3" fair value mortgage loans held for sale at fair value are discount rates, home price projections, voluntary prepayment/resale speeds and total prepayment speeds. Significant changes in any of those inputs in isolation could result in a significant change to the mortgage loans' fair value measurement. Increases in home price projections are generally accompanied by an increase in voluntary prepayment speeds.

Following is a quantitative summary of key "Level 3" fair value inputs used in the valuation of mortgage loans held for sale at fair value:

Key inputs	December 31, 2016	2015
Discount rate:		
Range	2.6% – 8.8%	2.5% – 9.1%
Weighted average	3.0%	2.8%
Twelve-month projected housing price index change:		
Range	2.0% – 4.5%	1.8% – 5.0%
Weighted average	3.7%	3.7%
Voluntary prepayment / resale speed (1):		
Range	0.1% – 24.4%	0.6% – 20.1%
Weighted average	20.9%	16.6%
Total prepayment speed (2):		
Range	0.1% – 39.8%	0.7% – 37.6%
Weighted average	34.3%	30.9%

(1) Voluntary prepayment/resale speed is measured using Life Voluntary Conditional Prepayment Rate ("CPR").

(2) Total prepayment speed is measured using Life Total CPR.

Changes in fair value attributable to changes in instrument specific credit risk are measured by reference to the change in the respective mortgage loan's delinquency status and performance history at period end from the later of the beginning of the period or acquisition date. Changes in fair value of mortgage loans held for sale are included in Net gains on mortgage loans held for sale at fair value in the Company's consolidated statements of income.

Derivative Financial Instruments

Interest Rate Lock Commitments

The Company categorizes IRLCs as a "Level 3" fair value asset or liability. The Company estimates the fair value of an IRLC based on quoted Agency MBS prices, its estimate of the fair value of the MSRs it expects to receive in the sale of the mortgage loans and the probability that the mortgage loan will fund or be purchased (the "pull-through rate").

The significant unobservable inputs used in the fair value measurement of the Company's IRLCs are the pull-through rate and the MSR component of the Company's estimate of the fair value of the mortgage loans it has committed to purchase. Significant changes in the pull-through rate or the MSR component of the IRLCs, in isolation, could result in significant changes in fair value measurement. The financial effects of changes in these inputs are generally inversely correlated as increasing interest rates have a positive effect on the fair value of the MSR component of IRLC fair value, but increase the pull-through rate for the mortgage loan principal and interest payment cash flow component, which has decreased in fair value. Changes in fair value of IRLCs are included in Net gains on mortgage loans acquired for sale at fair value and may be allocated to Net mortgage loan servicing fees as a hedge of the fair value of MSRs in the consolidated statements of income.

Following is a quantitative summary of key unobservable inputs used in the valuation of IRLCs:

	December 31,	
Key inputs	2016	2015
Pull-through rate:		
Range	35.0% – 100.0%	54.1% – 100.0%
Weighted average	84.9%	90.1%
Mortgage servicing rights value expressed as:		
Servicing fee multiple:		
Range	1.2 – 5.9	1.0 – 5.8
Weighted average	4.3	4.4

Percentage of unpaid principal balance:		
Range	0.3% – 2.8%	0.2% – 3.8%
Weighted average	1.3%	1.5%

Hedging Derivatives

The Company estimates the fair value of commitments to sell mortgage loans based on quoted MBS prices. These derivative financial instruments are categorized by the Company as "Level 1" fair value assets and liabilities for those based on exchange traded market prices or as "Level 2" fair value assets and liabilities for those based on observable MBS prices or interest rate volatilities in the MBS market. Changes in the fair value of hedging derivatives are included in Net gains on mortgage loans acquired for sale at fair value, or Net mortgage loan servicing fees-Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities, as applicable, in the consolidated statements of income.

Mortgage Servicing Rights

MSRs are categorized as "Level 3" fair value assets. The Company uses a discounted cash flow approach to estimate the fair value of MSRs. This approach consists of projecting net servicing cash flows discounted at a rate that

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management believes market participants would use in their determinations of fair value. The key inputs used in the estimation of the fair value of MSRs include the prepayment rates of the underlying mortgage loans, the applicable pricing spread (discount rate), and the per-loan annual cost to service the respective mortgage loans. Changes in the fair value of MSRs are included in Net mortgage loan servicing fees—Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities in the consolidated statements of income.

Following are the key inputs used in determining the fair value of MSRs at the time of initial recognition, excluding MSR purchases:

	Year ended December 31,					
	2016		2015		2014	
	Fair value	Amortized cost	Fair value	Amortized cost	Fair value	Amortized cost
	(Amount recognized and unpaid principal balance of underlying mortgage loans amounts in thousands)					
MSR and pool characteristics:						
Amount recognized	$17,319	$560,212	$18,013	$454,840	$24,698	$185,152
Unpaid principal balance of underlying mortgage loans	$1,452,779	$44,827,516	$1,463,150	$32,849,718	$1,982,505	$15,362,240
Weighted average servicing fee rate (in basis points)	33	30	33	34	33	31
Key inputs:						
Pricing spread (1):						
Range	7.2%-10.5%	7.2%-14.4%	7.0% - 14.4%	6.8% - 16.2%	7.8% - 16.2%	6.8% - 15.7%
Weighted average	9.2%	9.5%	9.3%	9.2%	11.4%	10.8%
Annual total prepayment speed (2):						
Range	3.3%-53.8%	2.8%-50.9%	1.9% - 62.4%	2.5% - 50.0%	7.6% - 46.1%	7.6% - 47.8%
Weighted average	11.8%	9.0%	11.8%	8.9%	9.3%	8.3%
Life (in years):						
Range	0.5-11.9	1.3-12.9	1.1-12.3	1.3 -12.0	1.5 -7.5	1.4 -7.5
Weighted average	6.8	8.1	6.5	7.2	6.9	7.0

Per-loan annual cost of servicing:						
Range	$68-$105	$68-$106	$59 – $101	$59 – $95	$53 – $100	$53 – $100
Weighted average	$88	$89	$77	$78	$86	$84

(1) Pricing spread represents a margin that is applied to a reference interest rates forward rate curve to develop periodic discount rates. The Company applies a pricing spread to the United States Dollar London Interbank Offered Rate ("LIBOR") curve for purposes of discounting cash flows relating to MSRs.

(2) Prepayment speed is measured using Life Total CPR.

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Following is a quantitative summary of key inputs used in the valuation and assessment for impairment of the Company's MSRs at year end and the effect on the fair value from adverse changes in those inputs (weighted averages are based upon UPB):

	December 31, 2016		December 31, 2015	
	Fair value	Amortized cost	Fair value	Amortized cost
	(Carrying value, unpaid principal balance of underlying mortgage loans and effect on fair value amounts in thousands)			
MSR and pool characteristics:				
Carrying value	$515,925	$1,111,747	$660,247	$751,688
Unpaid principal balance of underlying mortgage loans	$43,667,165	$85,509,941	$54,182,477	$56,420,227
Weighted average note interest rate	4.1%	3.7%	4.1%	3.8%
Weighted average servicing fee rate (in basis points)	32	31	32	32
Key inputs:				
Pricing spread (1):				
Range	7.6% – 14.9%	7.6% – 14.9%	7.2% – 14.1%	7.2% – 12.8%
Weighted average	10.1%	10.7%	8.9%	8.9%
Effect on fair value of (2):				
5% adverse change	($9,097)	($22,382)	($11,115)	($13,467)
10% adverse change	($17,872)	($43,889)	($21,857)	($26,472)
20% adverse change	($34,516)	($84,464)	($42,283)	($51,183)
Average life (in years):				
Range	1.3 – 8.6	1.6 – 9.4	1.9 – 9.0	1.8 – 9.1
Weighted average	6.7	8.1	6.9	7.4
Prepayment speed (3):				
Range	7.0% – 46.7%	6.6% – 43.9%	5.3% – 43.8%	5.7% – 46.7%
Weighted average	10.3%	8.7%	9.7%	9.5%
Effect on fair value of (2):				
5% adverse change	($8,818)	($16,636)	($12,475)	($14,360)
10% adverse change	($17,336)	($32,750)	($24,499)	($28,197)
20% adverse change	($33,533)	($63,513)	($47,286)	($54,406)
Annual per-loan cost of servicing:				
Range	$78-$101	$79-$101	$68 – $97	$68 – $95
Weighted average	$92	$92	$86	$84
Effect on fair value of (2):				
5% adverse change	($5,612)	($8,890)	($6,812)	($5,725)
10% adverse change	($11,225)	($17,781)	($13,624)	($11,451)
20% adverse change	($22,450)	($35,562)	($27,247)	($22,901)

(1) The Company applies a pricing spread to the United States Dollar LIBOR curve for purposes of discounting cash flows relating to MSRs.

(2)

For MSRs carried at fair value, an adverse change in one of the above-mentioned key inputs is expected to result in a reduction in fair value which will be recognized in income. For MSRs carried at lower of amortized cost or fair value, an adverse change in one of the above-mentioned key inputs may result in recognition of MSR impairment. The extent of the recognized MSR impairment will depend on the relationship of fair value to the carrying value of such MSRs.

(3) Prepayment speed is measured using Life Total CPR.

The preceding sensitivity analyses are limited in that they were performed at a particular point in time; only contemplate the movements in the indicated variables; do not incorporate changes to other variables; are subject to the accuracy of various models and inputs used; and do not incorporate other factors that would affect the Company's

overall financial performance in such events, including operational adjustments made by management to account for changing circumstances. For these reasons, the preceding estimates should not be viewed as earnings forecasts.

Mortgage Servicing Liabilities

MSLs are categorized as “Level 3” fair value liabilities. The Company uses a discounted cash flow approach to estimate the fair value of MSLs. This approach consists of projecting net servicing cash flows discounted at a rate that management believes market participants would use in their determinations of fair value. The key inputs used in the estimation of the fair value of MSLs include the prepayment rates of the underlying mortgage loans, the applicable pricing spread (discount rate), and the per-loan annual cost to service the respective mortgage loans. Changes in the fair value of MSLs are included in Net servicing fees—Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities in the consolidated statements of income.

Following are the key inputs used in determining the fair value of MSLs:

	December 31,	
	2016	2015
MSL and pool characteristics:		
Carrying value (in thousands)	$15,192	$1,399
Unpaid principal balance of underlying mortgage loans (in thousands)	$2,074,896	$806,897
Weighted average servicing fee rate (in basis points)	25	25
Key inputs:		
Pricing spread (1)	8.0%	6.4%
Average life (in years)	3.7	3.4
Prepayment speed (2)	31.7%	33.1%
Annual per-loan cost of servicing	$497	$258

(1) The Company applies a pricing spread to the United States Dollar LIBOR curve for purposes of discounting cash flows relating to MSLs.

(2) Prepayment speed is measured using Life Total CPR.

Excess Servicing Spread Financing at Fair Value

The Company categorizes ESS as a “Level 3” fair value liability. Because the ESS is a claim to a portion of the cash flows from MSRs, the fair value measurement of the ESS is similar to that of MSRs. The Company uses the same discounted cash flow approach to measuring the ESS as used to measure MSRs except that certain inputs relating to the cost to service the mortgage loans underlying the MSR and certain ancillary income are not included as these cash flows do not accrue to the holder of the ESS. The key inputs used in the estimation of ESS fair value include pricing spread (discount rate) and prepayment speed. Significant changes to either of those inputs in isolation could result in a significant change in the fair value of ESS. Changes in these key inputs are not necessarily directly related.

ESS is generally subject to fair value increases when mortgage interest rates increase. Increasing mortgage interest rates normally slow mortgage refinancing activity. Decreased refinancing activity increases the life of the mortgage loans underlying the ESS, thereby increasing its fair value, which is owed to PMT. Increases in the fair value of ESS decrease income and are included in Net mortgage loan servicing fees-Amortization, impairment and change in fair value of mortgage servicing rights and mortgage servicing liabilities.

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Following are the key inputs used in determining the fair value of ESS financing:

	December 31, 2016	2015
Carrying value (in thousands)	$288,669	$412,425
ESS and pool characteristics:		
Unpaid principal balance of underlying mortgage loans (in thousands)	$32,376,359	$51,966,405
Average servicing fee rate (in basis points)	34	32
Average excess servicing spread (in basis points)	19	17
Key inputs:		
Pricing spread (1):		
Range	3.8% – 4.8%	4.8% – 6.5%
Weighted average	4.4%	5.7%
Average life (in years):		
Range	1.4 – 8.6	1.4 – 9.0
Weighted average	6.8	6.9
Annualized prepayment speed (2):		
Range	7.0% – 41.3%	5.2% – 52.4%
Weighted average	10.5%	9.6%

(1) The Company applies a pricing spread to the United States Dollar LIBOR curve for purposes of discounting cash flows relating to ESS.

(2) Prepayment speed is measured using Life Total CPR.

Note 9—Mortgage Loans Held for Sale at Fair Value

Mortgage loans held for sale at fair value include the following:

	December 31, 2016	2015
	(in thousands)	
Government-insured or guaranteed	$ 1,984,020	$ 992,805
Conventional conforming	141,524	59,868
Purchased from Ginnie Mae pools serviced by the Company	40,437	42,600

Repurchased pursuant to representations and warranties	6,834	5,931
	$ 2,172,815	$ 1,101,204
Fair value of mortgage loans pledged to secure:		
Assets sold under agreements to repurchase	$ 1,422,255	$ 833,748
Mortgage loan participation and sale agreements	702,919	245,741
	$ 2,125,174	$ 1,079,489

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Note 10—Derivative Financial Instruments

The Company had the following derivative financial instruments recorded on its consolidated balance sheets:

Instrument	December 31, 2016 Notional amount (in thousands)	Fair value Derivative assets	Derivative liabilities	December 31, 2015 Notional amount	Fair value Derivative assets	Derivative liabilities
Derivatives not designated as hedging instruments:						
Interest rate lock commitments	4,279,611	$ 65,848	$ 6,457	3,487,366	$ 45,885	$ 2,112
Forward purchase contracts	12,746,191	77,905	16,914	5,254,293	4,181	9,004
Forward sales contracts	16,577,942	28,324	85,035	6,230,811	4,965	7,497
MBS put options	1,175,000	3,934	—	1,275,000	404	—
MBS call options	1,600,000	217	—	—	—	—
Put options on interest rate futures purchase contracts	1,125,000	3,109	—	1,650,000	1,832	203
Call options on interest rate futures purchase contracts	900,000	203	—	600,000	1,555	47
Interest rate swap futures purchase contracts	200,000	—	—	—	—	—
Total derivatives before netting		179,540	108,406		58,822	18,863
Netting		(96,635)	(86,044)		(8,542)	(9,780)
		$ 82,905	$ 22,362		$ 50,280	$ 9,083
Deposits placed with (received from) derivative counterparties, net		$ 10,591			$ (1,238)	

The following table summarizes the notional value activity for derivative contracts used in the Company's hedging activities:

	Year ended December 31, 2016 Balance		Dispositions/	Balance end of

Instrument	beginning of year	Additions	expirations	year
	(in thousands)			
Forward purchase contracts	5,254,293	210,412,697	(202,920,799)	12,746,191
Forward sale contracts	6,230,811	262,202,884	(251,855,753)	16,577,942
MBS put options	1,275,000	19,225,000	(19,325,000)	1,175,000
MBS call options	—	1,600,000	—	1,600,000
Put options on interest rate futures purchase contracts	1,650,000	15,331,000	(15,856,000)	1,125,000
Call options on interest rate futures purchase contracts	600,000	5,687,500	(5,387,500)	900,000
Put options on interest rate futures sale contracts	—	9,436,000	(9,436,000)	—
Call options on interest rate futures sale contracts	—	550,000	(550,000)	—
Treasury futures purchase contracts	—	585,800	(585,800)	—
Treasury futures sale contracts	—	585,800	(585,800)	—
Interest rate swap futures purchase contracts	—	400,000	(200,000)	200,000
Interest rate swap futures sale contracts	—	200,000	(200,000)	—

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Instrument	Year ended December 31, 2015 Balance beginning of year (in thousands)	Additions	Dispositions/ expirations	Balance end of year
Forward purchase contracts	2,634,218	103,571,212	(100,951,137)	5,254,293
Forward sale contracts	3,901,851	137,061,118	(134,732,158)	6,230,811
MBS put options	340,000	3,902,500	(2,967,500)	1,275,000
MBS call options	—	160,000	(160,000)	—
Put options on interest rate futures purchase contracts	755,000	8,790,000	(7,895,000)	1,650,000
Call options on interest rate futures purchase contracts	630,000	6,055,000	(6,085,000)	600,000
Put options on interest rate futures sale contracts	50,000	50,000	(100,000)	—
Call options on interest rate futures sale contracts	—	35,100	(35,100)	—

Instrument	Year ended December 31, 2014 Balance beginning of year (in thousands)	Additions	Dispositions/ expirations	Balance end of year
Forward purchase contracts	1,418,527	45,827,559	(44,611,868)	2,634,218
Forward sale contracts	2,659,000	63,117,808	(61,874,957)	3,901,851
MBS put options	185,000	1,730,000	(1,575,000)	340,000
MBS call options	105,000	590,000	(695,000)	—
Put options on interest rate futures purchase contracts	—	2,997,500	(2,242,500)	755,000
Call options on interest rate futures purchase contracts	—	2,385,000	(1,755,000)	630,000
Put options on interest rate futures sale contracts	—	425,000	(375,000)	50,000
Call options on interest rate futures sale contracts	—	1,025,000	(1,025,000)	—
Treasury futures purchase contracts	—	148,900	(148,900)	—
Treasury futures sale contracts	—	170,600	(170,600)	—
Eurodollar futures purchase contracts	—	26,000	(26,000)	—
Eurodollar futures sales contracts	—	26,000	(26,000)	—

Following are the gains (losses) recognized by the Company on derivative financial instruments and the income statement line items where such gains and losses are included:

Hedged item	Income statement line	Year ended December 31, 2016	2015	2014
		(in thousands)		
Interest rate lock commitments and mortgage loans held for sale	Net gains (losses) on mortgage loans held for sale	$ 20,619	$ (48,960)	$ (109,771)
Mortgage servicing rights	Net mortgage loan servicing fees	$ 26,405	$ (7,717)	$ 26,840

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Note 11—Mortgage Servicing Rights

Carried at Fair Value:

The activity in MSRs carried at fair value is as follows:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Balance at beginning of year	$ 660,247	$ 325,383	$ 224,913
Additions:			
Purchases	146	382,824	135,480
Mortgage servicing rights resulting from mortgage loan sales	17,319	18,013	24,698
	17,465	400,837	160,178
Sales	—	—	(10,881)
Change in fair value due to:			
Changes in valuation inputs used in valuation model (1)	(80,244)	7,352	(9,447)
Other changes in fair value (2)	(81,543)	(73,325)	(39,380)
Total change in fair value	(161,787)	(65,973)	(48,827)
Balance at end of year	$ 515,925	$ 660,247	$ 325,383

	December 31,	
	2016	2015
	(in thousands)	
Fair value of mortgage servicing rights pledged to secure:		
Assets sold under agreements to repurchase	$ 403,099	$ 37,705
Note payable	106,748	20,881
	$ 509,847	$ 58,586

(1) Principally reflects changes in discount rates and prepayment speed inputs, primarily due to changes in market interest rates.

(2) Represents changes due to realization of cash flows.

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Carried at Lower of Amortized Cost or Fair Value:

The activity in MSRs carried at the lower of amortized cost or fair value is summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Amortized cost:			
Balance at beginning of year	$ 798,925	$ 415,245	$ 263,373
Mortgage servicing rights resulting from mortgage loan sales	560,212	454,840	185,152
Amortization	(139,666)	(71,160)	(33,280)
Application of valuation allowance to write down mortgage servicing rights with other-than-temporary impairment	(12,777)	—	—
Balance at end of year	1,206,694	798,925	415,245
Valuation allowance:			
Balance at beginning of year	(47,237)	(9,800)	(4,622)
Additions	(60,487)	(37,437)	(5,178)
Application of valuation allowance to write down mortgage servicing rights with other-than-temporary impairment	12,777	—	—
Balance at end of year	(94,947)	(47,237)	(9,800)
Mortgage servicing rights, net	$ 1,111,747	$ 751,688	$ 405,445
Fair value of mortgage servicing rights at end of year	$ 1,112,302	$ 766,345	$ 416,802
Fair value of mortgage servicing rights at beginning of year	$ 766,345	$ 416,802	$ 269,422

	December 31,	
	2016	2015
	(in thousands)	
Fair value of mortgage servicing rights pledged to secure:		
Assets sold under agreements to repurchase	$ 1,076,223	$ 744,974
Note payable	31,601	—
	$ 1,107,824	$ 744,974

The following table summarizes the Company’s estimate of future amortization of its existing MSRs. This projection was developed using the inputs used by management in its December 31, 2016 valuation of MSRs. The inputs underlying the following estimate will change as market conditions and portfolio composition and behavior change, causing both actual and projected amortization levels to change over time.

Year ending December 31,	Estimated MSR amortization

	(in thousands)
2017	$ 134,697
2018	123,738
2019	112,616
2020	101,852
2021	91,814
Thereafter	641,977
	$ 1,206,694

Servicing fees relating to MSRs are recorded in Net mortgage loan servicing fees—Loan servicing fees—From non-affiliates on the consolidated statements of income; late charges and other ancillary fees relating to MSRs are recorded in Net mortgage loan servicing fees—Loan servicing fees—Ancillary and other fees on the consolidated statements of income. The fees are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Contractual servicing fees	$ 385,633	$ 290,474	$ 173,005
Ancillary and other fees:			
Late charges	19,341	5,835	4,320
Other	4,706	2,266	1,257
	$ 409,680	$ 298,575	$ 178,582

Mortgage Servicing Liabilities at Fair Value:

The activity in mortgage servicing liability carried at fair value is summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Balance at beginning of year	$ 1,399	$ 6,306	$ —
Mortgage servicing liabilities accepted for cash	10,139	—	—
Mortgage servicing liabilities resulting from mortgage loan sales	14,991	20,442	1,965
Changes in fair value due to:			
Changes in valuation inputs used in valuation model (1)	5,264	(15,653)	8,005
Other changes in fair value (2)	(16,601)	(9,696)	(3,664)
Total change in fair value	(11,337)	(25,349)	4,341
Balance at end of year	$ 15,192	$ 1,399	$ 6,306

(1) Principally reflects changes in discount rates and prepayment speed inputs, primarily due to changes in market interest rates.

(2) Represents changes due to realization of cash flows.

Note 12—Carried Interest Due from Investment Funds

The activity in the Company's Carried Interest due from Investment Funds is summarized as follows:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Balance at beginning of year	$ 69,926	$ 67,298	$ 61,142
Carried Interest recognized during the year	980	2,628	6,156
Balance at end of year	$ 70,906	$ 69,926	$ 67,298

The amount of the Carried Interest that will be received by the Company depends on the Investment Funds' future performance. As a result, the amount of Carried Interest recorded by the Company is based on the cash flows that would be produced assuming termination of the Investment Funds at year end and may be reduced in future periods based on the performance of the Investment Funds in those periods. However, the Company is not required to pay

guaranteed returns to the Investment Funds and the amount of any reduction to Carried Interest will be limited to the amounts previously recognized.

Management expects the Carried Interest to be collected by the Company when the Investment Funds liquidate. The Investment Funds will continue in existence through December 31, 2017, as a result of PCM's election to exercise the first of such three one-year extensions provided in their limited liability company and limited partnership agreements.

Note 13—Furniture, Fixtures, Equipment and Building Improvements

Furniture, fixtures, equipment and building improvements is summarized below:

	December 31,	
	2016	2015
	(in thousands)	
Furniture, fixtures, equipment and building improvements	$ 48,713	$ 26,862
Less: Accumulated depreciation and amortization	(17,392)	(10,551)
	$ 31,321	$ 16,311
Fixed assets pledged to secure obligations under capital lease	$ 25,134	$ 14,034

Depreciation and amortization expenses are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Depreciation and amortization expenses	$ 6,842	$ 4,149	$ 3,111
Less: Depreciation and amortization allocated to PMT(1)	(1,350)	(2,051)	(2,066)
Depreciation and amortization expenses included in Other expense	$ 5,492	$ 2,098	$ 1,045

(1) The Company's management agreement with PMT provides for allocation by the Company of certain common overhead cost to PMT.

Note 14—Capitalized Software

Capitalized software is summarized below:

	December 31,	
	2016	2015
	(in thousands)	
Cost	$ 13,457	$ 4,920
Less: Accumulated amortization	(2,252)	(1,895)
	$ 11,205	$ 3,025
Capitalized software pledged to secure obligation under capital lease	$ 515	$ 783

Software amortization expenses totaled $357,000, $324,000 and $320,000 for the years ended December 31, 2016, 2015 and 2014, respectively.

Note 15—Borrowings

The borrowing facilities described throughout this Note 15 contain various covenants, including financial covenants governing the Company's net worth, debt-to-equity ratio, profitability and liquidity. Management believes that the Company was in compliance with these covenants as of December 31, 2016.

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Assets Sold Under Agreements to Repurchase

The Company has multiple borrowing facilities in the form of asset sales under agreements to repurchase. These borrowing facilities are secured by mortgage loans held for sale at fair value or participation certificates backed by MSRs. Eligible mortgage loans and participation certificates backed by MSRs are sold at advance rates based on the fair value of the assets sold. Interest is charged at a rate based on the buyer's overnight cost of funds rate or on LIBOR depending on the terms of the respective agreement. Mortgage loans and MSRs financed under these agreements may be re-pledged by the lenders.

Assets sold under agreements to repurchase are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(dollars in thousands)		
Average balance of assets sold under agreements to repurchase	$ 1,438,181	$ 823,490	$ 529,832
Weighted average interest rate (1)	2.91 %	1.78 %	1.78 %
Total interest expense	$ 49,791	$ 21,377	$ 14,285
Maximum daily amount outstanding	$ 2,661,746	$ 1,976,744	$ 1,073,073

	December 31,	
	2016	2015
	(dollars in thousands)	
Carrying value:		
Unpaid principal balance	$ 1,736,922	$ 1,167,405
Unamortized debt issuance costs	(1,808)	(674)
	$ 1,735,114	$ 1,166,731
Unused amount (2)	$ 1,205,078	$ 40,178
Fair value of assets securing repurchase agreements:		
Mortgage loans held for sale	$ 1,422,255	$ 833,748
Mortgage servicing rights	$ 1,479,322	$ 782,679
Servicing advances	$ 81,306	$ 68,507
Financing receivable from PennyMac Mortgage Investment Trust	$ 150,000	$ —
Weighted average interest rate	3.02 %	2.50 %
Margin deposits placed with counterparties (3)	$ 3,000	$ 2,500

(1) Excludes the effect of amortization of commitment fees totaling $7.3 million, $7.4 million and $4.7 million for the years ended December 31, 2016, 2015 and 2014, respectively.

(2)

The amount the Company is able to borrow under asset repurchase agreements is tied to the fair value of unencumbered assets eligible to secure those agreements and the Company's ability to fund the agreements' margin requirements relating to the assets sold.

(3) Margin deposits are included in Other assets on the Company's consolidated balance sheets.

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Following is a summary of maturities of outstanding advances under repurchase agreements by maturity date:

Remaining maturity at December 31, 2016	Balance (dollars in thousands)
Within 30 days	$ 136,213
Over 30 to 90 days	1,193,709
Over 90 days	407,000
Total loans sold under agreements to repurchase	$ 1,736,922
Weighted average maturity (in months)	4.4

The amount at risk (the fair value of the assets pledged plus the related margin deposit, less the amount advanced by the counterparty and interest payable) relating to the Company's mortgage loans held for sale sold under agreements to repurchase is summarized by counterparty below as of December 31, 2016:

Counterparty	Amount at risk (in thousands)	Weighted average maturity of advances under repurchase agreement	Facility maturity
Credit Suisse First Boston Mortgage Capital LLC	$ 36,579	March 4, 2017	March 30, 2017
Credit Suisse First Boston Mortgage Capital LLC	$ 1,072,322	December 19, 2017	December 19, 2017
Bank of America, N.A.	$ 26,932	March 19, 2017	March 28, 2017
Morgan Stanley Bank, N.A.	$ 11,741	February 18, 2017	August 25, 2017
JP Morgan Chase Bank, N.A.	$ 8,076	March 20, 2017	August 18, 2017
Citibank, N.A.	$ 5,338	January 28, 2017	February 2, 2017
Barclays Bank PLC	$ 2,351	March 17, 2017	December 1, 2017
Royal Bank of Canada	$ —		September 18, 2017

The Company is subject to margin calls during the period the agreements are outstanding and therefore may be required to repay a portion of the borrowings before the respective agreements mature if the fair value (as determined by the applicable lender) of the mortgage loans securing those agreements decreases.

Mortgage Loan Participation and Sale Agreements

Three of the borrowing facilities secured by mortgage loans held for sale are in the form of mortgage loan participation and sale agreements. Participation certificates, each of which represents an undivided beneficial ownership interest in mortgage loans that have been pooled with Fannie Mae, Freddie Mac or Ginnie Mae, are sold to the lender pending the securitization of the mortgage loans and sale of the resulting securities. A commitment to sell the securities resulting from the pending securitization between the Company and a non-affiliate is also assigned to the lender at the time a participation certificate is sold.

The purchase price paid by the lender for each participation certificate is based on the trade price of the security, plus an amount of interest expected to accrue on the security to its anticipated delivery date, minus a present value adjustment, any related hedging costs and a holdback amount that is based on a percentage of the purchase price. The holdback amount is not required to be paid to the Company until the settlement of the security and its delivery to the lender.

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The mortgage loan participation and sale agreements are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(dollars in thousands)		
Average balance	$ 268,416	$ 157,918	$ 22,756
Weighted average interest rate (1)	1.75 %	1.45 %	1.43 %
Total interest expense	$ 5,523	$ 2,670	$ 427
Maximum daily amount outstanding	$ 1,268,871	$ 250,325	$ 144,846

	December 31,	
	2016	2015
	(dollars in thousands)	
Carrying value:		
Unpaid principal balance	$ 671,562	$ 234,898
Unamortized debt issuance costs	(136)	(26)
	$ 671,426	$ 234,872
Weighted average interest rate	2.02 %	1.45 %
Fair value of mortgage loans pledged to secure mortgage loan participation and sale agreements	$ 702,919	$ 245,741

(1) Excludes the effect of amortization of facility fees totaling $740,000 and $355,000 for the years ended December 31, 2016 and 2015, respectively.

Notes Payable

The Company entered into a revolving credit agreement, dated as of December 30, 2015, pursuant to which the lenders agreed to make revolving loans in an amount not to exceed $100 million. On November 18, 2016, the credit agreement was amended and restated. Pursuant to the amended and restated credit agreement, the lenders have agreed to make revolving loans in an amount not to exceed $150 million. The proceeds of the loans are to be used solely for working capital and general corporate purposes of the Company and its subsidiaries. Interest on the loans shall accrue at a per annum rate of interest equal to, at an election of the Company, either LIBOR plus the applicable margin or an alternate base rate (as defined in the credit agreement). During the existence of certain events of default, interest shall accrue at a higher rate. The maturity date of the loans is 364 days following the date of the credit agreement.

During December 2015, the Company entered into a note payable which is secured by MSRs relating to certain mortgage loans in the Company's servicing portfolio. Interest is charged at a rate based on LIBOR plus the applicable contract margin.

Notes payable are summarized below:

	Year ended December 31,		
	2016	2015	2014
	(dollars in thousands)		
Average balance	$ 108,475	$ 214,235	$ 102,546
Weighted average interest rate (1)	5.13 %	3.28 %	2.93 %
Total interest expense	$ 8,688	$ 9,336	$ 4,382
Maximum daily amount outstanding	$ 153,849	$ 469,380	$ 154,948

(1) Excluding the effect of amortization of debt issuance costs totaling $3.0 million and $2.1 million for the years ended December 31, 2016 and 2015, respectively.

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	December 31,	
	2016	2015
	(dollars in thousands)	
Carrying value:		
Unpaid principal balance	$ 151,935	$ 62,677
Unamortized debt issuance costs	(993)	(1,541)
	$ 150,942	$ 61,136
Weighted average interest rate	4.67 %	4.17 %
Unused amount	$ 98,065	$ 57,328
Assets pledged to secure notes payable:		
Cash	$ 91,788	$ 93,757
Carried Interest	$ 70,906	$ 69,926
Mortgage servicing rights	$ 138,349	$ 20,881

Obligations Under Capital Lease

In December 2015, the Company entered into a sale-leaseback transaction secured by certain fixed assets and capitalized software. The Company accounts for the sale-leaseback transaction as a capital lease. The capital lease matures on November 3, 2019 and bears interest at a spread over one month LIBOR.

Obligations under capital lease are summarized below:

	Year ended December 31,	
	2016	2015
	(dollars in thousands)	
During the year:		
Average balance	$ 18,620	$ 1,132
Weighted average interest rate	2.47 %	2.34 %
Total interest expense	$ 510	$ 18
Maximum daily amount outstanding	$ 24,242	$ 13,579
Year end:		
Unpaid principal balance	$ 23,424	$ 13,579
Weighted average interest rate	2.48 %	2.34 %
Assets pledged to secure obligations under capital lease:		

Furniture, fixtures and equipment	$ 25,134	$ 14,034
Capitalized software	$ 515	$ 783

Excess Servicing Spread Financing

In conjunction with the Company's purchase from non-affiliates of certain MSRs on pools of Agency-backed residential mortgage loans, the Company has entered into sale and assignment agreements with PMT. Under these agreements, the Company sold to PMT the right to receive ESS cash flows relating to certain MSRs. The Company retained all ancillary income associated with servicing the loans and a fixed base servicing fee. The Company continues to be the servicer of the mortgage loans and retains all servicing obligations, including responsibility to make servicing advances. The agreements are treated as financings and are carried at fair value with changes in fair value recognized in current period income.

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Following is a summary of ESS:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Balance at beginning of year	$ 412,425	$ 191,166	$ 138,723
Issuances of excess servicing spread to PennyMac Mortgage Investment Trust:			
For cash	—	271,554	99,728
Pursuant to a recapture agreement with PennyMac Mortgage Investment Trust	6,603	6,728	7,342
Accrual of interest	22,601	25,365	13,292
Repayment	(69,992)	(78,578)	(39,256)
Settlement (1)	(59,045)	—	—
Change in fair value	(23,923)	(3,810)	(28,663)
Balance at end of year	$ 288,669	$ 412,425	$ 191,166

(1) On February 29, 2016, the Company and PMT terminated that certain master spread acquisition and MSR servicing agreement that the parties entered into effective February 1, 2013 (the "2/1/13 Spread Acquisition Agreement") and all amendments thereto. In connection with the termination of the 2/1/13 Spread Acquisition Agreement, the Company reacquired from PMT all of its right, title and interest in and to all of the Fannie Mae ESS previously sold by the Company to PMT under the 2/1/13 Spread Acquisition Agreement and then subject to such 2/1/13 Spread Acquisition Agreement. On February 29, 2016, the Company also reacquired from PMT all of its right, title and interest in and to all of the Freddie Mac ESS previously sold to PMT by the Company.

Note 16—Liability for Losses Under Representations and Warranties

The activity in the Company's liability for representations and warranties is summarized below:

Year ended December 31,		
2016	2015	2014

	(in thousands)		
Balance at beginning of year	$ 20,611	$ 13,259	$ 8,123
Provision for losses on mortgage loans sold:			
Resulting from sales of mortgage loans	7,090	7,512	5,291
Reduction in liability due to change in estimate	(7,672)	—	—
Incurred losses	(962)	(160)	(155)
Balance at end of year	$ 19,067	$ 20,611	$ 13,259
Unpaid principal balance of mortgage loans subject to representations and warranties at year end	$ 90,650,605	$ 60,687,246	

The Company’s representations and warranties are generally not subject to stated limits of exposure. However, management believes that the current unpaid principal balance (“UPB”) of mortgage loans sold by the Company to date represents the maximum exposure to repurchases related to representations and warranties. Management believes the amount and range of reasonably possible losses in relation to the recorded liability is not material to the Company’s financial condition or income.

Note 17—Income Taxes

The Company files U.S. federal and state corporate income tax returns for PFSI and partnership returns for PennyMac. The Company's tax returns are subject to examination for 2013 and forward. PennyMac's federal partnership

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returns are subject to examination for 2013 and forward, and its state tax returns are generally subject to examination for 2012 and forward. No returns are currently under examination.

The following table details the Company's income tax expense.

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Current expense:			
Federal	$ (1,622)	$ —	$ 2,234
State	(244)	—	559
Total current expense	(1,866)	—	2,793
Deferred expense:			
Federal	38,082	24,819	19,126
State	9,887	6,816	4,803
Total deferred expense	47,969	31,635	23,929
Total provision for income taxes	$ 46,103	$ 31,635	$ 26,722

The provision for deferred income taxes for the years ended December 31, 2016, 2015 and 2014 primarily relates to the Company's investment in PennyMac partially offset by the Company's generation and utilization of a net operating loss and generation of tax credits. The portion attributable to its investment in PennyMac primarily relates to MSRs that PennyMac received pursuant to sales of mortgage loans held for sale at fair value and Carried Interest from the Investment Funds.

The following table is a reconciliation of the Company's provision for income taxes at statutory rates to the provision for income taxes at the Company's effective tax rate:

	Year ended December 31,		
	2016	2015	2014
Federal income tax statutory rate	35.0 %	35.0 %	35.0 %
Less: Rate attributable to noncontrolling interest	(24.8) %	(25.1) %	(25.0) %
State income taxes, net of federal benefit	1.6 %	1.6 %	1.5 %
Other	0.2 %	(0.2) %	0.5 %
Valuation allowance	0.0 %	0.0 %	0.0 %
Effective tax rate	12.0 %	11.3 %	12.0 %

The components of the Company's provision for deferred income taxes are as follows:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Investment in PennyMac	$ 40,493	$ 40,272	$ 20,981
Net operating loss	8,110	(8,637)	2,948
Tax credits	(634)	—	—
Valuation allowance	—	—	—
Total provision for deferred income taxes	$ 47,969	$ 31,635	$ 23,929

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The components of Deferred tax asset are as follows:

	December 31, 2016	December 31, 2015
	(in thousands)	
Taxes currently receivable	$ —	$ 3,883
Deferred income tax asset, net	—	14,495
Deferred tax asset	$ —	$ 18,378

The components of Income taxes payable are as follows:

	December 31, 2016	December 31, 2015
	(in thousands)	
Taxes currently receivable	$ 7,615	$ —
Deferred income tax liability, net	(32,703)	—
Income taxes payable	$ (25,088)	$ —

The tax effects of temporary differences that gave rise to deferred income tax assets and liabilities are presented below:

	December 31, 2016	December 31, 2015
	(in thousands)	
Deferred income tax assets (liabilities):		
Investment in PennyMac	$ (33,864)	$ 5,858
Net operating loss carryforward	527	8,637
Tax credits carryforward	634	—
Deferred income tax asset (liabilities), net	$ (32,703)	$ 14,495

The Company recorded a net deferred income tax liability in Income taxes payable in the consolidated balance sheet as of December 31, 2016. At December 31, 2015, the Company had a net deferred income tax asset that was recorded in Deferred tax asset. The current year change from a deferred tax asset to a deferred tax liability is attributable to the results of PennyMac operations, primarily from the deferral for tax purposes of income from MSRs and Carried Interest from Investment Funds. The increase in Income taxes payable was partially offset by increases in deferred tax

assets resulting from PennyMac members exchanging Class A units for PFSI Class A common stock. As existing members exchange their units, the Company records a deferred tax asset related to PennyMac's election pursuant to Section 754 of the Internal Revenue Code.

The Company recorded a deferred tax asset of $0.5 million related to a net operating loss of approximately $1.3 million which generally expires in 2036, and tax credits of $0.6 million, most of which have no expiration and some of which expire in 2036.

At December 31, 2016 and 2015, the Company had no unrecognized tax benefits and does not anticipate any unrecognized tax benefits. Should the recognition of any interest or penalties relative to unrecognized tax benefits be necessary, it is the Company's policy to record such expenses in the Company's income tax accounts. No such accruals existed at December 31, 2016 and 2015.

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Note 18—Noncontrolling Interest

Net income attributable to the Company’s common stockholders and the effects of changes in noncontrolling ownership interest in PennyMac is summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Net income attributable to PennyMac Financial Services, Inc. common stockholders	$ 66,079	$ 47,228	$ 36,842
Increase in the Company's additional paid-in capital for exchanges of Class A units of Private National Mortgage Acceptance Company, LLC to Class A common stock of PennyMac Financial Services, Inc.	$ 6,877	$ 4,982	$ 7,107
Shares of Class A common stock of PennyMac Financial Services, Inc. issued pursuant to exchange of Class A units of Private National Mortgage Acceptance Company, LLC	301	319	718

	December 31,	
	2016	2015
Percentage of noncontrolling interest in Private National Mortgage Acceptance Company, LLC	70.6%	71.1%

Note 19—Net Gains on Mortgage Loans Held for Sale

Net gains on mortgage loans held for sale at fair value is summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		

From non-affiliates:			
Cash loss:			
Mortgage loans	$ (62,283)	$ (82,709)	$ 43,665
Hedging activities	10,275	(47,150)	(90,507)
	(52,008)	(129,859)	(46,842)
Non-cash gain:			
Mortgage servicing rights and mortgage servicing liabilities resulting from mortgage loan sales, net	562,540	452,411	207,885
Provision for losses relating to representations and warranties:			
Pursuant to mortgage loan sales	(7,090)	(7,512)	(5,291)
Reduction in liability due to change in estimate	7,672	—	—
Change in fair value relating to mortgage loans and hedging derivatives held at year end:			
Interest rate lock commitments	15,618	11,372	25,640
Mortgage loans	2,796	3,949	12,733
Hedging derivatives	10,344	(1,810)	(19,264)
	539,872	328,551	174,861
Recapture payable to PennyMac Mortgage Investment Trust	(8,092)	(7,836)	(7,837)
	$ 531,780	$ 320,715	$ 167,024

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Note 20—Net Interest Expense

Net interest expense is summarized below:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Interest income:			
From non-affiliates:			
Short-term investments	$ 2,558	$ 506	$ 734
Mortgage loans held for sale at fair value	54,584	42,008	26,180
Placement fees relating to custodial funds	16,155	3,298	857
	73,297	45,812	27,771
From PennyMac Mortgage Investment Trust—Financing receivable	7,830	3,343	—
	81,127	49,155	27,771
Interest expense:			
To non-affiliates:			
Assets sold under agreements to repurchase	49,791	21,377	14,285
Mortgage loan participation and sale agreements	5,523	2,670	427
Notes payable	8,688	9,336	4,382
Obligations under capital lease	510	18	2
Interest shortfall on repayments of mortgage loans serviced for Agency securitizations	15,102	6,883	2,460
Interest on mortgage loan impound deposits	3,991	2,888	2,409
	83,605	43,172	23,965
To PennyMac Mortgage Investment Trust—Excess servicing spread financing at fair value	22,601	25,365	13,292
	106,206	68,537	37,257
	$ (25,079)	$ (19,382)	$ (9,486)

Note 21—Stock based Compensation

The Company's 2013 Equity Incentive Plan provides for grants of stock options, time-based and performance-based restricted stock units ("RSUs"), stock appreciation rights, performance units and stock grants. As of December 31, 2016,

the Company has 2.0 million units available for future awards.

Following is a summary of the stock-based compensation expense by instrument awarded:

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Performance-based RSUs	$ 9,475	$ 9,293	$ 3,075
Stock options	4,464	5,713	5,101
Time-based RSUs	2,494	2,294	1,824
Exchangeable PNMAC units	72	221	331
	$ 16,505	$ 17,521	$ 10,331

Performance Based RSUs

The performance based RSUs provide for the issuance of shares of the Company's Class A common stock based on the attainment of earnings per share and/or total shareholder return goals and are generally adjusted for grantee job performance ratings. The grantees' satisfaction of the performance goals will be established by review of a

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committee of the Company's board of directors. Approximately 414,000 shares vested under the grants with a performance period ended December 31, 2016 will be issued to the grantees in April 2017. No shares were issued relating to the RSUs with a performance period ended December 31, 2015 as the established performance goals were not achieved.

The performance based RSUs contain performance goals (attainment of earnings per share) and the grants awarded during the year ended December 31, 2014 included a market goal (total shareholder return). The actual amount of shares earned could vary from zero, if the performance goals are not met, to as much as 150% of target, if the performance goals are meaningfully exceeded. The Company separately accounts for the performance and market goals when recognizing compensation expense relating to performance based RSUs.

The grant date fair value of the market goal component of the performance based RSUs is measured using a variant of the Black Scholes model.

Following are the key inputs for grants made:

	Year ended December 31, 2014
Expected volatility (1)	42%
Expected dividends	0%
Risk-free rate	0.1% - 0.7%
Expected grantee forfeiture rate	4.3% - 20.2%

(1) Based on historical volatilities of comparable companies' common stock.

The fair value of the performance goal component of the performance based RSUs is measured based on the fair value of the Company's common stock at the grant date, taking into consideration management's estimate of the expected outcome of the performance goal, and the number of shares to be forfeited during the vesting period.

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Following is a summary of performance based RSU activity:

	Year ended December 31,		
	2016	2015	2014
	(in thousands, except per unit amounts)		
Number of units:			
Outstanding at beginning of year	2,350	1,257	491
Granted	813	1,143	789
Vested	—	—	—
Forfeited or cancelled	(688)	(50)	(23)
Outstanding at end of year	2,475	2,350	1,257
Weighted average grant date fair value per unit:			
Outstanding at beginning of year	$ 16.30	$ 15.48	$ 11.30
Granted	$ 11.28	$ 17.21	$ 14.35
Vested	—	—	—
Forfeited	$ 16.87	$ 16.46	$ 15.94
Outstanding at end of year	$ 14.24	$ 16.30	$ 15.48
Compensation expense recorded during the year	$ 9,475	$ 9,293	$ 3,075

	December 31,	
	2016	2015
	(in thousands, except for vesting periods)	
Unamortized compensation cost	$ 10,048	$ 16,620
Number of shares expected to vest	2,109	2,141
Weighted average remaining vesting period (in months)	12	17

Stock Options

The stock option award agreements provide for the award of stock options to purchase the optioned common stock. In general, and except as otherwise provided by the agreement, one third of the stock option awards vests on each of the first, second, and third anniversaries of the grant date, subject to the recipient's continued service through each anniversary. Each stock option has a term of ten years from the date of grant but expires (1) immediately upon termination of the holder's employment or other association with the Company for cause, (2) one year after the holder's employment or other association is terminated due to death or disability and (3) three months after the holder's employment or other association is terminated for any other reason.

The fair value of each stock option award is estimated on the date of grant using a variant of the Black Scholes model based on the following inputs:

	Year ended December 31,		
	2016	2015	2014
Expected volatility (1)	28%	41%	42%
Expected dividends	0%	0%	0%
Risk-free interest rate	0.3% - 2.1%	0.1% - 2.3%	0.1% - 2.9%
Expected grantee forfeiture rate	0.0% -20.2%	0.0% -18.7%	4.3% - 20.2%

(1) Based on historical volatilities of the Company’s common stock for 2016 grants and based on historical volatilities of comparable companies’ common stock for 2015 and 2014 grants.

The Company uses its historical employee departure behavior to estimate grantee forfeiture rates used in the option pricing model. The expected term of common stock options granted is derived from the option pricing model and represents the period of time that common stock options granted are expected to be outstanding. The risk free interest

rate for periods within the contractual term of the common stock option is based on the U.S. Treasury yield curve in effect at the time of grant.

The table below summarizes stock option award activity and compensation expense:

	Year ended December 31,		
	2016	2015	2014
	(in thousands, except per option amounts)		
Number of Stock Options:			
Outstanding at beginning of year	1,845	1,167	419
Granted	962	715	769
Exercised	(9)	—	—
Forfeited	(60)	(37)	(21)
Outstanding at end of year	2,738	1,845	1,167
Weighted average exercise price per option:			
Outstanding at beginning of year	$ 18.17	$ 18.23	$ 21.03
Granted	$ 11.29	$ 17.52	$ 17.22
Exercised	$ 17.33	$ 17.26	$ —
Forfeited	$ 15.66	$ 17.88	$ 18.71
Outstanding at end of year	$ 15.81	$ 18.17	$ 18.23
Compensation expense recorded during the year	$ 4,464	$ 5,713	$ 5,101

	December 31,	
	2016	2015
	(in thousands, except for time periods)	
Number of options exercisable at end of year	1,104	533
Weighted average remaining contractual term (in years):		
Outstanding	8.0	8.6
Exercisable	7.1	8.0
Aggregate intrinsic value:		
Outstanding	$ 5,042	$ —
Exercisable	$ 13	$ —
Expected vesting amounts at year end:		
Number of options expected to vest	1,504	1,280
Weighted average vesting period (in months)	11	17

Time Based RSUs

The RSU grant agreements provide for the award of time based RSUs, entitling the award recipient to one share of the Company's Class A common stock for each RSU. One third of the time based RSUs vest on each of the first, second, and third anniversaries of the grant date, subject to the recipient's continued service through each anniversary.

Compensation cost relating to time based RSUs is based on the grant date fair value of the Company's Class A common stock and the number of shares expected to vest. For purposes of estimating the cost of the time based RSUs granted, the Company assumes forfeiture rates of 4.3% 20.2% per year based on the grantees' employee classification.

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Following is a summary of time based RSU activity:

	Year ended December 31,		
	2016	2015	2014
	(in thousands, except per unit amounts)		
Number of units:			
Outstanding at beginning of year	271	202	100
Granted	261	150	147
Vested	(127)	(75)	(33)
Forfeited	(23)	(6)	(12)
Outstanding at end of year	382	271	202
Weighted average grant date fair value per unit:			
Outstanding at beginning of year	$ 17.81	$ 17.92	$ 18.04
Granted	$ 11.77	$ 17.87	$ 16.73
Vested	$ 17.99	$ 18.25	$ 20.46
Forfeited	$ 15.55	$ 26.07	$ 10.72
Outstanding at end of year	$ 13.71	$ 17.81	$ 17.92
Compensation expense recorded during the year	$ 2,494	$ 2,294	$ 1,824

	December 31,	
	2016	2015
	(in thousands, except for vesting periods)	
Unamortized compensation cost	$ 1,742	$ 2,270
Number of shares expected to vest	339	232
Weighted average remaining vesting period (in months)	12	20

Note 22—Supplemental Cash Flow Information

Year ended December 31,

	2016	2015	2014
	(in thousands)		
Cash paid for interest	$ 104,938	$ 69,317	$ 36,320
Cash paid for income taxes	$ 1,866	$ 1,909	$ 4,800
Non-cash investing activity:			
Mortgage servicing rights resulting from mortgage loan sales	$ 577,531	$ 472,853	$ 209,850
Mortgage servicing liabilities resulting from mortgage loan sales	$ 14,991	$ 20,442	$ 1,965
Transfer of Note receivable from PennyMac Mortgage Investment Trust to Asset sold under agreement to repurchase from PennyMac Mortgage Investment Trust	$ 150,000	$ —	$ —
Non-cash financing activity:			
Transfer of excess servicing spread to PennyMac Mortgage Investment Trust pursuant to a recapture agreement	$ 6,603	$ 6,728	$ 7,342
Unpaid distribution to Private National Mortgage Acceptance Company, LLC members	$ 7,585	$ —	$ —
Issuance of common stock in settlement of director fees	$ 313	$ 297	$ 222

Note 23—Regulatory Capital and Liquidity Requirements

The Company, through PLS and PennyMac, is required to maintain specified levels of equity to remain a seller/servicer in good standing with the Agencies. Such equity requirements generally are tied to the size of the Company’s loan servicing portfolio or loan origination volume.

The Company is subject to financial eligibility requirements for sellers/servicers eligible to sell or service mortgage loans with Fannie Mae and Freddie Mac. The eligibility requirements include tangible net worth of $2.5

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million plus 25 basis points (0.25%) of the Company’s total 1-4 unit servicing portfolio, excluding mortgage loans subserviced for others and a liquidity requirement equal to 3.5 basis points of the aggregate UPB serviced for the Agencies plus 200 basis points of total nonperforming Agency UPB in excess of 6.0%.

The Company is also subject to financial eligibility requirements for Ginnie Mae single-family issuers. The eligibility requirements include net worth of $2.5 million plus 35 basis points of PLS' outstanding Ginnie Mae single-family obligations and a liquidity requirement equal to the greater of $1.0 million or 10 basis points of PLS' outstanding Ginnie Mae single-family securities.

The Agencies’ capital and liquidity requirements, the calculations of which are specified by each Agency, are summarized below:

	December 31, 2016		December 31, 2015	
Agency–company subject to requirement	Balance (1)	Requirement	Balance (1)	Requirement
	(in thousands)			
Capital				
Fannie Mae & Freddie Mac - PLS	$ 1,289,464	$ 335,883	$ 835,157	$ 283,655
Ginnie Mae - PLS	$ 1,085,549	$ 455,542	$ 633,222	$ 386,732
Ginnie Mae - PennyMac	$ 1,261,565	$ 501,097	$ 894,731	$ 425,405
HUD - PLS	$ 1,085,549	$ 2,500	$ 633,222	$ 2,500
Liquidity				
Fannie Mae & Freddie Mac - PLS	$ 179,230	$ 45,930	$ 145,431	$ 38,936
Ginnie Mae - PLS	$ 179,230	$ 115,304	$ 145,431	$ 95,868

(1) Calculated in compliance with the respective Agency’s requirements.

Noncompliance with an Agency’s requirements can result in such Agency taking various remedial actions up to and including terminating PennyMac’s ability to sell loans to and service loans on behalf of the respective Agency.

Note 24—Commitments and Contingencies

Litigation

The business of the Company involves the collection of numerous accounts, as well as the validation of liens and compliance with various state and federal lending and servicing laws. Accordingly, the Company may be involved in proceedings, claims, and legal actions arising in the ordinary course of business. As of December 31, 2016, the

Company was not involved in any legal proceedings, claims, or actions that in management’s view would be reasonably likely to have a material adverse effect on the Company.

Commitments to Purchase and Fund Mortgage Loans

	December 31, 2016 (in thousands)
Commitments to purchase mortgage loans from PennyMac Mortgage Investment Trust	$ 2,508,788
Commitments to fund mortgage loans	1,770,823
	$ 4,279,611

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Leases

The Company leases office facilities. Rent expense during the years ended December 31, 2016, 2015 and 2014 was $9.1 million, $4.6 million and $4.2 million, respectively.

The following table provides a summary of future minimum lease payments required under lease agreements, which may also contain renewal options as of December 31, 2016:

	Future minimum lease payments (in thousands)
2017	$ 9,516
2018	12,702
2019	13,227
2020	12,885
2021	11,304
Thereafter	41,152
	$ 100,786

Note 25—Segments

The Company operates in three segments: loan production, loan servicing and investment management.

Two of the segments are in the mortgage banking business: loan production and loan servicing. The loan production segment performs mortgage loan origination, acquisition and sale activities. The loan servicing segment performs servicing of newly originated mortgage loans, execution and management of early buyout transactions and servicing of mortgage loans sourced and managed by the investment management segment for the Advised Entities, including executing the loan resolution strategy identified by the investment management segment relating to distressed mortgage loans.

The investment management segment represents the activities of the Company’s investment manager, which include sourcing, performing diligence, bidding and closing investment asset acquisitions, managing correspondent

production activities for PMT and managing the acquired assets for the Advised Entities.

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Financial performance and results by segment are as follows:

	Year ended December 31, 2016				
	Mortgage Banking			Investment	
	Production	Servicing	Total	Management	Total
	(in thousands)				
Revenue: (1)					
Net gains (losses) on mortgage loans held for sale at fair value	$ 464,027	$ 67,753	$ 531,780	$ —	$ 531,780
Loan origination fees	125,534	—	125,534	—	125,534
Fulfillment fees from PennyMac Mortgage Investment Trust	86,465	—	86,465	—	86,465
Net servicing fees	—	185,466	185,466	—	185,466
Management fees	—	—	—	22,746	22,746
Carried Interest from Investment Funds	—	—	—	980	980
Net interest income (expense):	—	—		—	
Interest income	48,944	32,182	81,126	1	81,127
Interest expense	32,669	73,537	106,206	50	106,256
	16,275	(41,355)	(25,080)	(49)	(25,129)
Other	2,104	1,022	3,126	319	3,445
Total net revenue	694,405	212,886	907,291	23,996	931,287
Expenses	278,309	248,985	527,294	21,510	548,804
Income before provision for income taxes and non-segment activities	416,096	(36,099)	379,997	2,486	382,483
Non-segment activities (2)	—	—	—	—	600
Income before provision for income taxes	$ 416,096	$ (36,099)	$ 379,997	$ 2,486	$ 383,083
Segment assets at year end (3)	$ 2,195,330	$ 2,841,551	$ 5,036,881	$ 91,517	$ 5,128,398

(1) All revenues are from external customers.
(2) Primarily represents repricing Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement
(3) Excludes parent Company assets, which consist primarily of working capital of $5.5 million.

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	Year ended December 31, 2015				
	Mortgage Banking			Investment	
	Production	Servicing	Total	Management	Total
	(in thousands)				
Revenue: (1)					
Net gains on mortgage loans held for sale at fair value	$ 310,254	$ 10,461	$ 320,715	$ —	$ 320,715
Loan origination fees	91,520	—	91,520	—	91,520
Fulfillment fees from PennyMac Mortgage Investment Trust	58,607	—	58,607	—	58,607
Net servicing fees	—	229,543	229,543	—	229,543
Management fees	—	—	—	28,237	28,237
Carried Interest from Investment Funds	—	—	—	2,628	2,628
Net interest income (expense):					
Interest income	39,238	9,917	49,155	—	49,155
Interest expense	19,851	48,686	68,537	—	68,537
	19,387	(38,769)	(19,382)	—	(19,382)
Other	1,868	1,087	2,955	(18)	2,937
Total net revenue	481,636	202,322	683,958	30,847	714,805
Expenses	209,767	201,025	410,792	23,125	433,917
Income before provision for income taxes and non-segment activities	271,869	1,297	273,166	7,722	280,888
Non-segment activities (2)	—	—	—	—	(1,695)
Income before provision for income taxes	$ 271,869	$ 1,297	$ 273,166	$ 7,722	$ 279,193
Segment assets at year end (3)	$ 1,122,242	$ 2,270,940	$ 3,393,182	$ 92,893	$ 3,486,075

(1) All revenues are from external customers

(2) Represents repricing Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement.

(3) Excludes parent company assets, which consist primarily of deferred tax asset of $18.4 million.

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	Year ended December 31, 2014				
	Mortgage Banking			Investment	
	Production	Servicing	Total	Management	Total
	(in thousands)				
Revenues: (1)					
Net gains on mortgage loans held for sale at fair value	$ 158,758	$ 8,266	$ 167,024	$ —	$ 167,024
Loan origination fees	41,576	—	41,576	—	41,576
Fulfillment fees from PennyMac Mortgage Investment Trust	48,719	—	48,719	—	48,719
Net servicing fees	—	216,919	216,919	—	216,919
Management fees	—	—	—	42,508	42,508
Carried Interest from Investment Funds	—	—	—	6,156	6,156
Net interest income (expense):					
Interest income	21,873	5,893	27,766	5	27,771
Interest expense	12,143	25,114	37,257	—	37,257
	9,730	(19,221)	(9,491)	5	(9,486)
Other	1,890	1,275	3,165	318	3,483
Total net revenue	260,673	207,239	467,912	48,987	516,899
Expenses	125,054	141,314	266,368	28,876	295,244
Income before provision for income taxes and non-segment activities	135,619	65,925	201,544	20,111	221,655
Non-segment activities (2)	—	—	—	—	1,378
Income before provision for income taxes	$ 135,619	$ 65,925	$ 201,544	$ 20,111	$ 223,033
Segment assets at year end (3)	$ 1,040,358	$ 1,320,092	$ 2,360,450	$ 92,881	$ 2,453,331

(1) All revenues are from external customers.

(2) Represents repricing of Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement.

(3) Excludes parent Company assets, which consist primarily of deferred tax asset of $46.0 million

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Note 26—Selected Quarterly Results (Unaudited)

Following is a presentation of selected quarterly financial data:

	Quarter ended							
	2016				2015			
	Dec. 31	Sept. 30	June. 30	Mar. 31	Dec. 31	Sept. 30	June. 30	Mar. 3
	(in thousands, except per share data)							
the quarter:								
ns on ge loans sale at fair	$ 127,932	$ 182,121	$ 130,203	$ 91,524	$ 78,736	$ 82,646	$ 83,955	$ 75,3
nent fees nnyMac ge ent Trust	27,164	27,255	19,111	12,935	12,855	17,553	15,333	12,8
rtgage loan g fees	95,528	45,864	26,555	17,519	76,959	57,258	68,549	26,7
ement fees rried Interest	5,619	5,628	5,974	6,505	6,059	7,939	7,145	9,72
ncome	33,042	30,527	25,963	14,918	12,631	23,809	21,369	15,5
	289,285	291,395	207,806	143,401	187,240	189,205	196,351	140,
es	159,877	152,117	123,548	113,262	110,007	115,282	121,552	87,0
before on for taxes	129,408	139,278	84,258	30,139	77,233	73,923	74,799	53,2
on for taxes	15,568	16,976	9,963	3,596	8,327	8,575	8,619	6,11
ome	113,840	122,302	74,295	26,543	68,906	65,348	66,180	47,1
et income able to rolling	91,096	98,617	59,820	21,368	56,135	52,668	53,431	38,0
ome able to Iac al Services, nmon lders	$ 22,744	$ 23,685	$ 14,475	$ 5,175	$ 12,771	$ 12,680	$ 12,749	$ 9,02
s per share mon stock:								
	$ 1.02	$ 1.07	$ 0.66	$ 0.24	$ 0.58	$ 0.58	$ 0.59	$ 0.42
	$ 1.00	$ 1.06	$ 0.65	$ 0.23	$ 0.58	$ 0.58	$ 0.59	$ 0.42

end:								
ge loans sale at fair	$ 2,172,815	$ 3,127,377	$ 2,097,138	$ 1,653,963	$ 1,101,204	$ 1,696,980	$ 1,594,262	$ 1,35
ge servicing	1,627,672	1,337,674	1,290,928	1,337,082	1,411,935	1,307,392	1,135,510	790,
Interest vestment	70,906	70,870	70,763	70,519	69,926	70,196	68,713	68,5
ng advances,	348,306	306,150	296,581	284,140	299,354	252,172	244,806	242,
ssets	914,203	754,123	860,910	635,559	622,875	488,582	387,314	402,
sets	$ 5,133,902	$ 5,596,194	$ 4,616,320	$ 3,981,263	$ 3,505,294	$ 3,815,322	$ 3,430,605	$ 2,85
old under ents to ase	$ 1,735,114	$ 2,491,366	$ 1,591,798	$ 1,658,578	$ 1,166,731	$ 1,286,411	$ 1,263,248	$ 992,
ge loan ation and eement	671,426	782,913	737,176	246,636	234,872	247,410	195,959	190,
ayable	150,942	110,619	114,235	127,693	61,136	406,990	246,456	134,
servicing financing at ue to Mac ge ent Trust	288,669	280,367	294,551	321,976	412,425	418,573	359,102	222,
abilities	888,395	640,525	707,707	533,167	567,780	466,631	446,367	465,
abilities	3,734,546	4,305,790	3,445,467	2,888,050	2,442,944	2,826,015	2,511,132	2,00
uity	1,399,356	1,290,404	1,170,853	1,093,213	1,062,350	989,307	919,473	852,
abilities and	$ 5,133,902	$ 5,596,194	$ 4,616,320	$ 3,981,263	$ 3,505,294	$ 3,815,322	$ 3,430,605	$ 2,85

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Note 27—Parent Company Information

The Company’s debt financing agreements require PLS, the Company’s indirect controlled subsidiary, to comply with financial covenants that include a minimum tangible net worth of $90 million. PLS is limited from transferring funds to the Parent by this minimum tangible net worth requirement.

PENNYMAC FINANCIAL SERVICES, INC.

CONDENSED BALANCE SHEET

	December 31,	
	2016	2015
	(in thousands)	
ASSETS		
Cash	$ 5,505	$ 841
Investments in subsidiaries	472,792	344,007
Deferred tax asset	—	18,378
Due from subsidiaries	3,585	3,818
Total assets	$ 481,882	$ 367,044
LIABILITIES AND STOCKHOLDERS' EQUITY		
Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement	$ 75,954	$ 74,315
Income taxes payable	25,077	—
Total liabilities	101,031	74,315
Stockholders' equity	380,851	292,729
Total liabilities and stockholders' equity	$ 481,882	$ 367,044

PENNYMAC FINANCIAL SERVICES, INC.

CONDENSED STATEMENT OF INCOME

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Revenues			
Dividends from subsidiary	$ 6,418	$ 3,825	$ 11,900
Interest	49	121	—
	551	(1,695)	1,378

Revaluation of Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement			
Total revenue	7,018	2,251	13,278
Expenses			
Interest	—	6	—
Total expenses	—	6	—
Income before provision for income taxes and equity in undistributed earnings in subsidiaries	7,018	2,245	13,278
Provision for income taxes	46,103	31,635	26,722
Income before equity in undistributed earnings of subsidiaries	(39,085)	(29,390)	(13,444)
Equity in undistributed earnings of subsidiaries	105,164	76,618	50,286
Net income	$ 66,079	$ 47,228	$ 36,842

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PENNYMAC FINANCIAL SERVICES, INC.

CONDENSED STATEMENT OF CASH FLOWS

	Year ended December 31,		
	2016	2015	2014
	(in thousands)		
Cash flows from operating activities			
Net income	$ 66,079	$ 47,228	$ 36,842
Adjustments to reconcile net income to net cash provided by (used in) operating activities			
Equity in undistributed earnings of subsidiaries	(105,164)	(76,618)	(50,286)
Revaluation of Payable to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement	(551)	1,695	(1,378)
Decrease in deferred tax asset	18,668	29,730	21,922
Decrease in intercompany receivable	(76)	(3,819)	—
Payments to exchanged Private National Mortgage Acceptance Company, LLC unitholders under tax receivable agreement	—	(5,132)	—
Decrease in payables to subsidiaries	—	—	(50)
Increase in income taxes payable	25,559	—	—
Net cash provided by (used in) operating activities	4,515	(6,916)	7,050
Cash flows from financing activities			
Proceeds from common stock options exercised	149	—	—
Net cash provided by financing activities	149	—	—
Net change in cash	4,664	(6,916)	7,050
Cash at beginning of year	841	7,757	707
Cash at end of year	$ 5,505	$ 841	$ 7,757

Note 28—Recently Issued Accounting Pronouncements

In May 2014, the FASB issued Accounting Standards Update ("ASU") ASU 2014-09, Revenue from Contracts with Customers (Subtopic 606)("ASU 2014-09"), which supersedes the guidance in ASC 605, Revenue Recognition. ASU 2014-09 clarifies the principles for recognizing revenue in order to improve comparability of revenue recognition

practices across entities and industries with certain scope exceptions including financial instruments, leases, and guarantees. ASU 2014-09 provides guidance intended to assist in the identification of contracts with customers and separate performance obligations within those contracts, the determination and allocation of the transaction price to those identified performance obligations and the recognition of revenue when a performance obligation has been satisfied. ASU 2014-09 also requires disclosures regarding the nature, amount, timing, and uncertainty of revenues and cash flows from contracts with customers.

Upon adoption, ASU 2014-09 provides for transition through either a full retrospective approach requiring the restatement of all presented prior periods or a modified retrospective approach, which allows the new recognition standard to be applied to only those contracts that are not completed at the date of transition. If the modified retrospective approach is adopted, a cumulative-effect adjustment to retained earnings is performed with additional disclosures required including the amount by which each line item is affected by the transition as compared to the guidance in effect before adoption and an explanation of the reasons for significant changes in these amounts.

The FASB has issued several amendments to ASU 2014-09, including:

- In May 2014, ASU 2015-14, Revenue From Contracts With Customers ("ASU 2015-14"). This update deferred the initial effective date of ASU 2014-09. As a result of the issuance of ASU 2015-14, ASU 2014-09 is effective for annual reporting periods beginning on or after December 15, 2017, and interim periods within those annual periods. Early adoption is permitted only as of annual reporting

periods beginning after December 15, 2016, including interim reporting periods within that reporting period.

· In March 2015, ASU 2016-08, Principal Versus Agent Considerations (Reporting Revenue Gross versus Net). The amendments to this update are intended to improve the implementation guidance on principal versus agent considerations in ASU 2014-09 by clarifying how an entity should identify the unit of account (i.e. the specified good or service) and how an entity should apply the control principle to certain types of arrangements.

· In May 2016, ASU 2016-12, Narrow-Scope Improvements and Practical Expedients. The amendments to this update clarify certain core recognition principles and provide practical expedients available at transition. The improvements address collectability, sales tax presentation, noncash consideration, contract modifications and completed contracts at transition.

· In December 2016, ASU 2016-20, Technical Corrections and Improvements to Topic 606, Revenue from Contracts with Customers. The amendments to this update affect narrow aspects of the guidance issued in ASU 2014-09. The amendments remove certain items under its scope and clarify application of certain principles. The amendments address loan guarantee fees, contracts costs impairment testing, provisions for losses on construction, insurance contracts, disclosure of remaining performance obligations, contract modifications, contract asset versus receivable, refund liability, advertising cost, fixed-odds wagering contracts in the casino industry and cost capitalization for advisor to private funds and public funds.

The Company expects that upon adoption, the guidance currently applied by the Company to its Carried Interest may be affected. The Company's Carried Interest arrangements with the Investment Funds represent capital allocations to PFSI. The Company is currently evaluating whether the nature and substance of its Carried Interest arrangements are within the scope of ASU 2014-09, or whether such Carried Interest should be accounted for under the equity method of accounting under the Investments – Equity Method and Joint Ventures topic of the ASC.

If the Company concludes the Carried Interest should be accounted for under the equity method of accounting, Carried Interest would be accounted for as a financial instrument and the amount recognized by the Company would not change significantly. The Company is still determining the potential additional effects of ASU 2014-09 on its financial statements for other arrangements that may be within the scope of ASU 2014-09.

In August 2014, the FASB issued Accounting Standards Update No. 2014-15, Presentation of Financial Statements—Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern ("ASU 2014-15"). ASU 2014-15 is intended to define management's responsibility to evaluate whether there is substantial doubt about an organization's ability to continue as a going concern and to provide related note disclosures.

Under GAAP, financial statements are prepared under the presumption that the reporting organization will continue to operate as a going concern, except in limited circumstances. Financial reporting under this presumption is commonly

referred to as the going concern basis of accounting. The going concern basis of accounting establishes the fundamental basis for measuring and classifying assets and liabilities.

Under ASU 2014-15, an entity would be required to evaluate its status as a going concern as part of its periodic financial statement preparation process and would be required to disclose information about its potential inability to continue as a going concern when “substantial doubt” about its ability to continue as a going concern for the period of one year from the earlier of the date its financial statements are issued or are ready to be issued.

If management concludes that there is “substantial doubt” about the entity’s ability to continue as a going concern, it must disclose the principal conditions or events causing substantial doubt to be raised, management’s

evaluation of the conditions and management's plans. If substantial doubt is not alleviated as a result of management's plans, the company is required to include a statement that there is "substantial doubt about the entity's ability to continue as a going concern." ASU 2014-15 also requires an entity to disclose how the substantial doubt was resolved in the period that substantial doubt no longer exists.

ASU 2014-15 is effective for the annual period ending December 31, 2016. The adoption of ASU 2014-15 did not have an effect on the financial statements of the Company.

In February 2015, the FASB issued ASU 2015-02, Consolidation (Topic 810): Amendments to the Consolidation Analysis ("ASU 2015-02"). ASU 2015-02 affects reporting entities that are required to evaluate whether they should consolidate certain legal entities. ASU 2015-02 modifies the evaluation of whether limited partnerships and similar legal entities are VIEs or voting interest entities, eliminates the presumption that a general partner should consolidate a limited partnership and affects the consolidation analysis of reporting entities that are involved with VIEs, particularly those that have fee arrangements and related party relationships. ASU 2015-02 is effective for fiscal years, and for interim periods within those fiscal years, beginning after December 15, 2015. The Company adopted ASU 2015-02 effective January 1, 2016. The adoption of ASU 2015-02 had no effect on the Company's consolidated financial statements.

In January 2016, the FASB issued ASU 2016-01, Financial Instruments–Overall: Recognition and Measurement of Financial Assets and Financial Liabilities ("ASU 2016-01"). ASU 2016-01 affects the accounting for equity investments, financial liabilities under the fair value option, the presentation and disclosure requirements for financial instruments, and the valuation allowance assessment when recognizing deferred tax assets resulting from unrealized losses on available-for-sale debt securities.

ASU 2016-01 requires that:

- All equity investments in unconsolidated entities (other than those accounted for using the equity method of accounting) with readily determinable fair values will generally be measured at fair value through earnings.
- When the fair value option has been elected for financial liabilities, changes in fair value due to instrument-specific credit risk will be recognized separately in other comprehensive income. The accumulated gains and losses due to these changes will be reclassified from accumulated other comprehensive income to earnings if the financial liability is settled before maturity.
- For financial instruments measured at amortized cost, public business entities will be required to use the exit price when measuring the fair value of financial instruments for disclosure purposes.
- Financial assets and financial liabilities shall be presented separately in the notes to the financial statements, grouped by measurement category (e.g., fair value, amortized cost, lower of cost or fair value) and form of financial asset (e.g., loans, securities).
- Public business entities will no longer be required to disclose the methods and significant assumptions used to estimate the fair value of financial instruments carried at amortized cost.
- Entities will have to assess the realizability of a deferred tax asset related to a debt security classified as available for sale in combination with the entity's other deferred tax assets.

The classification and measurement guidance will be effective for public business entities in fiscal years beginning after December 15, 2017, including interim periods within those fiscal years. Early adoption of the provision to record fair value changes for financial liabilities under the fair value option resulting from instrument-specific credit risk in other comprehensive income is permitted and can be elected for all financial statements of fiscal years and interim

periods that have not yet been issued or that have not yet been made available for issuance. The Company does not expect that the adoption of ASU 2016-01will have an effect on its consolidated financial statements.

In February 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842) (“ASU 2016-02”). ASU 2016-02 sets out the principles for the recognition, measurement, presentation and disclosure of leases for both parties to a

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contract (i.e. lessees and lessors) and supersedes previous leasing standards. ASU 2016-02 requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether the lease is effectively a financed purchase of the leased asset by the lessee. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than 12 months regardless of their classification.

ASU 2016-02 is effective for the Company for reporting periods beginning after December 15, 2018, with early adoption permitted. The Company is currently assessing the potential impact that the adoption of ASU 2016-02 will have on its consolidated financial statements. As shown in Note 24 - Commitments and Contingencies, the Company had approximately $100.8 million in future minimum lease payment commitments as of December 31, 2016. Were the Company to adopt ASU 2016-02 as of December 31, 2016, it would be required to recognize a right-of-use asset and a corresponding liability based on the present value of such obligation as of December 31, 2016. The Company does not expect to recognize a significant cumulative effect adjustment to its stockholders' equity as a result of adopting ASU 2016-02.

In March 2016, the FASB issued ASU 2016-09, Compensation—Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting ("ASU 2016-09"). ASU 2016-09 simplifies several aspects of the accounting for share-based payment award transactions, including:

· Modifies the accounting for income taxes relating to share-based payments. All excess tax benefits and tax deficiencies (including tax benefits of dividends on share-based payment awards) will be recognized as income tax expense or benefit in the consolidated income statement. The tax effects of exercised or vested awards will be treated as discrete items in the reporting period in which they occur. An entity will recognize excess tax benefits regardless of whether the benefit reduces taxes payable in the current period. Under current GAAP, excess tax benefits are recognized in additional paid-in capital; tax deficiencies are recognized either as an offset to accumulated excess tax benefits, if any, or in the consolidated income statement in the period they reduce income taxes payable.

· Changes the classification of excess tax benefits on the consolidated statement of cash flows. In the consolidated statement of cash flows, excess tax benefits will be classified along with other income tax cash flows as an operating activity. Under current GAAP, excess tax benefits are separated from other income tax cash flows and classified as a financing activity.

· Changes the requirement to estimate the number of awards that are expected to vest. Under ASU 2016-09, an entity can make an entity-wide accounting policy election to either estimate the number of awards that are expected to vest as presently required or account for forfeitures when they occur. Under current GAAP, accruals of compensation cost are based on the number of awards that are expected to vest.

· Changes the tax withholding requirements for share-based payment awards to qualify for equity accounting. The threshold to qualify for equity classification permits withholding up to the maximum statutory tax rates in the applicable jurisdictions. Under current GAAP, for an award to qualify for equity classification is that an entity cannot partially settle the award in cash in excess of the employer's minimum statutory withholding requirements.

- Establishes GAAP for the classification of employee taxes paid when an employer withholds shares for tax withholding purposes. Cash paid by an employer when directly withholding shares for tax- withholding purposes should be classified as a financing activity. This guidance establishes GAAP related to the classification of withholding taxes in the statement of cash flows as there is no such guidance under current GAAP.

ASU 2016-09 is effective for annual periods beginning after December 15, 2016, and interim periods within those annual periods. Early adoption is permitted for any organization in any interim or annual period. The Company does not expect the adoption of ASU 2016-09 to have a significant effect on its consolidated financial statements.

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Note 29—Subsequent Events

- On February 16, 2017, the Company, through the Issuer Trust, issued an aggregate principal amount of $400 million in Term Notes to qualified institutional buyers under Rule 144A of the Securities Act of 1933, as amended. The Term Notes bear interest at a rate equal to one-month LIBOR plus 4.75% per annum, payable each month beginning in February 2017. The Term Notes will mature on February 25, 2020 or, if extended pursuant to the terms of the related indenture supplement, February 25, 2021 (unless earlier redeemed in accordance with their terms). The Term Notes rank pari passu with the VFN issued by Issuer Trust to PLS and are secured by certain participation certificates relating to Ginnie Mae MSRs and ESS that are financed pursuant to the GNMA MSR Facility.

- On March 3, 2017, the Company, through PLS, amended and restated a master repurchase agreement, by and between Citibank, N.A. (“Citibank”) and PLS, pursuant to which PLS may sell to, and later repurchase from, Citibank certain newly originated mortgage loans that are originated through the PLS consumer direct lending channel or purchased from correspondent sellers through a subsidiary of PMT and, in either case, held by PLS pending sale and/or securitization. This repurchase agreement is committed to March 2, 2018 and provides for a maximum aggregate purchase price of $400 million, of which $200 million is committed. In connection with the amendment and restatement, the committed amount was increased from $150 million to $200 million.

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SIGNATURES

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

PENNYMAC FINANCIAL
SERVICES, INC.
(Registrant)
By: /s/ David A. Spector
David A. Spector
President and
Chief Executive Officer
(Principal Executive Officer)

Dated: March 9, 2017

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

Signatures	Title	Date
/s/ David A. Spector David A. Spector	President and Chief Executive Officer (Principal Executive Officer)	March 9, 2017
/s/ Andrew S. Chang Andrew S. Chang	Chief Financial Officer (Principal Financial Officer)	March 9, 2017
/s/ Gregory L. Hendry Gregory L. Hendry	Chief Accounting Officer (Principal Accounting Officer)	March 9, 2017
/s/ Stanford L. Kurland Stanford L. Kurland	Executive Chairman	March 9, 2017
/s/ Matthew Botein Matthew Botein	Director	March 9, 2017
/s/ James Hunt James Hunt	Director	March 9, 2017
/s/ Patrick Kinsella	Director	March 9, 2017

Patrick Kinsella		
/s/ Joseph Mazzella Joseph Mazzella	Director	March 9, 2017
/s/ Farhad Nanji Farhad Nanji	Director	March 9, 2017
/s/ Mark Wiedman Mark Wiedman	Director	March 9, 2017
/s/ Emily Youssouf Emily Youssouf	Director	March 9, 2017