BANK OF AMERICA CORP /DE/
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Product Supplement No. STOCK ARN-1 **Filed Pursuant to Rule 424(b)(5)**

(To Prospectus dated May 1, 2015 **Registration No. 333-202354**

and Series L Prospectus Supplement dated May 4, 2015)

October 22, 2015

Accelerated Return Notes® ARNs® Linked to One or More Equity Securities

ARNs are unsecured senior notes issued by Bank of America Corporation. Any payments due on ARNs, including any repayment of principal, will be subject to the credit risk of Bank of America Corporation.

ARNs do not guarantee the return of principal at maturity, and we will not pay interest on ARNs. Instead, the return on ARNs will be based on the performance of an underlying **Market Measure**, which will be the common equity securities of a company other than us and our affiliates (the **Underlying Stock**). The Market Measure may also consist of a **Basket** of two or more Underlying Stocks.

ARNs provide an opportunity to earn a multiple (which will be 3 times, unless otherwise set forth in the applicable term sheet) of the positive performance of the Market Measure, up to a specified cap (**Capped Value**), while exposing you to any negative performance of the Market Measure on a 1-to-1 basis.

If the value of the Market Measure increases from its Starting Value to its Ending Value (each as defined below), you will receive at maturity a cash payment per unit (the **Redemption Amount**) that equals the principal amount plus a multiple of that increase, up to the Capped Value.

If the value of the Market Measure decreases from its Starting Value to its Ending Value, you will be subject to 1-to-1 downside exposure to that decrease. In such a case, you may lose all or a significant portion of your investment in the ARNs.

This product supplement describes the general terms of ARNs, the risk factors to consider before investing, the general manner in which they may be offered and sold, and other relevant information.

For each offering of ARNs, we will provide you with a pricing supplement (which we refer to as a **term sheet**) that will describe the specific terms of that offering, including the specific Market Measure, the Capped Value, and certain risk factors. The term sheet will identify, if applicable, any additions or changes to the terms specified in this product supplement.

ARNs will be issued in denominations of whole units. Unless otherwise set forth in the applicable term sheet, each unit will have a principal amount of $10. The term sheet may also set forth a minimum number of units that you must purchase.

Unless otherwise specified in the applicable term sheet, ARNs will not be listed on a securities exchange or quotation system.

One or more of our affiliates, including Merrill Lynch, Pierce, Fenner & Smith Incorporated (**MLPF&S**), may act as our selling agents to offer ARNs and will act in a principal capacity in such role.

ARNs are unsecured and are not savings accounts, deposits, or other obligations of a bank. ARNs are not guaranteed by Bank of America, N.A. or any other bank, are not insured by the Federal Deposit Insurance Corporation (the ***FDIC*** *) or any other governmental agency and involve investment risks. Potential purchasers of ARNs should consider the information in Risk Factors beginning on page PS-6 of this product supplement, page S-5 of the accompanying Series L prospectus supplement, and page 9 of the accompanying prospectus.* ***You may lose all or a significant portion of your investment in ARNs.***

None of the Securities and Exchange Commission (the ***SEC*** *), any state securities commission, or any other regulatory body has approved or disapproved of these securities or passed upon the adequacy or accuracy of this product supplement, the prospectus supplement, or the prospectus. Any representation to the contrary is a criminal offense.*

Merrill Lynch & Co.

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ARNs® and Accelerated Return Notes® are our registered service marks.

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SUMMARY

The information in this Summary section is qualified in its entirety by the more detailed explanation set forth elsewhere in this product supplement, the prospectus supplement, and the prospectus, as well as the applicable term sheet. Neither we nor MLPF&S have authorized any other person to provide you with any information different from the information set forth in these documents. If anyone provides you with different or inconsistent information about the ARNs, you should not rely on it.

Key Terms:

General: ARNs are senior debt securities issued by Bank of America Corporation, and are not guaranteed or insured by the FDIC or secured by collateral. They rank equally with all of our other unsecured senior debt from time to time outstanding. **Any payments due on ARNs, including any repayment of principal, are subject to our credit risk.**

The return on ARNs will be based on the performance of a Market Measure and there is no guaranteed return of principal at maturity. Therefore, you may lose all or a significant portion of your investment if the value of the Market Measure decreases from the Starting Value to the Ending Value.

Each issue of ARNs will mature on the date set forth in the applicable term sheet. We cannot redeem ARNs at any earlier date, except under the limited circumstances set forth below. We will not make any payments on ARNs until maturity, and you will not receive interest payments.

Market Measure: The common equity securities (an **Underlying Stock**) of a company (the **Underlying Company**) represented either by a class of equity securities registered under the Securities Exchange Act of 1934, as amended (the **Exchange Act**), or by American Depositary Receipts (**ADRs**) registered under the Exchange Act.

The Market Measure may consist of a group, or **Basket**, of Underlying Stocks. We refer to each Underlying Stock included in any Basket as a **Basket Stock**. If the Market Measure to which your ARNs are linked is a Basket, the Basket Stocks will be set forth in the applicable term sheet.

Market Measure Performance: The performance of the Market Measure will be measured according to the percentage change of the Market Measure from its Starting Value to its Ending Value.

Unless otherwise specified in the applicable term sheet:

The **Starting Value** will be the price of the Underlying Stock on the date when the ARNs are priced for initial sale to the public (the **pricing date**), determined as set forth in the applicable term sheet.

If the Market Measure consists of a Basket, the Starting Value will be equal to 100. See Description of ARNs Basket Market Measures.

The **Ending Value** will be the Closing Market Price (as defined below) of the Underlying Stock on the calculation day multiplied by its Price Multiplier on that day (each as defined below).

If the Market Measure consists of a Basket, the Ending Value will be determined as described in Description of ARNs Basket Market Measures Ending Value of the Basket.

If a Market Disruption Event (as defined below) occurs and is continuing on the calculation day, or if certain other events occur, the calculation agent will determine the Ending Value as set forth in the section Description of ARNs The Starting Value and the Ending Value Ending Value.

Participation Rate: The rate at which investors participate in any increase in the value of the Market Measure, as calculated below. The Participation Rate will be 300% for ARNs, unless otherwise set forth in the applicable term sheet.

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Capped Value: The maximum Redemption Amount. Your investment return is limited to the return represented by the Capped Value specified in the applicable term sheet. We will determine the applicable Capped Value on the pricing date of each issue of ARNs.

Price Multiplier: Unless otherwise set forth in the term sheet, the **Price Multiplier** for each Underlying Stock will be 1, and will be subject to adjustment for certain corporate events relating to an Underlying Stock described below under Description of ARNs Anti-Dilution Adjustments.

Redemption Amount at Maturity: At maturity, you will receive a Redemption Amount that is greater than the principal amount if the value of the Market Measure increases from the Starting Value to the Ending Value. However, in no event will the Redemption Amount exceed the Capped Value. If the value of the Market Measure decreases from the Starting Value to the Ending Value, you will be subject to 1-to-1 downside exposure to that decrease, and will receive a Redemption Amount that is less than the principal amount.

Any payments due on the ARNs, including any repayment of principal, are subject to our credit risk as issuer of ARNs.

The Redemption Amount, denominated in U.S. dollars, will be calculated as follows:

Principal at Risk: You may lose all or a significant portion of the principal amount of the ARNs. Further, if you sell your ARNs prior to maturity, you may find that the market value per ARN is less than the price that you paid for the ARNs.

Calculation Agent: The calculation agent will make all determinations associated with the ARNs. Unless otherwise set forth in the applicable term sheet, we expect to appoint our affiliate, MLPF&S, or one of our other affiliates, to act as calculation agent for the ARNs. See the section entitled Description of ARNs Role of the Calculation Agent.

Selling Agents: One or more of our affiliates, including MLPF&S, will act as our selling agents in connection with each offering of ARNs and will receive a commission or an underwriting discount based on the number of units of ARNs sold. None of the selling agents is your fiduciary or advisor solely as a result of the making of any offering of ARNs, and you should not rely upon this product supplement, the term sheet, or the accompanying prospectus or prospectus supplement as investment advice or a recommendation to purchase ARNs.

Listing: Unless otherwise specified in the applicable term sheet, the ARNs will not be listed on a securities exchange or quotation system.

This product supplement relates only to ARNs and does not relate to any Underlying Stock described in any term sheet. You should read carefully the entire prospectus, prospectus supplement, and product supplement, together with the applicable term sheet, to understand fully the terms of

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your ARNs, as well as the tax and other considerations important to you in making a decision about whether to invest in any ARNs. In particular, you should review carefully the section in this product supplement entitled Risk Factors, which highlights a number of risks of an investment in ARNs, to determine whether an investment in ARNs is appropriate for you. If information in this product supplement is inconsistent with the prospectus or prospectus supplement, this product supplement will supersede those documents. However, if information in any term sheet is inconsistent with this product supplement, that term sheet will supersede this product supplement.

Neither we nor any selling agent is making an offer to sell ARNs in any jurisdiction where the offer or sale is not permitted.

Certain capitalized terms used and not defined in this product supplement have the meanings ascribed to them in the prospectus supplement and prospectus. Unless otherwise indicated or unless the context requires otherwise, all references in this product supplement to we, us, our, or similar references are to Bank of America Corporation.

You are urged to consult with your own attorneys and business and tax advisors before making a decision to purchase any ARNs.

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RISK FACTORS

Your investment in ARNs is subject to investment risks, many of which differ from those of a conventional debt security. Your decision to purchase ARNs should be made only after carefully considering the risks, including those discussed below, in light of your particular circumstances. ARNs are not an appropriate investment for you if you are not knowledgeable about the material terms of ARNs or investments in equity or equity-based securities in general.

General Risks Relating to ARNs

Your investment may result in a loss; there is no guaranteed return of principal. There is no fixed principal repayment amount on ARNs at maturity. The return on the ARNs will be based on the performance of the Market Measure and therefore, you may lose all or a significant portion of your investment if the value of the Market Measure decreases from the Starting Value to the Ending Value. If the Ending Value is less than the Starting Value, then you will receive a Redemption Amount at maturity that will be less than the principal amount of your ARNs.

Your return on the ARNs may be less than the yield on a conventional fixed or floating rate debt security of comparable maturity. There will be no periodic interest payments on ARNs as there would be on a conventional fixed-rate or floating-rate debt security having the same maturity. Any return that you receive on ARNs may be less than the return you would earn if you purchased a conventional debt security with the same maturity date. As a result, your investment in ARNs may not reflect the full opportunity cost to you when you consider factors, such as inflation, that affect the time value of money.

Your investment return is limited to the return represented by the Capped Value and may be less than a comparable investment directly in the Market Measure. The appreciation potential of ARNs is limited to the Capped Value. You will not receive a Redemption Amount greater than the Capped Value, regardless of the appreciation of the Market Measure. In contrast, a direct investment in the Market Measure would allow you to receive the full benefit of any appreciation in the value of the Market Measure.

In addition, unless otherwise set forth in the applicable term sheet and this product supplement under Description of ARNs Anti-Dilution Adjustments, the Ending Value will not reflect the value of dividends paid, or distributions made, on an Underlying Stock, or any other rights associated with an Underlying Stock. Your return on the ARNs will not reflect the return you would realize if you actually owned shares of an Underlying Stock.

Payments on ARNs are subject to our credit risk, and actual or perceived changes in our creditworthiness are expected to affect the value of ARNs. ARNs are our senior unsecured debt securities. As a result, your receipt of the Redemption Amount at maturity is dependent upon our ability to repay our obligations on the maturity date, regardless of whether the Market Measure increases from the Starting Value to the Ending Value. No assurance can be given as to what our financial condition will be on the maturity date. If we become unable to meet our financial obligations as they become due, you may not receive the amounts payable under the terms of the ARNs.

In addition, our credit ratings are an assessment by ratings agencies of our ability to pay our obligations. Consequently, our perceived creditworthiness and actual or anticipated decreases in our credit ratings or increases in the spread between the yield on our securities and the yield on U.S. Treasury securities (the **credit spread**) prior to the maturity date may adversely affect the market value of ARNs. However, because your return on ARNs depends upon factors in addition to our ability to pay our obligations, such as the value of the Market Measure, an improvement in our credit ratings will not reduce the other investment risks related to ARNs.

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The initial estimated value of ARNs considers certain assumptions and variables and relies in part on certain forecasts about future events, which may prove to be incorrect. The initial estimated value of ARNs, which will be set forth in the applicable term sheet, is an estimate only, determined as of a particular point in time by reference to our and our affiliates pricing models. These pricing models consider certain assumptions and variables, including our credit spreads, our internal funding rate on the pricing date, mid-market terms on hedging transactions, expectations on interest rates and volatility, price-sensitivity analysis, and the expected term of ARNs. These pricing models rely in part on certain forecasts about future events, which may prove to be incorrect.

The public offering price you pay for ARNs will exceed the initial estimated value. If you attempt to sell ARNs prior to maturity, their market value may be lower than the price you paid for them and lower than the initial estimated value. This is due to, among other things, changes in the value of the Market Measure, our internal funding rate, and the inclusion in the public offering price of the underwriting discount and an expected hedging related charge. These factors, together with various credit, market and economic factors over the term of ARNs, are expected to reduce the price at which you may be able to sell ARNs in any secondary market and will affect the value of ARNs in complex and unpredictable ways.

The initial estimated value does not represent a minimum or maximum price at which we, MLPF&S or any of our affiliates would be willing to purchase your ARNs in any secondary market (if any exists) at any time. The value of your ARNs at any time after issuance will vary based on many factors that cannot be predicted with accuracy, including the performance of the Market Measure, our creditworthiness and changes in market conditions.

We cannot assure you that there will be a trading market for your ARNs. If a secondary market exists, we cannot predict how the ARNs will trade, or whether that market will be liquid or illiquid. The development of a trading market for ARNs will depend on various factors, including our financial performance and changes in the value of the Market Measure. The number of potential buyers of your ARNs in any secondary market may be limited. There is no assurance that any party will be willing to purchase your ARNs at any price in any secondary market.

We anticipate that one or more of the selling agents will act as a market-maker for ARNs that it offers, but none of them is required to do so and may cease to do so at any time. Any price at which a selling agent may bid for, offer, purchase, or sell any of the ARNs may be higher or lower than the applicable public offering price, and that price may differ from the values determined by pricing models that it may use, whether as a result of dealer discounts, mark-ups, or other transaction costs. These bids, offers, or transactions may affect the prices, if any, at which those ARNs might otherwise trade in the market. In addition, if at any time any selling agent were to cease acting as a market-maker for any issue of ARNs, it is likely that there would be significantly less liquidity in that secondary market. In such a case, the price at which those ARNs could be sold likely would be lower than if an active market existed.

Unless otherwise stated in the term sheet, we will not list ARNs on any securities exchange. Even if an application were made to list your ARNs, we cannot assure you that the application will be approved or that your ARNs will be listed and, if listed, that they will remain listed for their entire term. The listing of ARNs on any securities exchange will not necessarily ensure that a trading market will develop, and if a trading market does develop, that there will be liquidity in the trading market.

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The Redemption Amount will not reflect changes in the value of the Market Measure other than on the calculation day. Changes in the value of the Market Measure during the term of ARNs other than on the calculation day will not be reflected in the calculation of the Redemption Amount. To calculate the Redemption Amount, the calculation agent will compare only the Ending Value to the Starting Value. No other values of the Market Measure will be taken into account. As a result, even if the value of the Market Measure has increased at certain times during the term of the ARNs, you will receive a Redemption Amount that is less than the principal amount if the Ending Value is less than the Starting Value.

If your ARNs are linked to a Basket, changes in the prices of one or more of the Basket Stocks may be offset by changes in the prices of one or more of the other Basket Stocks. The Market Measure of your ARNs may be a Basket. In such a case, changes in the prices of one or more of the Basket Stocks may not correlate with changes in the prices of one or more of the other Basket Stocks. The prices of one or more Basket Stocks may increase, while the prices of one or more of the other Basket Stocks may decrease or not increase as much. Therefore, in calculating the value of the Market Measure at any time, increases in the price of one Basket Stock may be moderated or wholly offset by decreases or lesser increases in the prices of one or more of the other Basket Stocks. If the weightings of the applicable Basket Stocks are not equal, adverse changes in the prices of the Basket Stocks which are more heavily weighted could have a greater impact upon your ARNs.

If you attempt to sell ARNs prior to maturity, their market value, if any, will be affected by various factors that interrelate in complex ways, and their market value may be less than the principal amount. You have no right to have your ARNs redeemed prior to maturity. If you wish to liquidate your investment in ARNs prior to maturity, your only option would be to sell them. At that time, there may be an illiquid market for your ARNs or no market at all. Even if you were able to sell your ARNs, there are many factors outside of our control that may affect their market value, some of which, but not all, are stated below. The impact of any one factor may be offset or magnified by the effect of another factor. The following paragraphs describe a specific factor s expected impact on the market value of ARNs, assuming all other conditions remain constant.

Value of the Market Measure. We anticipate that the market value of ARNs prior to maturity generally will depend to a significant extent on the value of the Market Measure. In general, it is expected that the market value of ARNs will decrease as the value of the Market Measure decreases, and increase as the value of the Market Measure increases. However, as the value of the Market Measure increases or decreases, the market value of ARNs is not expected to increase or decrease at the same rate. If you sell your ARNs when the value of the Market Measure is less than, or not sufficiently above, the applicable Starting Value, then you may receive less than the principal amount of your ARNs.

In addition, because the Redemption Amount will not exceed the applicable Capped Value, we do not expect that the ARNs will trade in any secondary market at a price that is greater than the Capped Value.

Volatility of the Market Measure. Volatility is the term used to describe the size and frequency of market fluctuations. Increases or decreases in the volatility of the Market Measure may have an adverse impact on the market value of ARNs. Even if the value of the Market Measure increases after the applicable pricing date, if you are able to sell your ARNs before their maturity date, you may receive substantially less than the amount that would be payable at maturity based on that value because of the anticipation that the value of the Market Measure will continue to fluctuate until the Ending Value is determined.

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Economic and Other Conditions Generally. The general economic conditions of the capital markets in the United States, as well as geopolitical conditions and other financial, political, regulatory, and judicial events and related uncertainties that affect stock markets generally, may affect the value of the Market Measure and the market value of ARNs.

Interest Rates. We expect that changes in interest rates will affect the market value of ARNs. In general, if U.S. interest rates increase, we expect that the market value of ARNs will decrease, and conversely, if U.S. interest rates decrease, we expect that the market value of ARNs will increase. In general, we expect that the longer the amount of time that remains until maturity, the more significant the impact of these changes will be on the value of the ARNs. The level of interest rates also may affect the U.S. economy and any applicable market outside of the U.S., and, in turn, the value of the Market Measure, and, thus, the market value of ARNs may be adversely affected. If any Underlying Stock is an ADR, the level of interest rates in the relevant foreign country may affect the economy of that foreign country and, in turn, the value of the ADR, and, thus, the market value of the ARNs may be adversely affected.

Dividend Yields. In general, if the cumulative dividend yield on any Underlying Stock increases, we anticipate that the market value of ARNs will decrease; conversely, if that dividend yield decreases, we anticipate that the market value of your ARNs will increase.

Our Financial Condition and Creditworthiness. Our perceived creditworthiness, including any increases in our credit spreads and any actual or anticipated decreases in our credit ratings, may adversely affect the market value of the ARNs. In general, we expect the longer the amount of time that remains until maturity, the more significant the impact will be on the value of the ARNs. However, a decrease in our credit spreads or an improvement in our credit ratings will not necessarily increase the market value of ARNs.

Time to Maturity. There may be a disparity between the market value of the ARNs prior to maturity and their value at maturity. This disparity is often called a time value, premium, or discount, and reflects expectations concerning the value of the Market Measure prior to the maturity date. As the time to maturity decreases, this disparity may decrease, such that the value of the ARNs will approach the expected Redemption Amount to be paid at maturity.

Trading and hedging activities by us and our affiliates may affect your return on the ARNs and their market value. We and our affiliates, including the selling agents, may buy or sell shares of any Underlying Stock, futures or options contracts on any Underlying Stock, or other listed or over-the counter derivative instruments linked to any Underlying Stock. We may execute such purchases or sales for our own accounts, for business reasons, or in connection with hedging our obligations under ARNs. These transactions could affect the value of an Underlying Stock in a manner that could be adverse to your investment in ARNs. On or before the applicable pricing date, any purchases by us, our affiliates or others on our behalf may increase the value of an Underlying Stock. Consequently, the value of that Underlying Stock may decrease subsequent to the pricing date of an issue of ARNs, which may adversely affect the market value of ARNs.

We or one or more of our affiliates, including the selling agents, may also engage in hedging activities that could increase the value of an Underlying Stock on the applicable pricing date. In addition, these activities may decrease the market value of your ARNs prior to maturity, including on the calculation day, and may reduce the Redemption Amount.

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We or one or more of our affiliates, including the selling agents, may purchase or otherwise acquire a long or short position in ARNs, and may hold or resell ARNs. For example, the selling agents may enter into these transactions in connection with any market making activities in which they engage. We cannot assure you that these activities will not adversely affect the value of the Market Measure, the market value of your ARNs prior to maturity or the Redemption Amount.

Our trading, hedging and other business activities may create conflicts of interest with you. We or one or more of our affiliates, including the selling agents, may engage in trading activities related to an Underlying Stock that are not for your account or on your behalf. We or one or more of our affiliates, including the selling agents, also may issue or underwrite other financial instruments with returns based upon the applicable Underlying Stock. These trading and other business activities may present a conflict of interest between your interest in ARNs and the interests we and our affiliates, including the selling agents, may have in our proprietary accounts, in facilitating transactions, including block trades, for our or their other customers, and in accounts under our or their management. These trading and other business activities, if they influence the value of the Market Measure or secondary trading in your ARNs, could be adverse to your interests as a beneficial owner of ARNs.

We expect to enter into arrangements or adjust or close out existing transactions to hedge our obligations under the ARNs. We or our affiliates also may enter into hedging transactions relating to other notes or instruments that we issue, some of which may have returns calculated in a manner related to that of a particular issue of ARNs. We may enter into such hedging arrangements with one of our subsidiaries or affiliates. Such a party may enter into additional hedging transactions with other parties relating to ARNs and the applicable Underlying Stock. This hedging activity is expected to result in a profit to those engaging in the hedging activity, which could be more or less than initially expected, or the hedging activity could also result in a loss. We or our affiliates will price these hedging transactions with the intent to realize a profit, regardless of whether the value of ARNs increases or decreases. Any profit in connection with such hedging activities will be in addition to any other compensation that we and our affiliates, including the selling agents, receive for the sale of the ARNs, which creates an additional incentive to sell the ARNs to you.

There may be potential conflicts of interest involving the calculation agent. We have the right to appoint and remove the calculation agent. One of our affiliates will be the calculation agent for ARNs and, as such, will determine the Starting Value, the Ending Value and the Redemption Amount. Under some circumstances, these duties could result in a conflict of interest between its status as our affiliate and its responsibilities as calculation agent. These conflicts could occur, for instance, in connection with the calculation agent s determination as to whether a Market Disruption Event has occurred, or in connection with judgments that it would be required to make if certain corporate events occur with respect to any Underlying Stock. See the sections entitled Description of ARNs Market Disruption Events and Anti-Dilution Adjustments. The calculation agent will be required to carry out its duties in good faith and use its reasonable judgment. However, because we expect to control the calculation agent, potential conflicts of interest could arise.

The U.S. federal income tax consequences of an investment in ARNs are uncertain, and may be adverse to a holder of ARNs. No statutory, judicial, or administrative authority directly addresses the characterization of ARNs or securities similar to ARNs for U.S. federal income tax purposes. As a result, significant aspects of the U.S. federal income tax consequences of an investment in ARNs are not certain. Under the terms of ARNs, you will have agreed with us to treat ARNs as single financial contracts, as described under U.S. Federal Income Tax Summary General. If the Internal Revenue Service (the IRS) were successful in asserting an alternative characterization for ARNs, the timing and character of

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gain or loss with respect to ARNs may differ. No ruling will be requested from the IRS with respect to ARNs and no assurance can be given that the IRS will agree with the statements made in the section entitled U.S. Federal Income Tax Summary.

You are urged to consult with your own tax advisor regarding all aspects of the U.S. federal income tax consequences of investing in ARNs.

Risks Relating to an Underlying Stock

You must rely on your own evaluation of the merits of an investment linked to any applicable Underlying Stock. In the ordinary course of business, our affiliates may have expressed views on expected movements in an Underlying Stock, and may do so in the future. These views or reports may be communicated to our clients and clients of our affiliates. However, these views are subject to change from time to time. Moreover, other professionals who deal in markets relating to an Underlying Stock may at any time have significantly different views from those of our affiliates. For these reasons, you are encouraged to derive information concerning an Underlying Stock from multiple sources, and you should not rely on the views expressed by our affiliates.

You will have no rights as a security holder, you will have no rights to receive any shares of any Underlying Stock, and you will not be entitled to dividends or other distributions by any Underlying Company. ARNs are our debt securities. They are not equity instruments, shares of stock, or securities of any other issuer. Investing in ARNs will not make you a holder of any Underlying Stock. You will not have any voting rights, any rights to receive dividends or other distributions, or any other rights with respect to any Underlying Stock. As a result, the return on your ARNs may not reflect the return you would realize if you actually owned shares of any Underlying Stock and received the dividends paid or other distributions made in connection with them. Your ARNs will be paid in cash and you have no right to receive delivery of shares of any Underlying Stock.

If shares of an Underlying Company are also listed on a foreign exchange, your return may be affected by factors affecting international securities markets. The value of securities traded outside of the U.S. may be adversely affected by a variety of factors relating to the relevant securities markets. Factors which could affect those markets, and therefore the return on your ARNs, include:

Market Volatility. The relevant foreign securities markets may be more volatile than U.S. or other securities markets and may be affected by market developments in different ways than U.S. or other securities markets.

Political, Economic, and Other Factors. The prices and performance of securities of companies in foreign countries may be affected by political, economic, financial, and social factors in those regions. Direct or indirect government intervention to stabilize a particular securities market and cross-shareholdings in companies in the relevant foreign markets may affect prices and the volume of trading in those markets. In addition, recent or future changes in government, economic, and fiscal policies in the relevant jurisdictions, the possible imposition of, or changes in, currency exchange laws, or other laws or restrictions, and possible fluctuations in the rate of exchange between currencies, are factors that could negatively affect the relevant securities markets. The relevant foreign economies may differ from the U.S. economy in economic factors such as growth of gross national product, rate of inflation, capital reinvestment, resources, and self-sufficiency.

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In particular, many emerging nations are undergoing rapid change, involving the restructuring of economic, political, financial and legal systems. Regulatory and tax environments may be subject to change without review or appeal, and many emerging markets suffer from underdevelopment of capital markets and tax systems. In addition, in some of these nations, issuers of the relevant securities face the threat of expropriation of their assets and/or nationalization of their businesses. The economic and financial data about some of these countries may be unreliable.

We do not control any Underlying Company and have not verified any disclosure made by any Underlying Company. We or our affiliates currently, or in the future, may engage in business with any Underlying Company, and we or our affiliates may from time to time own securities of any Underlying Company. However, neither we nor any of our affiliates, including the selling agents, have the ability to control any actions of any Underlying Company or have undertaken any independent review of, or made any due diligence inquiry with respect to, any Underlying Company. You should make your own investigation into any Underlying Stock.

Our business activities relating to any Underlying Company may create conflicts of interest with you. We or our affiliates, including the selling agents, at the time of any offering of ARNs or in the future, may engage in business with any Underlying Company, including making loans to, equity investments in, or providing investment banking, asset management, or other services to that company, its affiliates, and its competitors.

In connection with these activities, we or our affiliates may receive information about those companies that we will not divulge to you or other third parties. One or more of our affiliates have published, and in the future may publish, research reports on one or more of these companies. This research is modified from time to time without notice and may express opinions or provide recommendations that are inconsistent with purchasing or holding your ARNs. Any of these activities may affect the value of the Market Measure and, consequently, the market value of your ARNs. We, or any of our affiliates, do not make any representation to any purchasers of the ARNs regarding any matters whatsoever relating to any Underlying Company. Any prospective purchaser of the ARNs should undertake an independent investigation of any Underlying Company to a level that, in its judgment, is appropriate to make an informed decision regarding an investment in the ARNs. The selection of an Underlying Stock does not reflect any investment recommendations from us or our affiliates.

An Underlying Company will have no obligations relating to ARNs and we will not perform any due diligence procedures with respect to any Underlying Company. An Underlying Company will not have any financial or legal obligation with respect to ARNs or the amounts to be paid to you, including any obligation to take our needs or the needs of noteholders into consideration for any reason, including taking any corporate actions that might affect the value of an Underlying Stock or the value of ARNs. An Underlying Company will not receive any of the proceeds from any offering of ARNs, and will not be responsible for, or participate in, the offering of ARNs. No Underlying Company will be responsible for, or participate in, the determination or calculation of the amount receivable by holders of ARNs.

Neither we nor any selling agent will conduct any due diligence inquiry with respect to any Underlying Stock in connection with an offering of ARNs. Neither we nor any selling agent has made any independent investigation as to the completeness or accuracy of publicly available information regarding any Underlying Company or as to the future performance of any Underlying Stock. Any prospective purchaser of ARNs should undertake such independent investigation of any Underlying Company as in its judgment is appropriate to make an informed decision with respect to an investment in ARNs.

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The Redemption Amount will not be adjusted for all corporate events that could affect an Underlying Company. The Price Multiplier, the Ending Value, the Redemption Amount, and other terms of ARNs may be adjusted for the specified corporate events affecting any Underlying Stock, as described in the section entitled Description of ARNs Anti-Dilution Adjustments. However, these adjustments do not cover all corporate events that could affect the market price of an Underlying Stock, such as offerings of common shares for cash or in connection with certain acquisition transactions. The occurrence of any event that does not require the calculation agent to adjust the applicable Price Multiplier or the amount paid to you at maturity may adversely affect the Closing Market Price of an Underlying Stock, the Ending Value and the Redemption Amount, and, as a result, the market value of ARNs.

Risks Relating to Underlying Stocks that Are ADRs

The value of an ADR may not accurately track the value of the common shares of the related Underlying Company. If an Underlying Stock is an ADR, each ADR will represent shares of the relevant Underlying Company. Generally, the ADRs are issued under a deposit agreement that sets forth the rights and responsibilities of the depositary, the Underlying Company and the holders of the ADRs. The trading patterns of the ADRs will generally reflect the characteristics and valuations of the underlying common shares; however, the value of the ADRs may not completely track the value of those shares. There are important differences between the rights of holders of ADRs and the rights of holders of the underlying common shares. In addition, trading volume and pricing on the applicable non-U.S. exchange may, but will not necessarily, have similar characteristics as the ADRs. For example, certain factors may increase or decrease the public float of the ADRs and, as a result, the ADRs may have less liquidity or lower market value than the underlying common shares.

Exchange rate movements may adversely impact the value of an Underlying Stock that is an ADR. If an Underlying Stock is an ADR, the market price of the Underlying Stock will generally track the U.S. dollar value of the market price of the underlying common shares. Therefore, if the value of the related foreign currency in which the underlying common shares are traded decreases relative to the U.S. dollar, the market price of the Underlying Stock may decrease while the market price of the underlying common shares remains stable or increases, or does not decrease to the same extent. As a result, changes in, and the volatility of, the exchange rates between the U.S. dollar and the relevant non-U.S. currency could have a negative impact on the value of the Underlying Stock and consequently, the value of your ARNs and the amount payable on ARNs.

Adverse trading conditions in the applicable non-U.S. market may negatively affect the value of an Underlying Stock that is an ADR. Holders of an Underlying Company s ADRs may usually surrender the ADRs in order to receive and trade the underlying common shares. This provision permits investors in the ADRs to take advantage of price differentials between markets. However, this provision may also cause the market prices of the applicable Underlying Stock to more closely correspond with the values of the common shares in the applicable non-U.S. markets. As a result, a market outside of the United States for the underlying common shares that is not liquid may also result in an illiquid market for the ADRs, which may negatively impact the value of such ADRs and, consequently, the value of your ARNs.

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Delisting of an Underlying Stock that is an ADR may adversely affect the value of ARNs. If an Underlying Stock that is an ADR is no longer listed or admitted to trading on a U.S. securities exchange registered under the Exchange Act or included in the OTC Bulletin Board Service operated by the Financial Industry Regulatory Authority, Inc. (**FINRA**), or if the ADR facility between the Underlying Company and the ADR depositary is terminated for any reason, the Market Measure for ARNs will be deemed to be the Underlying Company s common equity securities rather than the ADRs, and the calculation agent will determine the price of the Market Measure by reference to those common shares, as described below under Description of ARNs Delisting of ADRs or Termination of ADR Facility. Replacing the original ADRs with the underlying common shares may adversely affect the value of ARNs and the Redemption Amount.

Other Risk Factors Relating to an Underlying Stock

The applicable term sheet may set forth additional risk factors as to an Underlying Stock that you should review prior to purchasing ARNs.

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USE OF PROCEEDS

We will use the net proceeds we receive from each sale of ARNs for the purposes described in the accompanying prospectus under Use of Proceeds. In addition, we expect that we or our affiliates may use a portion of the net proceeds to hedge our obligations under ARNs.

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DESCRIPTION OF ARNS

General

Each issue of ARNs will be part of a series of medium-term notes entitled Medium-Term Notes, Series L that will be issued under the Senior Indenture, as amended and supplemented from time to time. The Senior Indenture is described more fully in the prospectus and prospectus supplement. The following description of ARNs supplements and, to the extent it is inconsistent with, supersedes the description of the general terms and provisions of the notes and debt securities set forth under the headings Description of the Notes in the prospectus supplement and Description of Debt Securities in the prospectus. These documents should be read in connection with the applicable term sheet.

The maturity date of the ARNs and the aggregate principal amount of each issue of ARNs will be stated in the term sheet. If the scheduled maturity date is not a business day, we will make the required payment on the next business day, and no interest will accrue as a result of such delay.

We will not pay interest on ARNs. ARNs do not guarantee the return of principal at maturity. ARNs will be payable only in U.S. dollars.

Prior to the maturity date, ARNs are not redeemable by us, except under the limited circumstances set forth below, or repayable at the option of any holder. ARNs are not subject to any sinking fund.

We will issue ARNs in denominations of whole units. Unless otherwise set forth in the applicable term sheet, each unit will have a principal amount of $10. The CUSIP number for each issue of ARNs will be set forth in the applicable term sheet. You may transfer ARNs only in whole units.

Payment at Maturity

At maturity, subject to our credit risk as issuer of ARNs, you will receive a Redemption Amount, denominated in U.S. dollars. In no event will the Redemption Amount be less than zero. The **Redemption Amount** will be calculated as follows:

If the Ending Value is greater than the Starting Value, then the Redemption Amount will equal:

The Redemption Amount will not exceed a **Capped Value** set forth in the term sheet.

If the Ending Value is less than or equal to the Starting Value, then the Redemption Amount will equal:

The Redemption Amount will not be less than zero.

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Your participation in any upside potential of the Market Measure underlying your ARNs will also be impacted by the Participation Rate. The **Participation Rate** will be 300% for ARNs unless otherwise set forth in the term sheet.

Each term sheet will provide examples of Redemption Amounts based on a range of hypothetical Ending Values.

If specified in the term sheet, your ARNs may be **Relative Value ARNs**, the return on which will be determined based on the relative performance of two or more Underlying Stocks. The specific terms of any Relative Value ARNs will be set forth in the term sheet.

The term sheet will set forth information as to the specific Market Measure, including information as to the historical prices of the Underlying Stock or Underlying Stocks. However, historical prices of any Underlying Stock are not indicative of its future performance or the performance of your ARNs.

An investment in ARNs does not entitle you to any ownership interest, including any voting rights, in any Underlying Stock, nor dividends paid or other distributions made, by any Underlying Company.

The Starting Value and the Ending Value

Starting Value

The **Starting Value** will be the price of the Underlying Stock on the pricing date, determined as set forth in the term sheet.

If the Market Measure consists of a Basket, the Starting Value will be equal to 100. See Basket Market Measures.

Ending Value

The **Ending Value** will be the Closing Market Price of the Underlying Stock on the calculation day multiplied by its Price Multiplier on that day.

If the Market Measure consists of a Basket, the Ending Value of the Basket will be determined as described in Basket Market Measures.

The **calculation day** means a trading day shortly before the maturity date. The calculation day will be set forth in the term sheet.

A **trading day** means a day on which trading is generally conducted (or was scheduled to have been generally conducted, but for the occurrence of a Market Disruption Event) on the New York Stock Exchange (the **NYSE**), the NASDAQ Stock Market, the Chicago Board Options Exchange, and in the over-the-counter market for equity securities in the United States, or any successor exchange or market, or in the case of a security traded on one or more non-U.S. securities exchanges or markets, on the principal non-U.S. securities exchange or market for such security.

The **Closing Market Price** for one share of any Underlying Stock (or one unit of any other security for which a Closing Market Price must be determined) on any trading day means any of the following:

- if the Underlying Stock (or such other security) is listed or admitted to trading on a national securities exchange, the last reported sale price, regular way (or, in the case of The NASDAQ Stock Market, the official closing price), of the principal trading session on that day on the principal U.S. securities exchange registered under the Exchange Act on which the Underlying Stock (or such other security) is listed or admitted to trading;

- if the Underlying Stock (or such other security) is not listed or admitted to trading on any national securities exchange but is included in the OTC Bulletin Board, the last reported sale price of the principal trading session on the OTC Bulletin Board on that day;

- if the Underlying Stock (or such other security) is issued by a foreign issuer and its closing price cannot be determined as set forth in the two bullet points above, and the Underlying Stock (or such other security) is listed or admitted to trading on a non-U.S. securities exchange or market, the last reported sale price, regular way, of the principal trading session on that day on the primary non-U.S. securities exchange or market on which the Underlying Stock (or such other security) is listed or admitted to trading (converted to U.S. dollars using such exchange rate as the calculation agent, in its sole discretion, determines to be commercially reasonable); or

- if the Closing Market Price cannot be determined as set forth in the prior bullets, the mean, as determined by the calculation agent, of the bid prices for the Underlying Stock (or such other security) obtained from as many dealers in that security (which may include us, MLPF&S and/or any of our other affiliates), but not exceeding three, as will make the bid prices available to the calculation agent. If no such bid price can be obtained, the Closing Market Price will be determined (or, if not determinable, estimated) by the calculation agent in its sole discretion in a commercially reasonable manner.

If there is a Market Disruption Event on the scheduled calculation day, the calculation day will be the immediately succeeding trading day during which no Market Disruption Event occurs or is continuing; provided that the Closing Market Price of the Underlying Stock will be determined (or, if not determinable, estimated) by the calculation agent in a commercially reasonable manner on a date no later than the second scheduled trading day prior to the maturity date, regardless of the occurrence of a Market Disruption Event on that day.

The initial **Price Multiplier** for an Underlying Stock will be one, unless otherwise set forth in the applicable term sheet. The Price Multiplier will be subject to adjustment for certain corporate events relating to an Underlying Stock described below under Anti-Dilution Adjustments.

Market Disruption Events

As to any Underlying Stock, a **Market Disruption Event** means any of the following events, as determined by the calculation agent in its sole discretion:

(A) the suspension of or material limitation of trading, in each case, for more than two consecutive hours of trading, or during the one-half hour period preceding the close of trading, of the shares of the Underlying Stock (or the successor to the Underlying Stock) on the primary exchange where such shares trade, as determined by the calculation agent (without taking into account any extended or after-hours trading session);

(B) the suspension of or material limitation of trading, in each case, for more than two consecutive hours of trading, or during the one-half hour period preceding the close

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of trading, on the primary exchange that trades options contracts or futures contracts related to the shares of the Underlying Stock (or successor to the Underlying Stock) as determined by the calculation agent (without taking into account any extended or after-hours trading session), in options contracts or futures contracts related to the shares of the Underlying Stock; or

(C) the determination that the scheduled calculation day is not a trading day by reason of an extraordinary event, occurrence, declaration, or otherwise.

For the purpose of determining whether a Market Disruption Event has occurred:

(1) a limitation on the hours in a trading day and/or number of days of trading will not constitute a Market Disruption Event if it results from an announced change in the regular business hours of the relevant exchange;

(2) a decision to permanently discontinue trading in the shares of the Underlying Stock (or successor Underlying Stock) or the relevant futures or options contracts relating to such shares will not constitute a Market Disruption Event;

(3) a suspension in trading in a futures or options contract on the shares of the Underlying Stock (or successor Underlying Stock), by a major securities market by reason of (a) a price change violating limits set by that securities market, (b) an imbalance of orders relating to those contracts, or (c) a disparity in bid and ask quotes relating to those contracts, will each constitute a suspension of or material limitation on trading in futures or options contracts relating to the Underlying Stock;

(4) subject to paragraph (3) above, a suspension of or material limitation on trading on the relevant exchange will not include any time when that exchange is closed for trading under ordinary circumstances; and

(5) for the purpose of clause (A) above, any limitations on trading during significant market fluctuations under NYSE Rule 80B, or any applicable rule or regulation enacted or promulgated by the NYSE or any other self-regulatory organization or the SEC of similar scope as determined by the calculation agent, will be considered material.

Anti-Dilution Adjustments

As to any Underlying Stock, the calculation agent, in its sole discretion, may adjust the Price Multiplier (and as a result, the Ending Value), and any other terms of ARNs (such as the Starting Value), if an event described below occurs after the pricing date and on or before the calculation day and if the calculation agent determines that such an event has a diluting or concentrative effect on the theoretical value of the shares of the Underlying Stock or successor Underlying Stock.

The Price Multiplier resulting from any of the adjustments specified below will be rounded to the eighth decimal place with five one-billionths being rounded upward. No adjustments to the Price Multiplier will be required unless the adjustment would require a change of at least 0.1% in the Price Multiplier then in effect. Any adjustment that would require a change of less than 0.1% in the Price Multiplier which is not applied at the time of the event may be reflected at the time of any subsequent adjustment that would require a change of the Price Multiplier. The required adjustments specified below do not cover all events that could affect the Underlying Stock.

No adjustments to the Price Multiplier or any other terms of ARNs will be required other than those specified below. However, the calculation agent may, at its sole discretion, make

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additional adjustments to the Price Multiplier or any other terms of ARNs to reflect changes to the Underlying Stock if the calculation agent determines that the adjustment is appropriate to ensure an equitable result.

The calculation agent will be solely responsible for the determination of any adjustments to the Price Multiplier or any other terms of ARNs and of any related determinations with respect to any distributions of stock, other securities or other property or assets, including cash, in connection with any corporate event described below; its determinations and calculations will be conclusive absent a determination of a manifest error.

No adjustments are required to be made for certain other events, such as offerings of common equity securities by the Underlying Company for cash or in connection with the occurrence of a partial tender or exchange offer for the Underlying Stock by the Underlying Company.

Following an event that results in an adjustment to the Price Multiplier or any of the other terms of ARNs, the calculation agent may (but is not required to) provide holders of ARNs with information about that adjustment as it deems appropriate, depending on the nature of the adjustment. Upon written request by any holder of ARNs, the calculation agent will provide that holder with information about such adjustment.

Anti-Dilution Adjustments to Underlying Stocks that Are Common Equity

The calculation agent, in its sole discretion and as it deems reasonable, may adjust the Price Multiplier and other terms of ARNs, and hence the Ending Value, as a result of certain events related to an Underlying Stock, which include, but are not limited to, the following:

Stock Splits and Reverse Stock Splits. If an Underlying Stock is subject to a stock split or reverse stock split, then once such split has become effective, the Price Multiplier will be adjusted such that the new Price Multiplier will equal the product of:

- the prior Price Multiplier; and
- the number of shares that a holder of one share of the Underlying Stock before the effective date of the stock split or reverse stock split would have owned immediately following the applicable effective date.

For example, a two-for-one stock split would ordinarily change a Price Multiplier of one into a Price Multiplier of two. In contrast, a one-for-two reverse stock split would ordinarily change a Price Multiplier of one into a Price Multiplier of one-half.

Stock Dividends. If an Underlying Stock is subject to (i) a stock dividend (i.e., an issuance of additional shares of Underlying Stock) that is given ratably to all holders of the Underlying Stock or (ii) a distribution of additional shares of the Underlying Stock as a result of the triggering of any provision of the organizational documents of the Underlying Company, then, once the dividend has become effective and the Underlying Stock is trading ex-dividend, the Price Multiplier will be adjusted on the ex-dividend date such that the new Price Multiplier will equal the prior Price Multiplier *plus* the product of:

- the prior Price Multiplier; and
- the number of additional shares issued in the stock dividend with respect to one share of the Underlying Stock;

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provided that no adjustment will be made for a stock dividend for which the number of shares of the Underlying Stock paid or distributed is based on a fixed cash equivalent value, unless such distribution is an Extraordinary Dividend (as defined below).

For example, a stock dividend of one new share for each share held would ordinarily change a Price Multiplier of one into a Price Multiplier of two.

Extraordinary Dividends. There will be no adjustments to the Price Multiplier to reflect any cash dividends or cash distributions paid with respect to an Underlying Stock other than Extraordinary Dividends, as described below, and distributions described under the section entitled Reorganization Events below.

An **Extraordinary Dividend** means, with respect to a cash dividend or other distribution with respect to an Underlying Stock, a dividend or other distribution that the calculation agent determines, in its sole discretion, is not declared or otherwise made according to the Underlying Company s then existing policy or practice of paying such dividends on a quarterly or other regular basis. If an Extraordinary Dividend occurs, the Price Multiplier will be adjusted on the ex-dividend date so that the new Price Multiplier will equal the product of:

- the prior Price Multiplier; and
- a fraction, the numerator of which is the Closing Market Price per share of the Underlying Stock on the trading day preceding the ex-dividend date and the denominator of which is the amount by which the Closing Market Price per share of the Underlying Stock on that preceding trading day exceeds the Extraordinary Dividend Amount.

The **Extraordinary Dividend Amount** with respect to an Extraordinary Dividend will equal:

- in the case of cash dividends or other distributions that constitute regular dividends, the amount per share of the Underlying Stock of that Extraordinary Dividend minus the amount per share of the immediately preceding non-Extraordinary Dividend for that share; or
- in the case of cash dividends or other distributions that do not constitute regular dividends, the amount per share of the Underlying Stock of that Extraordinary Dividend.

To the extent an Extraordinary Dividend is not paid in cash, the value of the non-cash component will be determined by the calculation agent, whose determination will be conclusive. A distribution on the Underlying Stock described in the section Issuance of Transferable Rights or Warrants or clause (a), (d) or (e) of the section entitled Reorganization Events below that also constitutes an Extraordinary Dividend will only cause an adjustment under those respective sections.

Issuance of Transferable Rights or Warrants. If an Underlying Company issues transferable rights or warrants to all holders of record of the Underlying Stock to subscribe for or purchase the Underlying Stock, including new or existing rights to purchase the Underlying Stock under a shareholder rights plan or arrangement, then the Price Multiplier will be adjusted on the trading day immediately following the issuance of those transferable rights or warrants so that the new Price Multiplier will equal the prior Price Multiplier plus the product of:

- the prior Price Multiplier; and

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the number of shares of the Underlying Stock that can be purchased with the cash value of those warrants or rights distributed on one share of the Underlying Stock.

The number of shares that can be purchased will be based on the Closing Market Price of the Underlying Stock on the date the new Price Multiplier is determined. The cash value of those warrants or rights, if the warrants or rights are traded on a registered national securities exchange, will equal the closing price of that warrant or right. If the warrants or rights are not traded on a registered national securities exchange, the cash value will be determined by the calculation agent and will equal the average of the bid prices obtained from three dealers at 3:00 p.m., New York time on the date the new Price Multiplier is determined, provided that if only two of those bid prices are available, then the cash value of those warrants or rights will equal the average of those bids and if only one of those bids is available, then the cash value of those warrants or rights will equal that bid.

Reorganization Events

If after the pricing date and on or prior to the calculation day, as to any Underlying Stock:

(a) there occurs any reclassification or change of the Underlying Stock, including, without limitation, as a result of the issuance of tracking stock by the Underlying Company;

(b) the Underlying Company, or any surviving entity or subsequent surviving entity of the Underlying Company (a **Successor Entity**), has been subject to a merger, combination, or consolidation and is not the surviving entity;

(c) any statutory exchange of securities of the Underlying Company or any Successor Entity with another corporation occurs, other than under clause (b) above;

(d) the Underlying Company is liquidated or is subject to a proceeding under any applicable bankruptcy, insolvency, or other similar law;

(e) the Underlying Company issues to all of its shareholders securities of an issuer other than the Underlying Company, including equity securities of an affiliate of the Underlying Company, other than in a transaction described in clauses (b), (c), or (d) above;

(f) a tender or exchange offer or going-private transaction is consummated for all the outstanding shares of the Underlying Company;

(g) there occurs any reclassification or change of the Underlying Stock that results in a transfer or an irrevocable commitment to transfer all such outstanding shares of the Underlying Stock to another entity or person;

(h) the Underlying Company or any Successor Entity is the surviving entity of a merger, combination, or consolidation, that results in the outstanding Underlying Stock (other than Underlying Stock owned or controlled by the other party to such transaction) immediately prior to such event collectively representing less than 50% of the outstanding Underlying Stock immediately following such event; or

(i) the Underlying Company ceases to file the financial and other information with the SEC in accordance with Section 13(a) of the Exchange Act (an event in clauses (a) through (i), a **Reorganization Event**),

then, on or after the date of the occurrence of a Reorganization Event, the calculation agent shall, in its sole discretion, make an adjustment to the Price Multiplier or any other terms of ARNs as the calculation agent, in its sole discretion, determines appropriate to account for the economic effect on ARNs of that Reorganization Event (including adjustments to account for changes in volatility, expected dividends, stock loan rate, or liquidity relevant to the Underlying Stock or to ARNs), which may, but need not, be determined by reference to the adjustment(s) made in respect of such Reorganization Event by an options exchange to options on the relevant Underlying Stock traded on that options exchange and determine the effective date of that adjustment. If the calculation agent determines that no adjustment that it could make will produce a commercially reasonable result, then the calculation agent may cause the maturity date of ARNs to be accelerated to the fifth business day following the date of that determination and the amount payable to you will be calculated as though the date of early repayment were the stated maturity date of ARNs and as though the calculation day were the fifth trading day prior to the date of acceleration.

If the Underlying Company ceases to file the financial and other information with the SEC in accordance with Section 13(a) of the Exchange Act, as contemplated by clause (i) above, and the calculation agent determines in its sole discretion that sufficiently similar information is not otherwise available to you, then the calculation agent may cause the maturity date of ARNs to be accelerated to the fifth business day following the date of that determination and the amount payable to you will be calculated as though the date of early repayment were the stated maturity date of ARNs, and as though the calculation day were the fifth trading day prior to the date of acceleration. If the calculation agent determines that sufficiently similar information is available to you, the Reorganization Event will be deemed to have not occurred.

Alternative Anti-Dilution and Reorganization Adjustments

The calculation agent may elect at its discretion to not make any of the adjustments to the Price Multiplier or to the other terms of ARNs described in this section, but may instead make adjustments, in its discretion, to the Price Multiplier or any other terms of ARNs (such as the Starting Value) that will reflect the adjustments to the extent practicable made by the Options Clearing Corporation on options contracts on an Underlying Stock or any successor common stock. For example, if the Underlying Stock is subject to a two-for-one stock split, and the Options Clearing Corporation adjusts the strike prices of the options contract on the Underlying Stock by dividing the strike price by two, then the calculation agent may also elect to divide the Starting Value by two. In this case, the Price Multiplier will remain one. This adjustment would have the same economic effect on holders of ARNs as if the Price Multiplier had been adjusted.

Anti-Dilution Adjustments to Underlying Stocks that Are ADRs

For purposes of the anti-dilution adjustments set forth above, if an Underlying Stock is an ADR (an **Underlying ADR**), the calculation agent will consider the effect of any of the relevant events on the Underlying ADR, and adjustments will be made as if the Underlying ADR was the Underlying Stock described above. For example, if the stock represented by the Underlying ADR is subject to a two-for-one stock split, and assuming an initial Price Multiplier of 1, the Price Multiplier for the Underlying ADR would be adjusted so that it equals two. Unless otherwise specified in the applicable term sheet, with respect to ARNs linked to an Underlying ADR (or an Underlying Stock issued by a non-U.S. Underlying Company), the term dividend means the dividends paid to holders of the Underlying ADR (or the Underlying Stock issued by the non-U.S. Underlying Company), and such dividends may reflect the netting of any applicable foreign withholding or similar taxes that may be due on dividends paid to a U.S. person.

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The calculation agent may determine not to make an adjustment if:

(A) holders of the Underlying ADR are not eligible to participate in any of the events that would otherwise require anti-dilution adjustments as set forth above if ARNs had been linked directly to the common shares of the Underlying Company represented by the Underlying ADR; or

(B) to the extent that the calculation agent determines that the Underlying Company or the depositary for the ADRs has adjusted the number of common shares of the Underlying Company represented by each share of the Underlying ADR, so that the market price of the Underlying ADR would not be affected by the corporate event.

If the Underlying Company or the depositary for the ADRs, in the absence of any of the events described above, elects to adjust the number of common shares of the Underlying Company represented by each share of the Underlying ADR, then the calculation agent may make the appropriate anti-dilution adjustments to reflect such change. The depositary for the ADRs may also make adjustments in respect of the ADRs for share distributions, rights distributions, cash distributions and distributions other than shares, rights, and cash. Upon any such adjustment by the depositary, the calculation agent may adjust the Price Multiplier or other terms of ARNs as the calculation agent determines commercially reasonable to account for that event.

Delisting of ADRs or Termination of ADR Facility

If an Underlying ADR is no longer listed or admitted to trading on a U.S. securities exchange registered under the Exchange Act or included in the OTC Bulletin Board Service operated by FINRA, or if the ADR facility between the Underlying Company and the ADR depositary is terminated for any reason, then, on and after the date that the Underlying ADR is no longer so listed or admitted to trading or the date of such termination, as applicable (the **termination date**), the Market Measure for ARNs will be deemed to be the Underlying Company s common equity securities rather than the Underlying ADR. The calculation agent will determine the price of the Market Measure by reference to those common shares. Under such circumstances, the calculation agent may modify any terms of ARNs as it deems necessary, in its sole discretion, to ensure an equitable result. On and after the termination date, for all purposes, the Closing Market Price of the Underlying Company s common shares on their primary exchange will be converted to U.S. dollars using such exchange rate as the calculation agent, in its sole discretion, determines to be commercially reasonable.

Underlying Stock

Any information regarding any Underlying Stock or any Underlying Company will be derived from publicly available documents. Any Underlying Stock will be registered under the Exchange Act. Information provided to or filed with the SEC by any Underlying Company can be located at the SEC s facilities or through the SEC s website, www.sec.gov. Neither we nor any selling agent will have independently verified the accuracy or completeness of any of the information or reports of an Underlying Company.

The selection of an Underlying Stock is not a recommendation to buy or sell the Underlying Stock. Neither we nor any of our subsidiaries or affiliates makes any representation to any purchaser of ARNs as to the performance of any Underlying Stock.

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Basket Market Measures

If the Market Measure to which your ARNs are linked is a Basket, the Basket Stocks will be set forth in the term sheet. We will assign each Basket Stock a weighting (the **Initial Component Weight**) so that each Basket Stock represents a percentage of the Starting Value of the Basket on the pricing date. We may assign the Basket Stocks equal Initial Component Weights, or we may assign the Basket Stocks unequal Initial Component Weights. The Initial Component Weight for each Basket Stock will be stated in the term sheet.

Determination of the Component Ratio for Each Basket Stock

The **Starting Value** of the Basket will be equal to 100. We will set a fixed factor (the **Component Ratio**) for each Basket Stock on the pricing date, based upon the weighting of that Basket Stock. The Component Ratio for each Basket Stock will equal:

the Initial Component Weight (expressed as a percentage) for that Basket Stock, multiplied by 100; *divided by*

the Closing Market Price of that Basket Stock on the pricing date.

Each Component Ratio will be rounded to eight decimal places.

The Component Ratios will be calculated in this way so that the Starting Value of the Basket will equal 100 on the pricing date. The Component Ratios will not be revised subsequent to their determination on the pricing date, except that the calculation agent may in its good faith judgment adjust the Component Ratio of any Basket Stock in the event that Basket Stock is materially changed or modified in a manner that does not, in the opinion of the calculation agent, fairly represent the value of that Basket Stock had those material changes or modifications not been made.

The following table is for illustration purposes only, and does not reflect the actual composition, Initial Component Weights, or Component Ratios, which will be set forth in the term sheet.

Example: The **hypothetical** Basket Stocks are Stock ABC, Stock XYZ, and Stock RST, with their Initial Component Weights being 50.00%, 25.00% and 25.00%, respectively, on a **hypothetical** pricing date:

Basket Stock	Initial Component Weight	Hypothetical Closing Market Price(1)	Hypothetical Component Ratio(2)	Initial Basket Value Contribution
Stock ABC	50.00%	50.00	1.00000000	50.00
Stock XYZ	25.00%	24.00	1.04166667	25.00
Stock RST	25.00%	10.00	2.50000000	25.00
Starting Value				100.00

(1) This column sets forth the **hypothetical** Closing Market Price of each Basket Stock on the **hypothetical** pricing date.

(2) The **hypothetical** Component Ratio for each Basket Stock equals its Initial Component Weight (expressed as a percentage) multiplied by 100, and then divided by the Closing Market Price of that Basket Stock on the **hypothetical** pricing date, with the result rounded to eight decimal places.

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Ending Value of the Basket

The **Ending Value** of the Basket will be the value of the Basket on the calculation day. The value of the Basket will equal the sum of the products of the Closing Market Price of each Basket Stock on a trading day multiplied by its Price Multiplier on that day, and the Component Ratio for each Basket Stock. The value of the Basket will vary based on the increase or decrease in the price of each Basket Stock. Any increase in the price of a Basket Stock (assuming no change in the price of the other Basket Stock or Basket Stocks) will result in an increase in the value of the Basket. Conversely, any decrease in the price of a Basket Stock (assuming no change in the price of the other Basket Stock or Basket Stocks) will result in a decrease in the value of the Basket.

Unless otherwise specified in the term sheet, if, for any Basket Stock (an **Affected Basket Stock**), a Market Disruption Event occurs on the scheduled calculation day (such day being a **non-calculation day**), the calculation agent will determine the prices of the Basket Stocks for that non-calculation day, and as a result, the Ending Value, as follows:

The Closing Market Price of each Basket Stock that is not an Affected Basket Stock will be its Closing Market Price on that non-calculation day.

The Closing Market Price of each Basket Stock that is an Affected Basket Stock for the applicable non-calculation day will be determined in the same manner as described in the second to last paragraph of subsection The Starting Value and the Ending Value Ending Value, provided that references to Underlying Stock will be references to Basket Stock.

For purposes of determining whether a Market Disruption Event has occurred as to any Basket Stock, Market Disruption Event will have the meaning stated above in Market Disruption Events.

Role of the Calculation Agent

The calculation agent has the sole discretion to make all determinations regarding ARNs as described in this product supplement, including determinations regarding the Starting Value, the Ending Value, the Price Multiplier, the Closing Market Price, the Redemption Amount, any Market Disruption Events, a successor Underlying Stock, business days, trading days and non-calculation days. Absent manifest error, all determinations of the calculation agent will be conclusive for all purposes and final and binding on you and us, without any liability on the part of the calculation agent.

We expect to appoint MLPF&S or one of our other affiliates as the calculation agent for each issue of ARNs. However, we may change the calculation agent at any time without notifying you. The identity of the calculation agent will be set forth in the applicable term sheet.

Same-Day Settlement and Payment

ARNs will be delivered in book-entry form only through The Depository Trust Company against payment by purchasers of ARNs in immediately available funds. We will pay the Redemption Amount in immediately available funds so long as ARNs are maintained in book-entry form.

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Events of Default and Acceleration

Events of default are defined in the Senior Indenture. If such an event occurs and is continuing, unless otherwise stated in the term sheet, the amount payable to a holder of ARNs upon any acceleration permitted under the Senior Indenture will be equal to the Redemption Amount described under the caption Payment at Maturity, determined as if the date of acceleration were the maturity date of ARNs and as if the fifth trading day prior to the date of acceleration were the calculation day. If a bankruptcy proceeding is commenced in respect of us, your claim may be limited under applicable bankruptcy law. In case of a default in payment of ARNs, whether at their maturity or upon acceleration, they will not bear a default interest rate.

Listing

Unless otherwise specified in the applicable term sheet, ARNs will not be listed on a securities exchange or quotation system.

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SUPPLEMENTAL PLAN OF DISTRIBUTION

One or more of our affiliates may act as our selling agent for any offering of the ARNs. The selling agents may act on either a principal basis or an agency basis, as set forth in the applicable term sheet. Each selling agent will be a party to a distribution agreement described in the "Supplemental Plan of Distribution (Conflicts of Interest)" beginning on page S-15 of the accompanying prospectus supplement.

Each selling agent will receive an underwriting discount or commission that is a percentage of the aggregate principal amount of ARNs sold through its efforts, which will be set forth in the applicable term sheet. You must have an account with the applicable selling agent in order to purchase ARNs.

None of the selling agents is acting as your fiduciary or advisor solely as a result of the making of any offering of the ARNs, and you should not rely upon this product supplement, the term sheet, or the accompanying prospectus or prospectus supplement as investment advice or a recommendation to purchase any ARNs. You should make your own investment decision regarding ARNs after consulting with your legal, tax, and other advisors.

MLPF&S and any of our other affiliates may use this product supplement, the prospectus supplement, and the prospectus, together with the applicable term sheet, in a market-making transaction for any ARNs after their initial sale.

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U.S. FEDERAL INCOME TAX SUMMARY

The following summary of the material U.S. federal income tax considerations of the acquisition, ownership, and disposition of ARNs is based upon the advice of Morrison & Foerster LLP, our tax counsel. The following discussion supplements, and to the extent inconsistent supersedes, the discussions under U.S. Federal Income Tax Considerations in the accompanying prospectus and under U.S. Federal Income Tax Considerations in the accompanying prospectus supplement and is not exhaustive of all possible tax considerations. This summary is based upon the Internal Revenue Code of 1986, as amended (the **Code**), regulations promulgated under the Code by the U.S. Treasury Department (**Treasury**) (including proposed and temporary regulations), rulings, current administrative interpretations and official pronouncements of the IRS, and judicial decisions, all as currently in effect and all of which are subject to differing interpretations or to change, possibly with retroactive effect. No assurance can be given that the IRS would not assert, or that a court would not sustain, a position contrary to any of the tax consequences described below. This summary does not include any description of the tax laws of any state or local governments, or of any foreign government, that may be applicable to a particular holder. If the tax consequences associated with ARNs are different than those described below, they will be described in the applicable term sheet.

This summary is directed solely to U.S. Holders and Non-U.S. Holders that, except as otherwise specifically noted, will purchase ARNs upon original issuance and will hold ARNs as capital assets within the meaning of Section 1221 of the Code, which generally means property held for investment, and that are not excluded from the discussion under U.S. Federal Income Tax Considerations in the accompanying prospectus.

You should consult your own tax advisor concerning the U.S. federal income tax consequences to you of acquiring, owning, and disposing of ARNs, as well as any tax consequences arising under the laws of any state, local, foreign, or other tax jurisdiction and the possible effects of changes in U.S. federal or other tax laws.

General

Although there is no statutory, judicial, or administrative authority directly addressing the characterization of ARNs, we intend to treat ARNs for all tax purposes as single financial contracts with respect to the Market Measure and under the terms of ARNs, we and every investor in ARNs agree, in the absence of an administrative determination or judicial ruling to the contrary, to treat ARNs in accordance with such characterization. This discussion assumes that ARNs constitute single financial contracts with respect to the Market Measure for U.S. federal income tax purposes. If ARNs did not constitute single financial contracts, the tax consequences described below would be materially different.

This characterization of ARNs is not binding on the IRS or the courts. No statutory, judicial, or administrative authority directly addresses the characterization of ARNs or any similar instruments for U.S. federal income tax purposes, and no ruling is being requested from the IRS with respect to their proper characterization and treatment. Due to the absence of authorities on point, significant aspects of the U.S. federal income tax consequences of an investment in ARNs are not certain, and no assurance can be given that the IRS or any court will agree with the characterization and tax treatment described in this product supplement. Accordingly, you are urged to consult your tax advisor regarding all aspects of the U.S. federal income tax consequences of an investment in ARNs, including possible alternative characterizations.

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Unless otherwise stated, the following discussion is based on the characterization described above. The discussion in this section assumes that there is a significant possibility of a significant loss of principal on an investment in ARNs.

We will not attempt to ascertain whether the issuer of any Underlying Stock would be treated as a passive foreign investment company (**PFIC**), within the meaning of Section 1297 of the Code, or a United States real property holding corporation, within the meaning of Section 897(c) of the Code. If the issuer of any Underlying Stock were so treated, certain adverse U.S. federal income tax consequences could possibly apply to a holder of ARNs. You should refer to information filed with the SEC by the issuer of any Underlying Stock and consult your tax advisor regarding the possible consequences to you, if any, if the issuer of any Underlying Stock is or becomes a PFIC or is or becomes a United States real property holding corporation.

U.S. Holders

Upon receipt of a cash payment at maturity or upon a sale or exchange of ARNs prior to maturity, a U.S. Holder generally will recognize capital gain or loss equal to the difference between the amount realized and the U.S. Holder s tax basis in ARNs. A U.S. Holder s tax basis in ARNs will equal the amount paid by that holder to acquire them. This capital gain or loss generally will be long-term capital gain or loss if the U.S. Holder held ARNs for more than one year. The deductibility of capital losses is subject to limitations.

Alternative Tax Treatments. Due to the absence of authorities that directly address the proper tax treatment of ARNs, prospective investors are urged to consult their tax advisors regarding all possible alternative tax treatments of an investment in ARNs. In particular, if ARNs have a term that exceeds one year, the IRS could seek to subject ARNs to the Treasury regulations governing contingent payment debt instruments. If the IRS were successful in that regard, the timing and character of income on ARNs would be affected significantly. Among other things, a U.S. Holder would be required to accrue original issue discount every year at a comparable yield determined at the time of issuance. In addition, any gain realized by a U.S. Holder at maturity, or upon a sale or exchange, of ARNs generally would be treated as ordinary income, and any loss realized at maturity would be treated as ordinary loss to the extent of the U.S. Holder s prior accruals of original issue discount, and as capital loss thereafter. If ARNs have a term of one year or less, ARNs would generally be subject to the rules concerning short-term debt instruments as described under the heading U.S. Federal Income Tax Considerations Taxation of Debt Securities Consequences to U.S. Holders Short-Term Debt Securities.

The IRS released Notice 2008-2 (Notice) which sought comments from the public on the taxation of financial instruments currently taxed as prepaid forward contracts. This Notice addresses instruments such as ARNs. According to the Notice, the IRS and Treasury are considering whether a holder of an instrument such as ARNs should be required to accrue ordinary income on a current basis, regardless of whether any payments are made prior to maturity. It is not possible to determine what guidance the IRS and Treasury will ultimately issue, if any. Any such future guidance may affect the amount, timing and character of income, gain, or loss in respect of ARNs, possibly with retroactive effect.

The IRS and Treasury are also considering additional issues, including whether additional gain or loss from such instruments should be treated as ordinary or capital, whether foreign holders of such instruments should be subject to withholding tax on any deemed income accruals, whether Section 1260 of the Code, concerning certain constructive ownership transactions, generally applies or should generally apply to such instruments, and whether any of these determinations depend on the nature of the underlying asset.

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In addition, proposed Treasury regulations require the accrual of income on a current basis for contingent payments made under certain notional principal contracts. The preamble to the regulations states that the wait and see method of accounting does not properly reflect the economic accrual of income on those contracts, and requires current accrual of income for some contracts already in existence. While the proposed regulations do not apply to prepaid forward contracts, the preamble to the proposed regulations expresses the view that similar timing issues exist in the case of prepaid forward contracts. If the IRS or Treasury publishes future guidance requiring current economic accrual for contingent payments on prepaid forward contracts, it is possible that you could be required to accrue income over the term of ARNs.

Because of the absence of authority regarding the appropriate tax characterization of ARNs, it is also possible that the IRS could seek to characterize ARNs in a manner that results in tax consequences that are different from those described above. For example, the IRS could possibly assert that any gain or loss that a holder may recognize at maturity or upon sale or exchange of ARNs should be treated as ordinary gain or loss.

It is possible that the IRS could assert that a U.S. Holder s holding period in respect of ARNs should end on the applicable calculation day, even though such holder will not receive any amounts in respect of ARNs prior to the redemption or maturity of ARNs. In such case, if the applicable calculation day is not in excess of one year from the original issue date, a U.S. Holder may be treated as having a holding period in respect of ARNs equal to one year or less, in which case any gain or loss such holder recognizes at such time would be treated as short-term capital gain or loss.

Non-U.S. Holders

A Non-U.S. Holder generally will not be subject to U.S. federal income or withholding tax on any gain from the sale or exchange of ARNs or their settlement at maturity, provided that the Non-U.S. Holder complies with applicable certification requirements and that the payment is not effectively connected with the conduct by the Non-U.S. Holder of a U.S. trade or business. Notwithstanding the foregoing, gain from the sale or exchange of ARNs or their settlement at maturity may be subject to U.S. federal income tax if that Non-U.S. Holder is a non-resident alien individual and is present in the U.S. for 183 days or more during the taxable year of the settlement at maturity, sale or exchange and certain other conditions are satisfied.

If a Non-U.S. Holder of ARNs is engaged in the conduct of a trade or business within the U.S. and if gain realized on the settlement at maturity, sale or exchange of ARNs, is effectively connected with the conduct of such trade or business (and, if certain tax treaties apply, is attributable to a permanent establishment maintained by the Non-U.S. Holder in the U.S.), the Non-U.S. Holder generally will be subject to U.S. federal income tax on such gain on a net income basis in the same manner as if it were a U.S. Holder. Such Non-U.S. Holders should read the material under the heading U.S. Holders, for a description of the U.S. federal income tax consequences of acquiring, owning, and disposing of ARNs. In addition, if such Non-U.S. Holder is a foreign corporation, it may also be subject to a branch profits tax equal to 30% (or such lower rate provided by any applicable tax treaty) of a portion of its earnings and profits for the taxable year that are effectively connected with its conduct of a trade or business in the U.S., subject to certain adjustments.

A dividend equivalent payment is treated as a dividend from sources within the U.S. and such payments generally would be subject to a 30% (or a lower rate under an applicable treaty) U.S. withholding tax if paid to a Non-U.S. Holder. Under Treasury regulations, certain payments (including deemed payments) that are contingent upon or determined by reference to actual or estimated U.S. source dividends with respect to certain equity-linked instruments,

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whether explicitly stated or implicitly taken into account in computing one or more of the terms of such instruments, may be treated as dividend equivalents. However, this withholding on dividend equivalent payments, if any, will not apply to equity-linked instruments issued before January 1, 2016. If any payments are treated as dividend equivalents subject to withholding, we (or the applicable paying agent) would be entitled to withhold taxes without being required to pay any additional amounts with respect to amounts so withheld.

As discussed above, alternative characterizations of ARNs for U.S. federal income tax purposes are possible. Should an alternative characterization, by reason of change or clarification of the law, by regulation or otherwise, cause payments as to ARNs to become subject to withholding tax, we will withhold tax at the applicable statutory rate. As discussed above, the IRS has indicated in the Notice that it is considering whether income in respect of instruments such as ARNs should be subject to withholding tax. Prospective Non-U.S. Holders of ARNs should consult their own tax advisors in this regard.

U.S. Federal Estate Tax. Under current law, while the matter is not entirely clear, individual Non-U.S. Holders, and entities whose property is potentially includible in those individuals gross estates for U.S. federal estate tax purposes (for example, a trust funded by such an individual and with respect to which the individual has retained certain interests or powers), should note that, absent an applicable treaty benefit, ARNs are likely to be treated as U.S. situs property, subject to U.S. federal estate tax. These individuals and entities should consult their own tax advisors regarding the U.S. federal estate tax consequences of investing in ARNs.

Backup Withholding and Information Reporting

Please see the discussion under U.S. Federal Income Tax Considerations Taxation of Debt Securities Backup Withholding and Information Reporting in the accompanying prospectus for a description of the applicability of the backup withholding and information reporting rules to payments made on ARNs.

Foreign Account Tax Compliance Act

The IRS has announced that withholding under the Foreign Account Tax Compliance Act (as discussed in the prospectus supplement) on payments of gross proceeds from a sale or redemption of the notes will only apply to payments made after December 31, 2018.

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ERISA CONSIDERATIONS

Each fiduciary of a pension, profit-sharing, or other employee benefit plan subject to the Employee Retirement Income Security Act of 1974 (**ERISA**) (a **Plan**), should consider the fiduciary standards of ERISA in the context of the Plan s particular circumstances before authorizing an investment in the ARNs. Accordingly, among other factors, the fiduciary should consider whether the investment would satisfy the prudence and diversification requirements of ERISA and would be consistent with the documents and instruments governing the Plan.

The fiduciary investment considerations summarized above generally apply to employee benefit plans maintained by private-sector employers and to individual retirement accounts and other arrangements subject to Section 4975 of the Code, but generally do not apply to governmental plans (as defined in Section 3(32) of ERISA), certain church plans (as defined in Section 3(33) of ERISA), and foreign plans (as described in Section 4(b)(4) of ERISA). However, these other plans may be subject to similar provisions under applicable federal, state, local, foreign, or other regulations, rules, or laws (**similar laws**). The fiduciaries of plans subject to similar laws should also consider the foregoing issues in general terms as well as any further issues arising under the applicable similar laws.

In addition, we and certain of our subsidiaries and affiliates may be each considered a party in interest within the meaning of ERISA, or a disqualified person (within the meaning of the Code), with respect to many Plans, as well as many individual retirement accounts and Keogh plans (also **Plans**). Prohibited transactions within the meaning of ERISA or the Code would likely arise, for example, if the ARNs are acquired by or with the assets of a Plan with respect to which we or any of our affiliates is a party in interest, unless the ARNs are acquired under an exemption from the prohibited transaction rules. A violation of these prohibited transaction rules could result in an excise tax or other liabilities under ERISA and/or Section 4975 of the Code for such persons, unless exemptive relief is available under an applicable statutory or administrative exemption.

Under ERISA and various prohibited transaction class exemptions (**PTCEs**) issued by the U.S. Department of Labor, exemptive relief may be available for direct or indirect prohibited transactions resulting from the purchase, holding, or disposition of the ARNs. Those exemptions are PTCE 96-23 (for certain transactions determined by in-house asset managers), PTCE 95-60 (for certain transactions involving insurance company general accounts), PTCE 91-38 (for certain transactions involving bank collective investment funds), PTCE 90-1 (for certain transactions involving insurance company separate accounts), PTCE 84-14 (for certain transactions determined by independent qualified asset managers), and the exemption under Section 408(b)(17) of ERISA and Section 4975(d)(20) of the Code for certain arm s-length transactions with a person that is a party in interest solely by reason of providing services to Plans or being an affiliate of such a service provider (the **Service Provider Exemption**).

Because we may be considered a party in interest with respect to many Plans, the ARNs may not be purchased, held, or disposed of by any Plan, any entity whose underlying assets include plan assets by reason of any Plan s investment in the entity (a **Plan Asset Entity**) or any person investing plan assets of any Plan, unless such purchase, holding, or disposition is eligible for exemptive relief, including relief available under PTCE 96-23, 95-60, 91-38, 90-1, or 84-14 or the Service Provider Exemption, or such purchase, holding, or disposition is otherwise not prohibited. Any purchaser, including any fiduciary purchasing on behalf of a Plan, transferee or holder of the ARNs will be deemed to have represented, in its corporate and its fiduciary capacity, by its purchase and holding of the ARNs that either (a) it is not a Plan or a Plan Asset Entity and is not purchasing such ARNs on behalf of or with plan assets of any Plan or any plan subject to similar laws or (b) its purchase, holding, and disposition are eligible for exemptive relief or such purchase, holding, and disposition are not prohibited by ERISA or Section 4975 of the Code or similar laws.

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Further, any person acquiring or holding the ARNs on behalf of any plan or with any plan assets shall be deemed to represent on behalf of itself and such plan that (x) the plan is paying no more than, and is receiving no less than, adequate consideration within the meaning of Section 408(b)(17) of ERISA in connection with the transaction or any redemption of the ARNs, (y) none of us, MLPF&S, or any other selling agent directly or indirectly exercises any discretionary authority or control or renders investment advice or otherwise acts in a fiduciary capacity with respect to the assets of the plan within the meaning of ERISA and (z) in making the foregoing representations and warranties, such person has applied sound business principles in determining whether fair market value will be paid, and has made such determination acting in good faith.

In addition, any purchaser, that is a Plan or a Plan Asset Entity or that is acquiring the ARNs on behalf of a Plan or a Plan Asset Entity, including any fiduciary purchasing on behalf of a Plan or Plan Asset entity, will be deemed to have represented, in its corporate and its fiduciary capacity, by its purchase and holding of the ARNs that (a) none of us, MLPF&S, or any of our other affiliates is a **fiduciary** (under Section 3(21) of ERISA, or under any final or proposed regulations thereunder, or with respect to a governmental, church, or foreign plan under any similar laws) with respect to the acquisition, holding or disposition of the ARNs, or as a result of any exercise by us or our affiliates of any rights in connection with the ARNs, (b) no advice provided by us or any of our affiliates has formed a primary basis for any investment decision by or on behalf of such purchaser in connection with the ARNs and the transactions contemplated with respect to the ARNs, and (c) such purchaser recognizes and agrees that any communication from us or any of our affiliates to the purchaser with respect to the ARNs is not intended by us or any of our affiliates to be impartial investment advice and is rendered in its capacity as a seller of such ARNs and not a fiduciary to such purchaser. Purchasers of the ARNs have exclusive responsibility for ensuring that their purchase, holding, and disposition of the ARNs do not violate the prohibited transaction rules of ERISA or the Code or any similar regulations applicable to governmental or church plans, as described above.

This discussion is a general summary of some of the rules which apply to benefit plans and their related investment vehicles. This summary does not include all of the investment considerations relevant to Plans and other benefit plan investors such as governmental, church, and foreign plans and should not be construed as legal advice or a legal opinion. Due to the complexity of these rules and the penalties that may be imposed upon persons involved in non-exempt prohibited transactions, it is particularly important that fiduciaries or other persons considering purchasing the ARNs on behalf of or with plan assets of any Plan or other benefit plan investor consult with their legal counsel prior to directing any such purchase.

652

16,567

17,796

8,435

Loss on early extinguishment of debt (1)

0

0

0

0

9,092

Other income (expense), net (2)

(2,697
)

(3,097
)

(7,054
)

7,262

(3,338
)
Income from continuing operations before income tax expense

343,208

338,971

339,099

341,311

337,568

Income tax expense

99,767

100,368

105,844

98,964

100,296

Income from continuing operations

243,441

238,603

233,255

242,347

237,272

Income from discontinued operations, net of tax (3)

0

0

0

22,395

2,321

Net income

$
243,441

$
238,603

$
233,255

$

264,742

$
239,593

Financial position and other data (3)

Total assets

$
1,416,436

$
1,286,249

$
1,227,733

$
1,322,556

$
1,259,195

Operations:

Working capital

$
542,293

$
504,712

$
529,680

$
641,438

$
510,372

Current ratio

2.84 to 1

2.91 to 1

3.04 to 1

3.59 to 1

3.36 to 1

Depreciation and amortization

$
44,893

$
42,265

$
41,538

$
46,144

$
43,389

Capital expenditures

$
142,874

$
126,499

$
59,716

$
58,476

$
38,753

Gross profit as a % of net sales

33.2
%

31.7
%

28.5
%

28.6
%

28.5
%
Research, development, and testing expenses

$
156,959

$
158,254

$
139,183

$
136,573

$
117,845

Total long-term debt

$
507,275

$
490,920

$
359,334

$
344,749

$
419,354

Common stock and other shareholders' equity

$
483,251

$
387,564

$
421,041

$
572,448

$
402,205

Total long-term debt as a % of total capitalization (debt plus equity)

51.2
%

55.9
%

46.0
%

37.6
%

51.0
%
Common stock

Basic and diluted earnings per share:

Income from continuing operations

$
20.54

$
19.45

$
18.38

$
18.21

$
17.68

Income from discontinued operations (3)

0.00

0.00

0.00

1.69

0.17

Net income

$
20.54

$
19.45

$
18.38

$
19.90

$
17.85

Equity per share

$

40.79

$
32.44

$
33.83

$
43.70

$
29.98

Cash dividends declared per share (4)

$
6.40

$
5.80

$
4.70

$
3.80

$
28.00

22

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Notes to the Five Year Summary

(1) In March 2012, we entered into a $650 million five-year unsecured revolving credit facility. During 2012, we used a portion of the $650 million revolving credit facility to fund the early redemption of all of our then outstanding 7.125% senior notes (7.125% senior notes), as well as to repay the outstanding principal amount on the Foundry Park I, LLC mortgage loan agreement (mortgage loan). As a result, we recognized a loss on early extinguishment of debt of $10 million in 2012 from accelerated amortization of financing fees associated with the prior revolving credit facility, the 7.125% senior notes, and the mortgage loan, as well as costs associated with redeeming the 7.125% senior notes prior to maturity. Of the loss on early extinguishment of debt, $1 million is included as a component of income from discontinued operations, net of tax.

(2) Other income (expense), net in each year included the gain or loss on the Goldman Sachs interest rate swap, as well as several other small items. The loss on the interest rate swap was $5 million for the year ended December 31, 2016, $3 million for the year ended December 31, 2015, and $7 million for the year ended December 31, 2014. The gain on the interest rate swap was $7 million for the year ended December 31, 2013. The loss on the interest rate swap was $5 million for the year ended December 31, 2012. We terminated the interest rate swap on September 7, 2016, as discussed in Note 14 in the Notes to Consolidated Financial Statements. We did not use hedge accounting to record the interest rate swap, and accordingly, any change in the fair value was immediately recognized in earnings.

(3) On July 2, 2013, Foundry Park I completed the sale of its real estate assets which comprised the entire real estate development segment. The operations of the real estate development segment are reported as discontinued operations. The 2013 amount includes the gain on sale of discontinued business, net of tax, of $22 million. Financial position and cash flow data reflect discontinued operations and continuing operations together.

(4) Cash dividends declared per share for 2012 included a special dividend of $25 per share.

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

Forward-Looking Statements

The following discussion, as well as other discussions in this Annual Report on Form 10-K, contains forward-looking statements about future events and expectations within the meaning of the Private Securities Litigation Reform Act of 1995. We have based these forward-looking statements on our current expectations and projections about future results. When we use words in this document such as "anticipates," "intends," "plans," "believes," "estimates," "projects," "ex "should," "could," "may," "will," and similar expressions, we do so to identify forward-looking statements. Examples of forward-looking statements include, but are not limited to, statements we make regarding future prospects of growth in the petroleum additives market, other trends in the petroleum additives market, our ability to maintain or increase our market share, and our future capital expenditure levels.

We believe our forward-looking statements are based on reasonable expectations and assumptions, within the bounds of what we know about our business and operations. However, we offer no assurance that actual results will not differ materially from our expectations due to uncertainties and factors that are difficult to predict and beyond our control. Factors that could cause actual results to differ materially from expectations include, but are not limited to, the availability of raw materials and distribution systems; disruptions at manufacturing facilities, including single-sourced facilities; the ability to respond effectively to technological changes in our industry; failure to protect our intellectual property rights; failure to attract and retain a highly-qualified workforce; hazards common to chemical businesses; competition from other manufacturers; sudden or sharp raw material price increases; the gain or loss of significant customers; the occurrence or threat of extraordinary events, including natural disasters and terrorist attacks; risks related to operating outside of the United States; the impact of fluctuations in foreign exchange rates; an information technology system failure; political, economic, and regulatory factors concerning our products; future governmental regulation; resolution of environmental liabilities or legal proceedings; and our inability to realize expected benefits from investment in our infrastructure or future acquisitions or our inability to successfully integrate future acquisitions into our business. Risk factors are discussed in Item 1A, "Risk Factors."

You should keep in mind that any forward-looking statement made by us in this discussion or elsewhere speaks only as of the date on which we make it. New risks and uncertainties arise from time to time, and it is impossible for us to predict these events or how they may affect us. We have no duty to, and do not intend to, update or revise the forward-looking statements in this discussion after the date hereof, except as may be required by law. In light of these risks and uncertainties, any forward-looking statement made in this discussion or elsewhere, might not occur.

OVERVIEW

When comparing petroleum additives results in 2016 with 2015, net sales decreased 4.3% resulting primarily from changes in selling prices and foreign currency exchange, despite an increase in shipment volumes. Operating profit improved 2.7% in 2016 over 2015 levels resulting mostly from favorable raw material costs. Our operating profit margin remains strong at 18.9%.

Our operations generate cash that is in excess of the needs of the business. We continue to invest and manage our business for the long-run with the goal of helping our customers succeed in their marketplaces. We invest in organizational talent, technology development and processes, and global infrastructure, consisting of technical centers and supply capability, in support of our business.

During 2016, we repurchased 98,867 shares of our common stock at a total cost of $35.8 million.

In December 2016, we announced our intent to acquire Aditivos Mexicanos, S.A. de C.V. (AMSA) for $182.5 million. AMSA is a petroleum additives manufacturing, sales, and distribution company based in Mexico City, Mexico. We expect to close the transaction in the first half of 2017, pending a regulatory review in Mexico.

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RESULTS OF OPERATIONS

Net Sales

Our consolidated net sales for 2016 amounted to $2.0 billion, a decrease of $91 million, or 4.3% from 2015. The decrease between 2015 and 2014 was $195 million, or 8.3%.

No single customer accounted for 10% or more of our total net sales in 2016 or 2015. Sales to Shell amounted to $261 million (11% of consolidated net sales) in 2014. These sales represented a wide range of products sold to multiple Shell affiliates around the world.

The following table shows net sales by segment and product line for each of the last three years.

	Years Ended December 31,		
(in millions)	2016	2015	2014
Petroleum additives			
Lubricant additives	$1,673	$1,741	$1,901
Fuel additives	362	384	424
Total	2,035	2,125	2,325
All other	14	16	10
Net sales	$2,049	$2,141	$2,335

Petroleum Additives - The regions in which we operate include North America (the United States and Canada), Latin America (Mexico, Central America, and South America), Asia Pacific, and the Europe/Middle East/Africa/India (EMEAI) region. The percentage of net sales being generated in the regions has remained fairly consistent over the past three years, with some limited fluctuation due to various factors, including the impact of regional economic trends. North America represents almost 40% of our petroleum additives net sales, while EMEAI represents a little over 30%. Asia Pacific contributes approximately 20% and Latin America represents almost 10%. As shown in the table above, lubricant additives net sales and fuel additives net sales compared to total petroleum additives net sales has remained substantially consistent over the past three years, although there have been slight increases in the percent of lubricant additives product line net sales over the past three years. The discussion below provides further detail on net sales in our petroleum additives segment for 2016, 2015, and 2014.

The approximate components of the petroleum additives decrease in net sales of $90 million when comparing 2016 to 2015 and $200 million when comparing 2015 to 2014 are shown below in millions.

Net sales for year ended December 31, 2014	$2,325
Lubricant additives shipments	(49)
Fuel additives shipments	15
Selling prices	(76)
Foreign currency impact, net	(90)
Net sales for year ended December 31, 2015	2,125
Lubricant additives shipments	9
Fuel additives shipments	3
Selling prices	(97)
Foreign currency impact, net	(5)
Net sales for year ended December 31, 2016	$2,035

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Petroleum additives net sales for 2016 of $2.0 billion were approximately 4.3% lower than 2015 levels. All regions, except for Asia Pacific, reflected decreased net sales ranging from approximately 2% in EMEAI to about 16% in Latin America. North America experienced an approximate 9% decrease, while Asia Pacific reported an approximate 8% increase in net sales. Lower selling prices were the primary factor of the decrease in petroleum additives net sales when comparing 2016 and 2015, with foreign currency exchange also having an unfavorable impact. The U.S. Dollar strengthened against most of the major currencies in which we transact, including the European Euro and the British Pound Sterling, resulting in an unfavorable impact on net sales when comparing the two years. The Japanese Yen strengthened against the U.S. Dollar during the same time period partially offsetting the unfavorable impact from the other currencies in which we transact. Increases in the volume of product shipments, mostly from fuel additives, along with a favorable impact from product mix, mostly in lubricant additives, partially offset the negative effects of selling prices and foreign currency exchange. The volume of product shipments for petroleum additives increased approximately 1.1% on a worldwide basis when comparing 2016 and 2015. Lubricant additives product shipments increased in both Asia Pacific and EMEAI, but were substantially offset by decreases in North America and Latin America. Fuel additives product shipments increased in all regions, except for EMEAI.

Petroleum additives net sales for 2015 of $2.1 billion were approximately 8.6% lower than 2014 levels. All regions, except for Latin America reflected lower net sales with decreases ranging from approximately 7% in North America and Asia Pacific to 15% in EMEAI. Net sales in Latin America increased about 4%. The most significant factors in the decrease in net sales in 2015 from 2014 levels resulted from an unfavorable foreign currency impact, as well as lower selling prices. From a foreign currency perspective, the U.S. Dollar strengthened against all of the major currencies in which we transact, primarily the European Euro and the Japanese Yen, resulting in an unfavorable foreign currency impact on net sales. The volume of product shipments was substantially unchanged for petroleum additives when comparing 2015 with 2014, reflecting a decrease of just over 1%, but net sales were negatively impacted by mix of products sold. On a worldwide basis, lubricant additives shipments decreased which was partially offset by an increase in fuel additives shipments. The decrease in lubricant additives shipments was across all regions except for Latin America, which increased over 2014 levels. The increase in fuel additives shipments was across all regions except for a small decrease in the Asia Pacific region.

All Other - The “All other” category includes the operations of the TEL business, and certain contracted manufacturing and services performed by Ethyl.

Segment Operating Profit

NewMarket evaluates the performance of the petroleum additives business based on segment operating profit. NewMarket Services expenses are charged to each subsidiary pursuant to services agreements between the companies. Depreciation on segment property, plant, and equipment, as well as amortization of segment intangible assets, is included in segment operating profit.

The table below reports segment operating profit for the last three years. A reconciliation of segment operating profit to income before income tax expense is in Note 21.

	Years Ended December 31,		
(in millions)	2016	2015	2014
Petroleum additives	$385	$375	$385
All other	$0	$4	$1

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Petroleum Additives - Petroleum additives operating profit increased $10 million when comparing 2016 to 2015 and decreased $10 million when comparing 2015 to 2014. Both comparative periods included the impact of the same factors that affected gross profit (see discussion below). In addition to the impact of foreign currency exchange on net sales discussed above, petroleum additives operating profit also included a favorable foreign currency impact when comparing 2016 and 2015, but an unfavorable impact when comparing 2015 and 2014 arising from other transactions. The operating profit margin was 18.9% in 2016, 17.6% in 2015, and 16.6% in 2014. These margins are consistent with our expectations of the performance of our business over the long term. While operating profit margins will fluctuate from quarter to quarter due to multiple factors, we do not operate our business differently from quarter to quarter. We believe the fundamentals of our business and industry are unchanged. Our continued focus is on developing and delivering innovative, technology-driven solutions to our customers.

Gross profit increased $11 million when comparing 2016 and 2015 and decreased $2 million when comparing 2015 and 2014. Cost of sales as a percentage of net sales has remained fairly consistent over the last three years at 67% in 2016, 68% in 2015, and 72% in 2014.

When comparing 2016 and 2015, the primary factor in the improvement in gross profit resulted from a favorable raw material cost variance due to lower costs, which contributed over 100% of the change, along with favorable impacts from the volume variance in product shipments (as discussed in the Net Sales section above), conversion costs, and miscellaneous costs. An unfavorable selling price variance mostly offset the favorable impacts. The sales price variance for the comparative periods included the impact from foreign currency rates as discussed in the Net Sales section above.

When comparing 2015 and 2014, the primary factor in the $2 million decrease in gross profit was a significant unfavorable selling price variance, which contributed over 100% of the change, along with much smaller unfavorable variances in conversion and miscellaneous costs. There was also an unfavorable volume variance in product shipments, as discussed in the Net Sales section above. These unfavorable variances were substantially offset by a significant favorable raw material variance due to lower costs.

Selling, general, and administrative expenses (SG&A) in 2016 were $2 million, or 1%, lower than 2015 levels, while 2015 was $2 million, or 1%, higher than 2014 levels. SG&A as a percentage of net sales was 6.7% in 2016, 6.5% in 2015, and 5.8% in 2014. Our SG&A costs are mainly personnel-related and include salaries, benefits and other costs associated with our workforce. There were no significant changes in these costs when comparing the years.

When comparing 2016 with 2015, R&D decreased approximately $1 million, and when comparing 2015 with 2014, R&D increased approximately $19 million. When comparing 2016 with 2015, investments in R&D in the lubricant additives product line increased, but were more than offset by reductions in the fuel additives product line. For the 2015 to 2014 comparison, the increase was completely in the lubricant additives product line. As a percentage of net sales, R&D was 7.7% in 2016, 7.4% in 2015 and 6.0% in 2014.

Our R&D investments reflect our efforts to support the development of solutions that meet our customers' needs, meet new and evolving standards, and support our expansion into new product areas. Our approach to R&D investment, as it is with SG&A, is one of purposeful spending on programs to support our current product base and to ensure that we develop products to support our customers' programs in the future. R&D investments include personnel-related costs, as well as internal and external testing of our products. Most R&D is incurred in the United States and in the United Kingdom, with over 70% of total R&D being attributable to the North America and EMEAI regions. Substantially all investments in new product development are incurred in the United States and the United Kingdom. The remaining 30% of R&D is attributable to the Asia Pacific and Latin America regions and represents customer technology support services in those regions. All of our R&D is related to the petroleum additives segment.

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The following discussion references certain captions on the Consolidated Statements of Income.

Interest and Financing Expenses

Interest and financing expenses were $17 million in 2016, $15 million in 2015, and $17 million in 2014. The increase in interest and financing expense between 2016 and 2015 resulted primarily from higher average debt. The decrease in interest and financing expenses between 2015 and 2014 resulted from a lower average interest rate, as well as lower amortization and fees, which were offset by higher average debt.

Other Income (Expense), Net

Other income (expense), net was expense of $3 million in both 2016 and 2015, and $7 million in 2014. The amounts for all periods primarily reflected the impact from a derivative instrument representing an interest rate swap recorded at fair value through earnings. As discussed in Note 14, we terminated the interest rate swap on September 7, 2016.

Income Tax Expense

Income tax expense was $100 million in both 2016 and 2015, and $106 million in 2014. The effective tax rate was 29.1% in 2016, 29.6% in 2015, and 31.2% in 2014. The effective income tax rates for each year included the benefit of income in foreign jurisdictions with lower tax rates than the United States, as well as a benefit from the domestic manufacturing tax deduction. The effective tax rates for all years included the domestic R&D tax credit for that year. See Note 19 for further details on income taxes.

When comparing 2016 and 2015, the decrease in the effective income tax rate resulted in lower income tax expense of $2 million, which was substantially offset by higher income before income tax expense.

The lower effective income tax rate in 2015 as compared to 2014 resulted in a decrease of $6 million in income tax expense. The small change in income before income tax expense had no impact on income tax expense.

Our deferred taxes are in a net asset position. Based on current forecasted operating plans and historical profitability, we believe that we will recover nearly the full benefit of our deferred tax assets and have, therefore, only recorded an immaterial valuation allowance at certain foreign subsidiaries.

CASH FLOWS DISCUSSION

We generated cash from operating activities of $353 million in 2016, $268 million in 2015, and $235 million in 2014. During 2016, we used the $353 million cash generated from operations and $11 million of borrowings on our revolving credit facility to fund $143 million of capital expenditures, fund $76 million in dividend payments, and repurchase $36 million of our common stock. These transactions, along with an unfavorable foreign currency impact of $8 million resulted in an increase of $99 million in cash and cash equivalents. Cash flows from operating activities included an increase of $21 million from lower working capital requirements, as well as contributions of $26 million for our pension and postretirement plans.

During 2015, we used the $268 million cash generated from operations, as well as $131 million of borrowings on our revolving credit facility and $10 million cash-on-hand, to repurchase $195 million of our common stock, fund $126 million of capital expenditures, and fund $71 million in dividend payments. The change in cash also included an unfavorable foreign currency impact of $12 million. Cash flows from operating activities included a decrease of $23 million from higher working capital requirements, as well as contributions of $27 million for our pension and postretirement plans.

During 2014, we used the $235 million cash generated from operations, as well as $136 million cash-on-hand and $14 million of borrowings on our revolving credit facility primarily to repurchase $249 million of our common stock, fund $59 million in dividend payments, and fund $60 million of capital expenditures. The change in cash also included an unfavorable foreign currency impact of $9 million. Cash flows from operating activities included a decrease of $53 million from higher working capital requirements, as well as contributions of $27 million for our pension and postretirement plans.

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We expect that cash from operations, together with borrowing available under our credit facilities, will continue to be sufficient to cover our operating needs and planned capital expenditures for at least the next twelve months.

FINANCIAL POSITION AND LIQUIDITY

Cash

At December 31, 2016, we had cash and cash equivalents of $192 million as compared to $93 million at the end of 2015.

Our cash and cash equivalents held by our foreign subsidiaries amounted to approximately $189 million at December 31, 2016 and $92 million at December 31, 2015. A significant amount, but not all, of these foreign cash balances are associated with earnings that we have asserted are indefinitely reinvested. We plan to use these indefinitely reinvested earnings to support growth outside of the United States through funding of operating expenses, research and development expenses, capital expenditures, and other cash needs of our foreign subsidiaries. Periodically, we repatriate cash from our foreign subsidiaries to the United States through intercompany dividends. These intercompany dividends are paid only by subsidiaries whose earnings we have not asserted are indefinitely reinvested or whose earnings qualify as previously taxed income, as defined by the United States Internal Revenue Code. If circumstances were to change that would cause these indefinitely reinvested earnings to be repatriated, an incremental U.S. tax liability would be incurred. As part of our foreign subsidiary repatriation activities, we received cash dividends from our foreign subsidiaries of $6 million for 2016, $28 million for 2015, and $27 million for 2014. The amount of cash that we repatriate from foreign subsidiaries in any given year is dependent upon many factors, including utilization of available cash in the foreign locations for working capital, capital investments, and other needs.

Debt

4.10% Senior Notes - At both December 31, 2016 and December 31, 2015, we had $350 million of 4.10% senior notes due 2022 which are senior unsecured obligations. The senior notes are registered under the Securities Act of 1933. We incurred financing costs totaling approximately $5 million related to the 4.10% senior notes, which are being amortized over the term of the agreement.

The 4.10% senior notes rank:

- equal in right of payment with all of our existing and future senior unsecured indebtedness; and
- senior in right of payment to any of our future subordinated indebtedness.

The indenture governing the 4.10% senior notes contains covenants that, among other things, limit our ability and the ability of our subsidiaries to:

- create or permit to exist liens;
- enter into sale-leaseback transactions;
- incur additional guarantees; and
- sell all or substantially all of our assets or consolidate or merge with or into other companies.

We were in compliance with all covenants under the indenture governing the 4.10% senior notes as of December 31, 2016 and December 31, 2015.

Revolving Credit Facility – At December 31, 2016, we had a $650 million, multicurrency revolving credit facility, with a $100 million sublimit for multicurrency borrowings, a $75 million sublimit for letters of credit, and a $20 million sublimit for swingline loans pursuant to a credit agreement (Credit Agreement). The Credit Agreement includes an expansion feature which allows us, subject to certain conditions, to request an increase in the aggregate amount of the revolving credit facility or obtain incremental term loans in an amount up to $150 million. Outstanding borrowings under our current revolving credit facility amounted to $156 million at December 31, 2016 and $145 million at December 31, 2015.

We have recorded deferred financing costs of $2.5 million related to the revolving credit facility, which we are amortizing over the term of the Credit Agreement.

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The obligations under the Credit Agreement are unsecured and are fully guaranteed by NewMarket. The revolving credit facility matures on October 28, 2019. On July 15, 2016, we entered into Amendment No.1 to the Credit Agreement. The amendment allows certain of our foreign subsidiaries to borrow under the original Credit Agreement dated as of October 28, 2014. We did not incur significant additional financing fees with the amendment.

Borrowings made under the revolving credit facility bear interest at an annual rate equal to, at our election, either (1) the Alternate Base Rate (ABR) plus the Applicable Rate (solely in the case of loans denominated in U.S. dollars to NewMarket) or (2) the Adjusted LIBO Rate plus the Applicable Rate. ABR is the greatest of (i) the rate of interest publicly announced by the Administrative Agent as its prime rate, (ii) the federal funds effective rate plus 0.5%, or (iii) the Adjusted LIBO Rate for a one month interest period plus 1%. The Adjusted LIBO Rate means the rate at which Eurocurrency deposits in the London interbank market for certain periods (as selected by NewMarket) are quoted, as adjusted for statutory reserve requirements. Depending on our consolidated Leverage Ratio, the Applicable Rate ranges from 0.00% to 0.50% for loans bearing interest based on the ABR and from 1.00% to 1.50% for loans bearing interest based on the Adjusted LIBO Rate. At December 31, 2016, the Applicable Rate was 0.25% for loans bearing interest based on the ABR and 1.25% for loans bearing interest based on the Adjusted LIBO Rate.

The Credit Agreement contains financial covenants that require NewMarket to maintain a consolidated Leverage Ratio (as defined in the Credit Agreement) of no more than 3.50 to 1.00 and a consolidated Interest Coverage Ratio (as defined in the Credit Agreement) of no less than 3.00 to 1.00, calculated on a rolling four quarter basis, as of the end of each fiscal quarter ending on and after December 31, 2014. At December 31, 2016, the Leverage Ratio was 1.28 and the Interest Coverage Ratio was 21.45.

We were in compliance with all covenants under the revolving credit facility at December 31, 2016 and December 31, 2015.

The following table provides information related to the unused portion of our revolving credit facility in effect at December 31, 2016 and December 31, 2015.

	December 31,	
(in millions)	2016	2015
Maximum borrowing capacity under the revolving credit facility	$650	$650
Outstanding borrowings under the revolving credit facility	156	145
Outstanding letters of credit	3	3
Unused portion of revolving credit facility	$491	$502

The average interest rate for borrowings under our revolving credit facilities was 1.9% during both 2016 and 2015.

Other Borrowings - Our subsidiaries in China have access to short-term lines of credit totaling $28 million. The outstanding balance under these lines was $1 million at December 31, 2016 and $3 million at December 31, 2015. The average interest rate was approximately 3.9% during 2016 and 2.0% during 2015. At December 31, 2016 the interest rate on the drawn amount was 4.1325%. The outstanding balance is due during 2017.

On January 4, 2017, we issued $250 million in senior unsecured notes in a private placement with The Prudential Insurance Company of America and certain other purchasers. These notes bear interest at 3.78% and mature on January 4, 2029. Interest is payable semiannually and principal payments of $50 million are payable annually beginning on January 4, 2025. Under certain conditions, we have the option to prepay the notes. The note purchase agreement contains representations, warranties, terms and conditions customary for transactions of this type. These include negative covenants, certain financial covenants and events of default which are substantially similar to the covenants and events of default in our revolving credit facility.

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We had long-term debt of $507 million at December 31, 2016 and $491 million at December 31, 2015. The increase in debt resulted from additional borrowing of $11 million on the revolving credit facility during 2016, as well as a capital lease.

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As a percentage of total capitalization (total long-term debt and shareholders' equity), our total long-term debt decreased from 55.9% at the end of 2015 to 51.2% at the end of 2016. The change in the percentage was primarily the result of the increase in shareholders' equity, partially offset by an increase in debt. The increase in shareholders' equity reflects our earnings, offset by the impact of stock repurchases, dividend payments, changes in the foreign currency translation adjustment, and a small reduction in the funded position of our defined benefit plan. Normally, we repay any outstanding long-term debt with cash from operations or refinancing activities.

Working Capital

Including cash and cash equivalents and the impact of foreign currency on the balance sheet, at December 31, 2016, we had working capital of $542 million, resulting in a current ratio of 2.84 to 1. Our working capital at December 31, 2015 on the same basis was $505 million, resulting in a current ratio of 2.91 to 1.

Other than the increase in cash and cash equivalents, the most significant changes in working capital since December 31, 2015 primarily reflect decreased inventory along with an increase in accounts payable, which were partially offset by higher accounts receivable. The decrease in inventory was the result of planned reduction in quantity on hand, as well as the impact from lower material cost. The increase in accounts payable was due to timing of payments, as well as higher balances in the Asia Pacific region due to the Singapore plant start-up in 2016. The fluctuation in accounts receivable primarily resulted from lower sales levels in the fourth quarter of 2015 as compared to the same period in 2016.

Capital Expenditures

Capital expenditures were $143 million for 2016, $126 million for 2015, and $60 million for 2014. We expect capital expenditures in 2017 will be similar to the amount spent in 2016. We expect to continue to finance this capital spending through cash on hand and cash provided from operations, together with borrowing available under our $650 million revolving credit facility.

The estimated 2017 capital expenditure amount includes anticipated spending on several improvements to our manufacturing and R&D infrastructure around the world, as well as phase two of our manufacturing facility in Singapore. Phase two will include additional component units and will more than double our investment in the Singapore facility. It is scheduled to be completed in 2017. The investment in the Singapore facility will enable us to more effectively serve our Asia Pacific customers, as well as those in India and the Middle East. The facility is expandable to allow for growth, as demand warrants.

Environmental Expenses

We spent approximately $24 million in 2016, $22 million in 2015, and $22 million in 2014 for ongoing environmental operating and clean-up costs, excluding depreciation of previously capitalized expenditures. These environmental operating and clean-up expenses are primarily included in cost of goods sold. We expect to continue to fund these costs through cash provided by operations.

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Contractual Obligations

The table below shows our year-end contractual obligations by year due.

(in millions)	Payments Due by Period Total	Less than 1 Year	1 - 3 Years	3 - 5 Years	More than 5 Years
Debt obligations (a)	$757	$ 1	$156	$0	$ 600
Interest payable on long-term debt and capital lease obligations	191	27	54	48	62
Letters of credit (b)	3	0	0	0	3
Capital lease obligations (c)	5	0	0	1	4
Operating lease obligations	71	14	21	12	24
Property, plant, and equipment purchase obligations	52	52	0	0	0
Purchase obligations (d)	1,021	151	331	299	240
Other long-term liabilities (e)	44	28	2	2	12
Reserves for uncertain tax positions	9	2	1	6	0
Total	$2,153	$ 275	$565	$368	$ 945

(a) Amounts represent contractual payments due on the 4.10% senior notes, revolving credit facility, and short-term lines of credit as of December 31, 2016. Amounts also include contractual payments due on the Prudential senior unsecured notes issued on January 4, 2017. See Note 11 for more information on long-term debt obligations.

(b) We intend to renew letters of credit when necessary as they mature; therefore, the obligations do not have a definitive maturity date.

(c) Amounts represent the debt obligation under the capital lease related to the Singapore manufacturing facility, as well as future minimum lease payments in excess of the capital lease debt obligation.

(d) Purchase obligations include agreements to purchase goods or services that are enforceable and legally binding and that specify all significant terms, including: fixed or minimum quantities to be purchased; fixed, minimum, or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable without penalty. Purchase orders made in the ordinary course of business are excluded from the above table. Any amounts for which we are liable under purchase orders are reflected in our Consolidated Balance Sheets as accounts payable or accrued expenses.

(e) These represent other long-term liability amounts reflected in our Consolidated Balance Sheets that have known payment streams. Amounts include environmental liabilities, as well as contributions associated with pension and postretirement benefit plans. Amounts accrued for potential exposure with respect to litigation, claims, and assessments are not included in the table above.

Pension and Postretirement Benefit Plans

Our U.S. and foreign benefit plans are discussed separately below. The information applies to all of our U.S. benefit plans. Our foreign plans are quite diverse, and the actuarial assumptions used by the various foreign plans are based upon the circumstances of each particular country and retirement plan. The discussion surrounding our foreign retirement benefits focuses only on our pension plan in the United Kingdom (U.K.), which represents the majority of the impact on our financial statements from foreign pension plans. We use a December 31 measurement date to determine our pension and postretirement expenses and related financial disclosure information. Additional information on our pension and postretirement plans is in Note 17.

U.S. Pension and Postretirement Benefit Plans—The average remaining service period of active participants for our U.S. plans is 13.6 years, while the average remaining life expectancy of inactive participants is 23.7 years. We utilize the sex distinct RP-2014 tables with separate rates for annuitants and non-annuitants, adjusted to remove MP-2014 improvements, with separate rates for annuitants and non-annuitants, projected generationally with Scale MP-2016 in determining the impact of the U.S. benefit plans on our financial statements.

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Investment Return Assumptions and Asset Allocation—We periodically review our assumptions for the long-term expected return on pension plan assets. As part of the review and to develop expected rates of return, we considered an analysis of expected returns based on the U.S. plans' asset allocation as of both January 1, 2017 and January 1, 2016. This analysis reflects our expected long-term rates of return for each significant asset class or economic indicator. As of January 1, 2017, the expected rates were 8.5% for U.S. large cap stocks, 4.4% for fixed income, and 3% for inflation. The range of returns developed relies both on forecasts and on broad-market historical benchmarks for expected return, correlation, and volatility for each asset class.

The asset allocation for our U.S. pension plans is predominantly weighted toward equities. Through the ongoing monitoring of our investments and review of market data, we have determined that we should maintain the expected long-term rate of return for our U.S. pension plans at 8.5% at December 31, 2016.

An actuarial loss occurred during both 2016 and 2015 as the expected investment return for all of our U.S. pension plans exceeded the actual return by approximately $3 million in 2016 and $26 million in 2015. An actuarial gain occurred during 2014 as the actual investment return was higher than the expected return for all of our U.S. pension plans by approximately $1 million. Investment gains and losses are recognized in earnings on an amortized basis over a period of years, resulting in increased expense of approximately $0.1 million in 2017. We expect volatility in pension expense as actual investment returns vary from the expected return, but we continue to believe the potential long-term benefits justify the risk premium for equity investments.

At December 31, 2016, our expected long-term rate of return on our postretirement plans was 5.5%. This rate varies from the pension rate of 8.5% primarily because of the difference in investment of assets. The assets of the postretirement plan are held in an insurance contract, which results in a lower assumed rate of investment return.

Pension expense and the life insurance portion of postretirement expense are sensitive to changes in the expected return on assets. For example, decreasing the expected rate of return by 100 basis points to 7.5% for pension assets and 4.5% for postretirement benefit assets (while holding other assumptions constant) would increase the forecasted 2017 expense for our U.S. pension and postretirement plans by approximately $3 million. Similarly, a 100 basis point increase in the expected rate of return to 9.5% for pension assets and 6.5% for postretirement benefit assets (while holding other assumptions constant) would reduce forecasted 2017 pension and postretirement expense by $3 million.

Discount Rate Assumption—We develop the discount rate assumption by determining the single effective discount rate for a unique hypothetical portfolio constructed from investment-grade bonds that, in the aggregate, match the projected cash flows of each of our retirement plans. The discount rate is developed based on the hypothetical portfolio on the last day of December. The discount rate at December 31, 2016 was 4.25% for all plans.

Pension and postretirement benefit expense is also sensitive to changes in the discount rate. For example, decreasing the discount rate by 100 basis points to 3.25% (while holding other assumptions constant) would increase the forecasted 2017 expense for our U.S. pension and postretirement benefit plans by approximately $6 million. A 100 basis point increase in the discount rate to 5.25% would reduce forecasted 2017 pension and postretirement benefit expense by $5 million.

Rate of Projected Compensation Increase—We have maintained our rate of projected compensation increase at December 31, 2016 at 3.5%. The rate assumption was based on an analysis of our projected compensation increases for the foreseeable future.

Liquidity—Cash contribution requirements to the pension plan are sensitive to changes in assumed interest rates and investment gains or losses in the same manner as pension expense. We expect our aggregate cash contributions, before income taxes, to the U.S. pension plans will be approximately $19 million in 2017. We expect our contributions to the postretirement benefit plans will be approximately $1 million in 2017.

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Foreign Pension Benefit Plans—Our foreign pension plans are quite diverse. The following information applies only to our U.K. pension plan, which represents the majority of the impact on our financial statements from our foreign pension plans. The average remaining service period of active participants for our U.K. plan is 11 years, while the average remaining life expectancy of inactive participants is 25 years. We utilize the S2P (Light) mortality tables and allow for future projected improvements in life expectancy in line with the CMI 2015 model, with a long-term rate of improvement of 1% per year based on the membership of the plan, in determining the impact of the U.K. pension plans on our financial statements.

Investment Return Assumptions and Asset Allocation—We periodically review our assumptions for the long-term expected return on the U.K. pension plan assets. The expected long-term rate of return is based on both the asset allocation, as well as yields available in the U.K. markets.

The target asset allocation in the U.K. is to be invested 55% in pooled equities funds, 40% in pooled government bonds, and 5% in a pooled investment property fund, while the actual allocation at the end of 2016 was 54% in equities, 42% in government bonds, and 4% in a pooled investment property fund. Based on the actual asset allocation and the expected yields available in the U.K. markets, the expected long-term rate of return for the U.K. pension plan was 5.6% at December 31, 2016.

An actuarial gain occurred during 2016 as the actual investment return exceeded the expected investment return by approximately $22 million. An actuarial loss occurred during 2015 as the expected investment return exceeded the actual investment return by approximately $5 million. An actuarial gain of $6 million occurred during 2014. Investment gains and losses are recognized in pension expense on an amortized basis. The amortization of the actuarial net loss is expected to be $0.3 million in 2017. We expect volatility in pension expense as actual investment returns vary from the expected return, but we continue to believe the potential benefits justify the risk premium for the target asset allocation.

Pension expense is sensitive to changes in the expected return on assets. For example, decreasing the expected rate of return by 100 basis points to 4.6% (while holding other assumptions constant) would increase the forecasted 2017 expense for our U.K. pension plan by approximately $1 million. Similarly, a 100 basis point increase in the expected rate of return to 6.6% (while holding other assumptions constant) would reduce forecasted 2017 pension expense by approximately $1 million.

Discount Rate Assumption—We utilize a yield curve based on AA-rated corporate bond yields in developing a discount rate assumption. The yield appropriate to the duration of the U.K. plan liabilities is then used. The discount rate at December 31, 2016 was 2.8%.

Pension expense is also sensitive to changes in the discount rate. For example, decreasing the discount rate by 100 basis points to 1.8% (while holding other assumptions constant) would increase the forecasted 2017 expense for our U.K. pension plans by approximately $1 million. A 100 basis point increase in the discount rate to 3.8% would reduce forecasted 2017 pension expense by approximately $1 million.

Rate of Projected Compensation Increase—Our rate of projected compensation increase at December 31, 2016 is 4.4%. The rate assumption was based on an analysis of our projected compensation increases for the foreseeable future.

Liquidity—Cash contribution requirements to the U.K. pension plan are sensitive to changes in assumed interest rates in the same manner as pension expense. We expect our aggregate U.K. cash contributions, before income taxes, will be approximately $4 million in 2017.

OUTLOOK

We are pleased with the overall performance of our business in 2016. Our stated goal is to provide a 10% return per year for our shareholders over any five-year period (defined by earnings per share growth plus dividends), although we may not necessarily achieve a 10% return each year. We continue to have confidence in our customer-focused strategy and approach to the market. We believe the fundamentals of how we run our business - a long-term view, safety-first culture, customer-focused solutions, technology-driven product offerings, and world-class supply chain capability - will continue to be beneficial for all of our stakeholders.

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We expect our petroleum additives segment to deliver solid performance in 2017, after having posted strong operating results over the past several years. We expect that the petroleum additives industry shipment demand will grow at an average annual rate of 1% to 2% over the long-term, as there have been no significant changes in the positive fundamentals of the industry. Over the long-term, we plan to exceed the industry growth rate.

We have made significant investments to expand our capabilities around the world over the last few years, which have continued in 2016. These investments have been and will continue to be in organizational talent, technology development and processes, and global infrastructure, consisting of technical centers, production capability and geographic expansion. Our investments in support of our customers include completing construction of phase one of our new manufacturing facility in Singapore, ongoing construction of phase two of the facility in Singapore which will more than double our investment there, and entering into a definitive purchase agreement to acquire AMSA, which we plan to complete in the first half of 2017. We intend to utilize these new investments to improve our ability to deliver the solutions that our customers value, expand our global reach, and enhance our operating results. We will continue to invest in our capabilities to provide even better service, technology, and customer solutions.

Our business generates significant amounts of cash beyond what is necessary for the expansion and growth of our current offerings. We are making investments like the ones mentioned above to position ourselves for the future. We regularly review our many internal opportunities to utilize excess cash from a technological, geographic, and product line perspective. We believe our capital spending is creating the capability we need to grow and support our customers worldwide, and our research and development investments are positioning us well to provide added value to our customers. Our primary focus in the acquisition area remains on the petroleum additives industry. It is our view that this industry segment will provide the greatest opportunity for solid returns on our investments while minimizing risk. We remain focused on this strategy and will evaluate any future opportunities. We will continue to evaluate all alternative uses of cash to enhance shareholder value, including stock repurchases and dividends.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

The following discussion highlights some of the more critical areas where a significant change in facts and circumstances in our operating and financial environment could cause a change in future reported financial results.

Income Taxes

We file United States, foreign, state, and local income tax returns. Significant judgment is required in determining our worldwide provision for income taxes and recording the related tax assets and liabilities. Any significant impact as a result of changes in underlying facts, law, tax rates, or tax audits could lead to adjustments to our income tax expense, effective tax rate, financial position, or cash flow.

Deferred income taxes are provided for the estimated income tax effect of temporary differences between the financial statement carrying amounts and the tax basis of existing assets and liabilities, as well as for net operating losses and tax credit carryforwards. When recording these deferred tax assets and liabilities, we must estimate the tax rates we expect will apply to taxable income in the periods in which the deferred tax liability or asset is expected to be settled or realized. In addition, we may record valuation allowances to reduce deferred tax assets if it is more likely than not that some portion or all of the deferred tax assets will not be realized. Judgment is required as we consider the scheduled reversal of deferred tax assets and liabilities, projected future taxable income, and tax planning strategies in making this assessment. If our estimates and assumptions change from those used when we recorded deferred tax assets and liabilities, the effect on our results of operations and financial position could be material.

The income tax returns for our entities in the United States and in foreign jurisdictions are open for examination by tax authorities. We assess our income tax positions and record a liability for all years open for examination based upon our evaluation of the facts, circumstances, and information available at the reporting date. The economic benefit associated with a tax position will be recognized only if we determine it is more likely than not to be upheld on audit. Although we believe our estimates and judgments are reasonable, actual results could differ, resulting in gains or losses that may be material to our results of operations and financial position.

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At each interim reporting period, we estimate an effective income tax rate that is expected to be applicable for the full year. Our provision for income taxes is impacted by the income tax rates of the countries where we operate. A change in the geographical source of our income can affect the effective tax rate. Significant judgment is involved regarding the application of global income tax laws and regulations when projecting the jurisdictional mix of income. Additionally, interpretations of tax laws, court decisions, or other guidance provided by taxing authorities influence our estimate of the effective income tax rate. As a result, our actual effective income tax rate and related income tax liabilities may differ materially from our estimated effective tax rate and related income tax liabilities.

Pension Plans and Other Postretirement Benefits

We use assumptions to record the impact of the pension and postretirement benefit plans in the financial statements. These assumptions include the discount rate, expected long-term rate of return on plan assets, and rate of compensation increase. A change in any one of these assumptions could cause different results for the plans and therefore, impact our results of operations, cash flows, and financial condition. We develop these assumptions after considering available information that we deem relevant. Information is provided on the pension and postretirement plans in Note 17. In addition, further disclosure of the effect of changes in these assumptions is provided in the "Financial Position and Liquidity" section of Item 7.

Environmental and Legal Proceedings

We have disclosed our environmental matters in Item 1 of this Annual Report on Form 10-K, as well as in the Notes to Consolidated Financial Statements. Our estimates for costs that will be incurred to satisfy our obligations related to environmental matters are affected by many variables, including our judgment regarding the extent of remediation that will be required, future changes in and enforcement and interpretation of laws and regulations, current and future technology available, and timing of remediation activities. While we currently do not anticipate significant changes to the many factors that could impact our environmental requirements, we continue to keep our accruals consistent with these requirements as they change.

Also, as noted in the discussion of "Legal Proceedings" in Item 3 of this Annual Report on Form 10-K, while it is not possible to predict or determine with certainty the outcome of any legal proceeding, it is our opinion, based on our current knowledge, that we will not experience any material adverse effects on our results of operations, cash flows, or financial condition as a result of any pending or threatened proceeding.

Intangibles (net of amortization)

We have certain identifiable intangibles amounting to $6 million at December 31, 2016 that are discussed in Note 8. These intangibles relate to our petroleum additives business and are being amortized over periods with up to approximately thirteen years of remaining life. We continue to assess the market related to these intangibles, as well as their specific values, and have concluded the values and amortization periods are appropriate. We also evaluate these intangibles for any potential impairment when significant events or circumstances occur that might impair the value of these assets. These evaluations continue to support the values at which these identifiable intangibles are carried on our financial statements. However, if conditions were to substantially deteriorate in the petroleum additives market, it could possibly cause a decrease in the estimated useful lives of the intangible assets or result in a noncash write-off of all or a portion of the intangibles' carrying amount. A reduction in the amortization period would have no effect on cash flows. We do not anticipate such a change in the market conditions in the near term.

RECENTLY ISSUED ACCOUNTING STANDARDS

For a full discussion of the more significant pronouncements which may impact our financial statements, see Note 23.

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ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We are exposed to many market risk factors, including fluctuations in interest and foreign currency rates, as well as changes in the cost of raw materials. These risk factors may affect our results of operations, cash flows, and financial position.

We manage these risks through regular operating and financing methods, including the use of derivative financial instruments. When we have derivative instruments, they are with major financial institutions and are not for speculative or trading purposes. Also, as part of our financial risk management, we regularly review significant contracts for embedded derivatives and, if identified, would record them in accordance with accounting principles generally accepted in the United States.

The following analysis presents the effect on our results of operations, cash flows, and financial position as if the hypothetical changes in market risk factors occurred at December 31, 2016. We analyzed only the potential impacts of our hypothetical assumptions. This analysis does not consider other possible effects that could impact our business.

Interest Rate Risk

At December 31, 2016, we had total long-term debt of $507 million. Of the total debt, $350 million is at fixed rates. There was no interest rate risk at the end of the year associated with the fixed rate debt.

At December 31, 2016, we had $156 million of outstanding variable rate debt under our revolving credit facility. Holding all other variables constant, if the variable portion of the interest rates hypothetically increased 10%, the effect on our earnings and cash flows would have been higher interest expense of approximately $0.1 million.

A hypothetical 100 basis point decrease in interest rates, holding all other variables constant, would have resulted in a change of $19 million in fair value of our debt at December 31, 2016.

Foreign Currency Risk

We sell to customers in foreign markets through our foreign subsidiaries, as well as through export sales from the United States. These transactions are often denominated in currencies other than the U.S. Dollar. Our primary currency exposures are the European Union Euro, British Pound Sterling, Japanese Yen, Chinese Renminbi, Indian Rupee, Singapore Dollar, Mexican Peso, Australian Dollar, and Canadian Dollar. We may enter into forward contracts as hedges to minimize the fluctuation of intercompany accounts receivable denominated in foreign currencies. At December 31, 2016, we had no outstanding forward contracts.

Raw Material Price Risk

We utilize a variety of raw materials in the manufacture of our products, including base oil, polyisobutylene, antioxidants, alcohols, solvents, sulfonates, friction modifiers, olefins, and copolymers. We may also enter into contracts which commit us to purchase some of our more critical raw materials based on anticipated demand. Our profitability is sensitive to changes in the quantities of raw materials we may need and the costs of those materials which may be caused by changes in supply, demand or other market conditions, over which we have little or no control. In addition, political and economic conditions in certain regions of the world in which we operate have caused, and may continue to cause, our demand for and the cost of our raw materials to fluctuate. War, armed hostilities, terrorist acts, civil unrest, or other incidents may also cause a sudden or sharp change in our demand for and the cost of our raw materials. If we experience such increases in the cost of our raw materials, we may not be able to pass them along to our customers in the form of price increases for our products. The inability to do so would have a negative impact on our operating profit. In addition, if our demand for raw materials were to decline such that we would not have need for the quantities required to be purchased under commitment agreements, we could incur additional charges that would affect our profitability.

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ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Report of Independent Registered Public Accounting Firm
To the Board of Directors and Shareholders of NewMarket Corporation:

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of income, comprehensive income, shareholders’ equity and cash flows present fairly, in all material respects, the financial position of NewMarket Corporation and its subsidiaries (the “Company”) at December 31, 2016 and December 31, 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. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting 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 (COSO). The Company's management is responsible for these financial statements, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on these financial statements and on the Company's internal control over financial reporting based on our integrated 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 audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

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 (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (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 of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

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

/s/ PricewaterhouseCoopers LLP

Richmond, Virginia
February 15, 2017

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NewMarket Corporation and Subsidiaries
Consolidated Statements of Income

	Years Ended December 31,		
(in thousands, except per-share amounts)	2016	2015	2014
Net sales	$2,049,451	$2,140,830	$2,335,405
Cost of goods sold	1,368,690	1,461,774	1,669,982
Gross profit	680,761	679,056	665,423
Selling, general, and administrative expenses	161,112	164,082	163,520
Research, development, and testing expenses	156,959	158,254	139,183
Operating profit	362,690	356,720	362,720
Interest and financing expenses, net	16,785	14,652	16,567
Other income (expense), net	(2,697)	(3,097)	(7,054)
Income before income tax expense	343,208	338,971	339,099
Income tax expense	99,767	100,368	105,844
Net income	$243,441	$238,603	$233,255
Earnings per share - basic and diluted	$20.54	$19.45	$18.38

See accompanying Notes to Consolidated Financial Statements
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NewMarket Corporation and Subsidiaries
Consolidated Statements of Comprehensive Income

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Net income	$243,441	$238,603	$233,255
Other comprehensive income (loss):			
Pension plans and other postretirement benefits:			
Prior service credit (cost) arising during the period, net of income tax expense (benefit) of $(286) in 2016 and $13,913 in 2015	(463)	21,855	0
Amortization of prior service cost (credit) included in net periodic benefit cost (income), net of income tax expense (benefit) of $(1,123) in 2016, $(375) in 2015 and $17 in 2014	(1,801)	(629)	(11)
Actuarial net gain (loss) arising during the period, net of income tax expense (benefit) of $(4,409) in 2016, $(2,477) in 2015 and $(31,282) in 2014	(8,102)	(1,331)	(54,473)
Amortization of actuarial net loss (gain) included in net periodic benefit cost (income), net of income tax expense (benefit) of $2,287 in 2016, $3,052 in 2015 and $1,484 in 2014	3,977	5,426	2,728
Settlements and curtailments, net of income tax expense (benefit) of $608 in 2014	0	0	1,126
Amortization of transition obligation (asset) included in net periodic benefit cost (income), net of income tax expense (benefit) of $1 in 2014	0	0	4
Total pension plans and other postretirement benefits	(6,389)	25,321	(50,626)
Foreign currency translation adjustments, net of income tax expense (benefit) of $(895) in 2016, $(71) in 2015 and $(2,220) in 2014	(31,595)	(30,687)	(28,448)
Other comprehensive income (loss)	(37,984)	(5,366)	(79,074)
Comprehensive income	$205,457	$233,237	$154,181

See accompanying Notes to Consolidated Financial Statements

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NewMarket Corporation and Subsidiaries
Consolidated Balance Sheets

(in thousands, except share amounts)	December 31, 2016	2015
ASSETS		
Current assets:		
Cash and cash equivalents	$192,154	$93,424
Trade and other accounts receivable, net	306,916	287,967
Inventories	311,512	351,631
Prepaid expenses and other current assets	26,301	35,370
Total current assets	836,883	768,392
Property, plant, and equipment, at cost	1,264,957	1,128,989
Less accumulated depreciation and amortization	761,212	726,543
Net property, plant, and equipment	503,745	402,446
Prepaid pension cost	25,800	20,430
Deferred income taxes	29,063	44,729
Intangibles (net of amortization) and goodwill	10,436	10,907
Deferred charges and other assets	10,509	39,345
Total assets	$1,416,436	$1,286,249
LIABILITIES AND SHAREHOLDERS’ EQUITY		
Current liabilities:		
Accounts payable	$141,869	$128,745
Accrued expenses	104,082	99,511
Dividends payable	17,478	17,594
Income taxes payable	17,573	12,773
Other current liabilities	13,588	5,057
Total current liabilities	294,590	263,680
Long-term debt	507,275	490,920
Other noncurrent liabilities	131,320	144,085
Total liabilities	933,185	898,685
Commitments and contingencies (Note 16)		
Shareholders’ equity:		
Common stock and paid-in capital (without par value; authorized shares - 80,000,000; issued and outstanding - 11,845,972 at December 31, 2016 and 11,948,446 at December 31, 2015)	1,603	0
Accumulated other comprehensive loss	(182,510)	(144,526)
Retained earnings	664,158	532,090
Total shareholders' equity	483,251	387,564
Total liabilities and shareholders' equity	$1,416,436	$1,286,249

See accompanying Notes to Consolidated Financial Statements

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NewMarket Corporation and Subsidiaries
Consolidated Statements of Shareholders' Equity

(in thousands, except share and per-share amounts)	Common Stock and Paid-in Capital Shares	Amount	Accumulated Other Comprehensive Loss	Retained Earnings	Total Shareholders' Equity
Balance at December 31, 2013	13,099,356	$0	$ (60,086)	$632,534	$ 572,448
Net income				233,255	233,255
Other comprehensive income (loss)			(79,074)		(79,074)
Cash dividends ($4.70 per share)				(59,400)	(59,400)
Repurchases of common stock	(664,254)	(2,312)		(246,197)	(248,509)
Stock-based compensation	11,263	2,312		9	2,321
Balance at December 31, 2014	12,446,365	0	(139,160)	560,201	421,041
Net income				238,603	238,603
Other comprehensive income (loss)			(5,366)		(5,366)
Cash dividends ($5.80 per share)				(70,763)	(70,763)
Repurchases of common stock	(501,261)	(3,070)		(194,781)	(197,851)
Tax benefit from stock-based compensation		374			374
Tax withholdings related to stock-based compensation	(3,135)	(3)		(1,196)	(1,199)
Stock-based compensation	6,477	2,699		26	2,725
Balance at December 31, 2015	11,948,446	0	(144,526)	532,090	387,564
Net income				243,441	243,441
Other comprehensive income (loss)			(37,984)		(37,984)
Cash dividends ($6.40 per share)				(75,829)	(75,829)
Repurchases of common stock	(98,867)	(252)		(35,563)	(35,815)
Tax withholdings related to stock-based compensation	(2,582)	(1,076)		0	(1,076)
Stock-based compensation	(1,025)	2,931		19	2,950
Balance at December 31, 2016	11,845,972	$1,603	$ (182,510)	$664,158	$ 483,251

See accompanying Notes to Consolidated Financial Statements
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NewMarket Corporation and Subsidiaries
Consolidated Statements of Cash Flows

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Cash and cash equivalents at beginning of year	$93,424	$103,003	$238,703
Cash flows from operating activities:			
Net income	243,441	238,603	233,255
Adjustments to reconcile net income to cash flows from operating activities:			
Depreciation and amortization	44,893	42,265	41,538
Noncash pension and postretirement expense	12,829	22,037	16,751
Deferred income tax expense	19,185	150	8,208
Unrealized (gain) loss on derivative instruments, net	0	(1,656)	2,179
Change in assets and liabilities:			
Trade and other accounts receivable, net	(38,231)	7,215	(6,891)
Inventories	14,480	(21,747)	(51,827)
Prepaid expenses	8,790	1,464	404
Accounts payable and accrued expenses	18,455	(8,809)	8,059
Book overdrafts	10,149	(8,241)	2,414
Income taxes payable	7,172	6,856	(4,727)
Cash pension and postretirement contributions	(25,898)	(26,813)	(26,505)
Proceeds from legal settlements	0	0	5,150
Realized loss on derivative instruments, net	4,825	4,877	4,946
Other, net	33,344	11,826	2,004
Cash provided from (used in) operating activities	353,434	268,027	234,958
Cash flows from investing activities:			
Capital expenditures	(142,874)	(126,499)	(59,716)
Deposits for interest rate swap	(7,570)	(16,487)	(10,844)
Return of deposits for interest rate swap	11,832	18,140	8,900
Other, net	(4,749)	(4,877)	(4,946)
Cash provided from (used in) investing activities	(143,361)	(129,723)	(66,606)
Cash flows from financing activities:			
Net borrowings under revolving credit facility	11,000	131,000	14,000
Dividends paid	(75,829)	(70,763)	(59,400)
Repurchases of common stock	(35,815)	(194,924)	(248,509)
Other, net	(2,733)	(791)	(1,461)
Cash provided from (used in) financing activities	(103,377)	(135,478)	(295,370)
Effect of foreign exchange on cash and cash equivalents	(7,966)	(12,405)	(8,682)
Increase (decrease) in cash and cash equivalents	98,730	(9,579)	(135,700)
Cash and cash equivalents at end of year	$192,154	$93,424	$103,003

See accompanying Notes to Consolidated Financial Statements
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Notes to Consolidated Financial Statements

1. Summary of Significant Accounting Policies

Consolidation—Our consolidated financial statements include the accounts of NewMarket Corporation and its subsidiaries. All intercompany transactions are eliminated upon consolidation. References to "we," "us," "our," the "company," and "NewMarket" are to NewMarket Corporation and its consolidated subsidiaries, unless the context indicates otherwise.

NewMarket is the parent company of three operating companies, each managing its own assets and liabilities. Those companies are Afton, which focuses on petroleum additive products; Ethyl, representing certain contracted manufacturing and services, as well as the TEL business; and NewMarket Development, which manages the property and improvements that we own in Virginia. NewMarket is also the parent company of NewMarket Services, which provides various administrative services to NewMarket, Afton, Ethyl, and NewMarket Development.

Certain reclassifications have been made to the accompanying consolidated financial statements and the related notes to conform to the current presentation.

Foreign Currency Translation—We translate the balance sheets of our foreign subsidiaries into U.S. Dollars based on the current exchange rate at the end of each period. We translate the statements of income using the weighted-average exchange rates for the period. NewMarket includes translation adjustments in the Consolidated Balance Sheets as part of accumulated other comprehensive loss and transaction adjustments in the Consolidated Statements of Income as part of cost of goods sold. Foreign currency transaction adjustments resulted in a net gain of $5 million in 2016, and a net loss of $11 million in 2015, and $4 million in 2014.

Revenue Recognition—Our policy is to recognize revenue from the sale of products when title and risk of loss have transferred to the buyer, the price is fixed and determinable, and collectability is reasonably assured. Net sales (revenues) are reported at the gross amount billed, including amounts related to shipping that are charged to the customer. Provisions for rebates to customers are recorded in the same period that the related sales are recorded. Freight costs incurred on the delivery of products are included in the Consolidated Statements of Income in cost of goods sold. Our standard terms of delivery are included in our contracts, sales order confirmation documents, and invoices. Taxes assessed by a governmental authority concurrent with sales to our customers, including sales, use, value-added, and revenue-related excise taxes, are not included as net sales, but are reflected in accrued expenses until remitted to the appropriate governmental authority.

Cash and Cash Equivalents—Our cash equivalents consist of government obligations and commercial paper with original maturities of 90 days or less. Throughout the year, we have cash balances in excess of federally insured amounts on deposit with various financial institutions. We state cash and cash equivalents at cost, which approximates fair value.

Accounts Receivable—We record our accounts receivable at net realizable value. We maintain an allowance for doubtful accounts for estimated losses resulting from our customers not making required payments. We determine the adequacy of the allowance by periodically evaluating each customer’s receivable balance, considering their financial condition and credit history, and considering current economic conditions. The allowance for doubtful accounts was not material at December 31, 2016 or December 31, 2015.

Inventories—NewMarket values its petroleum additives and TEL inventories at the lower of cost or net realizable value. In the United States, cost is determined on the last-in, first-out (LIFO) basis. In all other countries, we determine cost using the weighted-average method. Inventory cost includes raw materials, direct labor, and manufacturing overhead.

Property, Plant, and Equipment—We state property, plant, and equipment at cost and compute depreciation by the straight-line method based on the estimated useful lives of the assets. We capitalize expenditures for significant improvements that extend the useful life of the related property. We expense repairs and maintenance, including plant turnaround costs, as incurred. When property is sold or retired, we remove the cost and accumulated depreciation from the accounts and any related gain or loss is included in earnings.

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Intangibles (Net of Amortization) and Goodwill—Identifiable intangibles include the cost of acquired contracts, formulas and technology, trademarks and trade names, and customer bases. We assign a value to identifiable intangibles based on independent third-party appraisals and management's assessment at the time of acquisition. NewMarket amortizes the cost of the customer bases by an accelerated method and the cost of the remaining identifiable intangibles by the straight-line method over the estimated economic life of the intangible.

Goodwill arises from the excess of cost over net assets of businesses acquired. Goodwill represents the residual purchase price after allocation to all identifiable net assets. We test goodwill for impairment each year, as well as whenever a significant event or circumstance occurs which could reduce the fair value of the reporting unit to which the goodwill applies below the carrying amount of the reporting unit.

Impairment of Long-Lived Assets—When significant events or circumstances occur that might impair the value of long-lived assets, we evaluate recoverability of the recorded cost of these assets. Assets are considered to be impaired if their carrying amount is not recoverable from the estimated undiscounted future cash flows associated with the assets. If we determine an asset is impaired and its recorded cost is higher than estimated fair market value based on the estimated present value of future cash flows, we adjust the asset to estimated fair market value.

Environmental Costs—NewMarket capitalizes environmental compliance costs if they extend the useful life of the related property or prevent future contamination. Environmental compliance costs also include maintenance and operation of pollution prevention and control facilities. We expense these compliance costs in cost of goods sold as incurred.

Accrued environmental remediation and monitoring costs relate to an existing condition caused by past operations. NewMarket accrues these costs in current operations within cost of goods sold in the Consolidated Statements of Income when it is probable that we have incurred a liability and the amount can be reasonably estimated. These estimates are based on an assessment of the site, available clean-up methods, and prior experience in handling remediation.

When we can reliably determine the amount and timing of future cash flows, we discount these liabilities, incorporating an inflation factor.

Legal Costs—We expense legal costs in the period incurred.

Employee Savings Plan—Most of our full-time salaried and hourly employees may participate in defined contribution savings plans. Employees who are covered by collective bargaining agreements may also participate in a savings plan according to the terms of their bargaining agreements. Employees, as well as NewMarket, contribute to the plans. We made contributions of $7 million in 2016, $6 million in 2015, and $6 million in 2014 related to these plans.

Research, Development, and Testing Expenses—NewMarket expenses all research, development, and testing costs as incurred. R&D costs include personnel-related costs, as well as internal and external testing of our products.

Income Taxes—We recognize deferred income taxes for temporary differences between the financial reporting basis and the income tax basis of assets and liabilities. We also adjust for changes in tax rates and laws at the time the changes are enacted. A valuation allowance is recorded when it is more likely than not that a deferred tax asset will not be realized. We recognize accrued interest and penalties associated with uncertain tax positions as part of income tax expense on our Consolidated Statements of Income.

We generally provide for additional U.S. taxes that would be incurred if a foreign subsidiary returns its earnings in cash to the United States. Undistributed earnings of certain foreign subsidiaries for which U.S. taxes have not been provided totaled approximately $537 million at December 31, 2016, $436 million at December 31, 2015, and $363 million at December 31, 2014. Deferred income taxes have not been provided on these earnings since we expect them to be indefinitely reinvested abroad. Accordingly, no provision has been made for taxes that may be payable on the remittance of these earnings. The determination of the amount of such unrecognized deferred tax liability is not practicable because of the complexities with its hypothetical calculation.

Capital Lease Obligation—We record our capital lease obligations at the lower of fair market value of the related asset at the inception of the lease or the present value of the total minimum lease payments.

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Derivative Financial Instruments and Hedging Activities—We record all derivatives on the balance sheet at fair value. The accounting for changes in the fair value of derivatives depends on the intended use of the derivative, whether we have elected to designate a derivative in a hedging relationship and apply hedge accounting, and whether the hedging relationship has satisfied the criteria necessary to apply hedge accounting. We may enter into derivative contracts that are intended to economically hedge certain of our risks, even though hedge accounting does not apply or we elect not to apply hedge accounting. We do not enter into derivative instruments for speculative purposes. We had no derivative financial instruments outstanding at December 31, 2016.

Stock-based Compensation—We calculate the fair value of restricted stock and restricted stock units based on the closing price of our common stock on the date of grant. If award recipients are entitled to receive dividends during the vesting period, we make no adjustment to the fair value of the award for dividends. If the award does not entitle recipients to dividends during the vesting period, we reduce the grant-date price of our common stock by the present value of the dividends expected to be paid on the underlying shares during the vesting period, discounted at the risk-free interest rate.

We recognize stock-based compensation expense for the number of awards expected to vest on a straight-line basis over the requisite service period.

Estimates and Risks Due to Concentration of Business—The preparation 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 amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

In addition, our financial results can be influenced by certain risk factors. Some of our significant concentrations of risk include the following:

- reliance on a small number of significant customers;
- customers concentrated in the fuel and lubricant industries; and
- production of several of our products solely at one facility.

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2. Earnings Per Share

We had 18,114 shares in 2016, 27,434 shares in 2015, and 30,521 shares in 2014 of nonvested restricted stock and restricted stock units that were excluded from the calculation of diluted earnings per share, as their effect on earnings per share would be anti-dilutive.

The nonvested restricted stock is considered a participating security since the restricted stock contains nonforfeitable rights to dividends. As such, we use the two-class method to compute basic and diluted earnings per share for all periods presented since this method yielded a more dilutive result than the treasury-stock method. The following table illustrates the earnings allocation method utilized in the calculation of basic and diluted earnings per share.

	Years Ended December 31,		
(in thousands, except per-share amounts)	2016	2015	2014
Earnings per share numerator:			
Net income attributable to common shareholders before allocation of earnings to participating securities	$243,441	$238,603	$233,255
Earnings allocated to participating securities	477	482	391
Net income attributable to common shareholders after allocation of earnings to participating securities	$242,964	$238,121	$232,864
Earnings per share denominator:			
Weighted-average number of shares of common stock outstanding - basic and diluted	11,828	12,241	12,671
Earnings per share - basic and diluted	$20.54	$19.45	$18.38

3. Supplemental Cash Flow Information

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Cash paid during the year for			
Interest and financing expenses (net of capitalization)	$18,775	$16,193	$16,223
Income taxes	60,998	99,006	112,289
Supplemental disclosure of non-cash transactions			
Release of deposit account funds to terminate interest rate swap	21,868	0	0
Non-cash additions to property, plant, and equipment	8,762	13,959	5,933
Non-cash obligation under capital lease	4,810	0	0

4. Trade and Other Accounts Receivable, Net

	December 31,	
(in thousands)	2016	2015
Trade receivables	$265,991	$252,699
Income tax receivables	26,189	20,141
Other	14,736	15,127
	$306,916	$287,967

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5. Inventories

(in thousands)	December 31, 2016	2015
Finished goods and work-in-process	$254,068	$292,978
Raw materials	45,581	48,728
Stores, supplies, and other	11,863	9,925
	$311,512	$351,631

Our U.S. inventories, which are stated on the LIFO basis, amounted to $130 million at December 31, 2016, which was below replacement cost by approximately $39 million. At December 31, 2015, LIFO basis inventories were $147 million, which was approximately $36 million below replacement cost.

Our foreign inventories amounted to $176 million at December 31, 2016 and $196 million at December 31, 2015.

Reserves for obsolete and slow-moving inventory included in the table above were not material at December 31, 2016 or December 31, 2015.

6. Prepaid Expenses and Other Current Assets

(in thousands)	December 31, 2016	2015
Dividend funding	$17,478	$17,594
Income taxes on intercompany profit	3,954	12,310
Other	4,869	5,466
	$26,301	$35,370

7. Property, Plant, and Equipment, at Cost

(in thousands)	December 31, 2016	2015
Land	$40,190	$41,101
Land improvements	44,048	32,074
Leasehold improvements	1,510	1,516
Buildings	161,512	156,555
Machinery and equipment	915,423	774,857
Construction in progress	102,274	122,886
	$1,264,957	$1,128,989

We depreciate the cost of property, plant, and equipment by the straight-line method over the following estimated useful lives:

Land improvements	5 - 30 years
Buildings	10 - 48 years
Machinery and equipment	3 - 20 years

Depreciation expense was $42 million in 2016, $35 million in 2015, and $34 million in 2014.

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8. Intangibles (Net of Amortization) and Goodwill

The net carrying amount of intangibles and goodwill was $10 million at December 31, 2016 and $11 million at December 31, 2015. The gross carrying amount and accumulated amortization of each type of intangible asset and goodwill are presented in the table below.

	December 31,			
	2016		2015	
(in thousands)	Gross Carrying Amount	Accumulated Amortization	Gross Carrying Amount	Accumulated Amortization
Amortizing intangible assets				
Formulas and technology	$2,678	$ 1,958	$88,763	$ 86,861
Contracts	2,000	0	4,476	4,103
Customer bases	6,938	3,961	6,977	3,627
Trademarks and trade names	1,513	1,069	1,549	923
Goodwill	4,295		4,656	
	$17,424	$ 6,988	$106,421	$ 95,514
Aggregate amortization expense		$ 1,860		$ 5,704

Aggregate amortization expense was $6 million in 2014. All of the intangibles relate to the petroleum additives segment. The change in the gross carrying amount between 2015 and 2016 is due to the following factors:

- Certain intangible assets related to formulas and technology and contracts became fully amortized during 2016, resulting in a decrease in the gross carrying amount and accumulated amortization,
- A contract renewal related to a non-compete agreement, and
- Foreign currency fluctuations.

There is no accumulated goodwill impairment. Estimated annual amortization expense related to our intangible assets for the next five years is expected to be (in thousands):

2017	$864
2018	834
2019	813
2020	504
2021	440

We amortize the contract over 10 years; customer bases over 20 years; formulas and technology over 10 years; and trademarks and trade names over 10 years.

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9. Deferred Charges and Other Assets

	December 31,	
(in thousands)	2016	2015
Asbestos insurance receivables	$4,147	$5,244
Deferred financing costs, net of amortization	1,414	1,914
Interest rate swap deposits	0	26,130
Other	4,948	6,057
	$10,509	$39,345

Deferred financing costs, net of amortization in the table above include only those costs associated with the revolving credit facility. The amount of deferred financing costs, net of amortization related to the 4.10% senior notes is reported as a component of long-term debt. See Note 11 for further information on our long-term debt. We terminated the interest rate swap on September 7, 2016, as discussed in Note 14.

10. Accrued Expenses

	December 31,	
(in thousands)	2016	2015
Employee benefits, payroll, and related taxes	$33,019	$30,562
Customer rebates	20,944	21,290
Capital projects	18,779	13,927
Taxes other than income and payroll	6,046	7,216
Other	25,294	26,516
	$104,082	$99,511

11. Long-term Debt

	December 31,			
(in thousands)	2016		2015	
Senior notes - 4.10% due 2022 (net of related deferred financing costs)	$	346,505	$	345,920
Revolving credit facility	156,000		145,000	
Capital lease obligation	4,770		0	
	$	507,275	$	490,920

4.10% Senior Notes – In 2012, we issued $350 million aggregate principal amount of 4.10% senior notes due 2022 at an issue price of 99.83%. The notes are senior unsecured obligations and are registered under the Securities Act of 1933. We incurred financing costs totaling approximately $5 million related to the 4.10% senior notes, which are being amortized over the term of the agreement.

The 4.10% senior notes rank:

- equal in right of payment with all of our existing and future senior unsecured indebtedness; and
- senior in right of payment to any of our future subordinated indebtedness.

The indenture governing the 4.10% senior notes contains covenants that, among other things, limit our ability and the ability of our subsidiaries to:

- create or permit to exist liens;
- enter into sale-leaseback transactions;
- incur additional guarantees; and
- sell all or substantially all of our assets or consolidate or merge with or into other companies.

We were in compliance with all covenants under the indenture governing the 4.10% senior notes as of December 31, 2016 and December 31, 2015.

Revolving Credit Facility – On October 28, 2014, we entered into a Credit Agreement with a term of five years. The Credit Agreement provides for a $650 million, multicurrency revolving credit facility, with a $100 million sublimit for multicurrency borrowings, a $75 million sublimit for letters of credit, and a $20 million sublimit for swingline loans. The Credit Agreement includes an expansion feature which allows us, subject to certain conditions, to request an increase to the aggregate amount of the revolving credit facility or obtain incremental term loans in an amount up to $150 million.

We have recorded deferred financing costs of $2.5 million related to the credit facility, which we are amortizing over the term of the Credit Agreement.

On July 15, 2016, we entered into Amendment No. 1 to the Credit Agreement. The amendment allows certain of our foreign subsidiaries to borrow under the original Credit Agreement dated as of October 28, 2014. We did not incur significant additional financing fees with the amendment.

The obligations under the Credit Agreement are unsecured and fully guaranteed by NewMarket. The revolving credit facility matures on October 28, 2019.

Borrowings made under the revolving credit facility bear interest at an annual rate equal to, at our election, either (1) the ABR plus the Applicable Rate (solely in the case of loans denominated in U.S. dollars to NewMarket) or (2) the Adjusted LIBO Rate plus the Applicable Rate. ABR is the greatest of (i) the rate of interest publicly announced by the Administrative Agent as its prime rate, (ii) the federal funds effective rate plus 0.5%, or (iii) the Adjusted LIBO Rate for a one month interest period plus 1%. The Adjusted LIBO Rate means the rate at which Eurocurrency deposits in the London interbank market for certain periods (as selected by NewMarket) are quoted, as adjusted for statutory reserve requirements. Depending on our consolidated Leverage Ratio, the Applicable Rate ranges from 0.00% to 0.50% for loans bearing interest based on the ABR and from 1.00% to 1.50% for loans bearing interest based on the Adjusted LIBO Rate. At December 31, 2016, the Applicable Rate was 0.25% for loans bearing interest based on the ABR and 1.25% for loans bearing interest based on the Adjusted LIBO Rate.

The Credit Agreement contains financial covenants that require NewMarket to maintain a consolidated Leverage Ratio (as defined in the Credit Agreement) of no more than 3.50 to 1.00 and a consolidated Interest Coverage Ratio (as defined in the Credit Agreement) of no less than 3.00 to 1.00, calculated on a rolling four quarter basis, as of the end of each fiscal quarter ending on and after December 31, 2014. We were in compliance with all covenants under the revolving credit facility at December 31, 2016 and December 31, 2015.

The following table provides information related to the unused portion of our revolving credit facility in effect at December 31, 2016 and December 31, 2015:

	December 31,	
(in thousands)	2016	2015
Maximum borrowing capacity under the revolving credit facility	$650,000	$650,000
Outstanding borrowings under the revolving credit facility	156,000	145,000
Outstanding letters of credit	3,483	2,895
Unused portion of revolving credit facility	$490,517	$502,105

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The average interest rate for borrowings under our revolving credit facilities was 1.9% during both 2016 and 2015. The average interest rate on outstanding borrowings was 2.1% at December 31, 2016 and December 31, 2015. Outstanding borrowings for the revolving credit facility are due in 2019. None of our remaining outstanding borrowings at December 31, 2016 are due in the next five years.
Capital Lease Obligation – The capital lease obligation is related to the Singapore manufacturing facility.
Other Borrowings - On January 4, 2017, we issued $250 million in senior unsecured notes in a private placement with The Prudential Insurance Company of America and certain other purchasers. These notes bear interest at 3.78% and mature on January 4, 2029. Interest is payable semiannually and principal payments of $50 million are payable annually beginning on January 4, 2025. Under certain conditions, we have the option to prepay the notes. The note purchase agreement contains representations, warranties, terms and conditions customary for transactions of this type. These include negative covenants, certain financial covenants and events of default which are substantially similar to the covenants and events of default in our revolving credit facility.

12. Other Noncurrent Liabilities

	December 31,	
(in thousands)	2016	2015
Employee benefits	$81,377	$77,413
Environmental remediation	13,796	14,907
Asbestos litigation reserve	9,710	9,571
Deferred income taxes	9,234	9,656
Interest rate swaps	0	19,494
Other	17,203	13,044
	$131,320	$144,085

We terminated the interest rate swap on September 7, 2016, as discussed in Note 14.

13. Stock-based Compensation

The 2014 Incentive Compensation and Stock Plan (the Plan) was approved on April 24, 2014 and replaced the 2004 Incentive Compensation and Stock Plan (the Prior Plan). No new awards may be granted under the Prior Plan, but the terms of the Prior Plan continued to govern awards that were issued under the Prior Plan and remained outstanding. All awards outstanding under the Prior Plan vested or were forfeited during 2016.
Any employee of our company or an affiliate or a person who is a member of our Board of Directors or the board of directors of an affiliate is eligible to participate in the Plan if the Compensation Committee of the Board of Directors (the Administrator), in its sole discretion, determines that such person has contributed or can be expected to contribute to the profits or growth of our company or its affiliates (each, a participant). Under the terms of the Plan, we may grant participants stock awards, incentive awards, stock units, or options (which may be either incentive stock options or nonqualified stock options), or stock appreciation rights (SARs), which may be granted with a related option. Stock options entitle the participant to purchase a specified number of shares of our common stock at a price that is fixed by the Administrator at the time the option is granted; provided, however, that the price cannot be less than the shares' fair market value on the date of grant. The maximum period in which an option may be exercised is fixed by the Administrator at the time the option is granted but, in the case of an incentive stock option, cannot exceed ten years. No participant may be granted or awarded, in any calendar year, shares, options, SARs, or stock units covering more than 200,000 shares of our common stock in the aggregate. For purposes of this limitation and the individual limitation on the grant of options, an option and corresponding SAR are treated as a single award.

The maximum aggregate number of shares of our common stock that may be issued under the Plan is 1,000,000. At December 31, 2016, 981,067 shares were available for grant. During 2016, we granted 720 shares to five of our non-employee directors, which vested immediately.

A summary of activity during 2016 related to NewMarket's restricted stock and restricted stock units (stock awards) is presented below in whole shares:

	Number of Shares	Weighted Average Grant-Date Fair Value
Unvested stock awards at January 1, 2016	27,434	$ 359.48
Vested in 2016	7,575	314.19
Forfeited in 2016	1,745	351.29
Unvested stock awards at December 31, 2016	18,114	379.22

The weighted average grant-date fair value was $375.57 for stock awards granted in 2015 and $381.99 for stock awards granted in 2014. The fair value of shares vested was $3 million in 2016 and $4 million in 2015. We recognized compensation expense of $3 million in 2016, $2 million in 2015, and $2 million in 2014 related to stock awards. At December 31, 2016, total unrecognized compensation expense related to stock awards was $3 million, which is expected to be recognized over a period of 1.7 years.

14. Derivatives and Hedging Activities

We are exposed to certain risks arising from both our business operations and economic conditions. We manage our exposures to a wide variety of business and operational risks through management of our core business activities.

We manage certain economic risks, including interest rate, liquidity, and credit risk primarily by managing the amount, sources, and duration of our debt funding, as well as through the use of derivative financial instruments. Specifically, we have entered, and in the future may enter, into interest rate swaps to manage our exposure to interest rate movements.

Our foreign operations expose us to fluctuations of foreign exchange rates. These fluctuations may impact our results of operations, financial position, and cash flows. To manage this exposure, we sometimes enter into foreign currency forward contracts to minimize currency exposure due to cash flows from foreign operations. There were no such contracts outstanding at December 31, 2016 or December 31, 2015.

Non-designated Hedges

On June 25, 2009, we entered into an interest rate swap with Goldman Sachs in the notional amount of $97 million and with a maturity date of January 19, 2022 (Goldman Sachs interest rate swap). We terminated this swap, which had been fully collateralized over the period that it was outstanding, on September 7, 2016 and settled the liability using approximately $22 million of the cash deposit with Goldman Sachs. Under the terms of this interest rate swap, NewMarket made fixed rate payments at 5.3075% and Goldman Sachs made variable rate payments based on three-month LIBOR. Until termination, we collateralized this exposure through cash deposits posted with Goldman Sachs amounting to $26 million at December 31, 2015.

We have made an accounting policy election to not offset derivative fair value amounts with the fair value amounts for the right to reclaim cash collateral under our master netting arrangement. We did not use hedge accounting for the Goldman Sachs interest rate swap, and therefore, immediately recognized any change in the fair value of this derivative financial instrument directly in earnings.

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The table below presents the fair value of our derivative financial instruments, as well as their classification on the Consolidated Balance Sheets.

	Liability Derivatives			
	December 31, 2016		December 31, 2015	
(in thousands)	Balance Sheet Location	Fair Value	Balance Sheet Location	Fair Value
Derivatives Not Designated as Hedging Instruments				
Goldman Sachs interest rate swap	Accrued expenses and Other noncurrent liabilities	$ 0	Accrued expenses and Other noncurrent liabilities	$21,734

The following table presents the effect of our derivative financial instruments on the Consolidated Statements of Income.

Effect of Derivative Instruments on the Consolidated Statements of Income
Not Designated Derivatives
(in thousands)

Derivatives Not Designated as Hedging Instruments	Location of Gain (Loss) Recognized in Income on Derivatives	Amount of Gain (Loss) Recognized in Income on Derivatives		
		Years Ended December 31,		
		2016	2015	2014
Goldman Sachs interest rate swap	Other income (expense), net	$ (4,883)	$ (3,221)	$ (7,125)

15. Fair Value Measurements

The following table provides information on assets and liabilities measured at fair value on a recurring basis. No material events occurred during 2016 requiring adjustment to the recognized balances of assets or liabilities which are recorded at fair value on a nonrecurring basis. As discussed in Note 14, we terminated the interest swap on September 7, 2016.

(in thousands)	Carrying Amount in Consolidated Balance Sheets	Fair Value	Fair Value Measurements Using Level 1	Level 2	Level 3
	December 31, 2016				
Cash and cash equivalents	$192,154	$192,154	$192,154	$ 0	$ 0
	December 31, 2015				
Cash and cash equivalents	$93,424	$93,424	$93,424	$ 0	$ 0
Cash deposit for collateralized interest rate swap	26,130	26,130	26,130	0	0
Interest rate swap liability	21,734	21,734	0	21,734	0

Before the termination of the interest swap, its fair value was determined using the market standard methodology of netting the discounted future fixed cash receipts and the discounted expected variable cash payments. The analysis reflected the contractual term of the derivative, including the period to maturity. The variable cash payments were based on an expectation of future interest rates derived from observable market interest rate curves. In determining the fair value measurements, we incorporated credit valuation adjustments to appropriately reflect both our nonperformance risk and the counterparties' nonperformance risk.

Although we determined that the majority of the inputs used to value our derivative fell within Level 2 of the fair value hierarchy, the credit valuation adjustment associated with the derivative utilized Level 3 inputs. These Level 3 inputs included estimates of current credit spreads to evaluate the likelihood of default by both us and the counterparties to the derivative. As of December 31, 2015, we assessed the significance of the impact of the credit valuation adjustment on the overall valuation of our derivative and determined that the credit valuation adjustment was not significant to the overall valuation of the derivative. Accordingly, we determined that our derivative valuation should be classified in Level 2 of the fair value hierarchy.

We have made an accounting policy election to measure credit risk of any derivative financial instruments subject to master netting agreements on a net basis by counterparty portfolio.

Long-term debt - We record the carrying amount of our long-term debt at historical cost, less deferred financing costs related to the 4.10% senior notes. The estimated fair value of our long-term debt is shown in the table below and is based primarily on estimated current rates available to us for debt of the same remaining duration and adjusted for nonperformance risk and credit risk. The estimated fair value of our publicly traded 4.10% senior notes included in long-term debt in the table below is based on the last quoted price closest to December 31, 2016. The fair value is categorized as Level 2.

	December 31, 2016		December 31, 2015	
(in thousands)	Carrying Amount	Fair Value	Carrying Amount	Fair Value
Long-term debt (excluding capital lease obligation)	$502,505	$507,925	$490,920	$515,302

16. Commitments and Contingencies

Contractual Commitments—NewMarket has operating lease agreements primarily for office space, land, transportation equipment, and storage facilities. Rental expense was $33 million in 2016, $34 million in 2015, and $30 million in 2014.

Future lease payments for all noncancelable operating leases as of December 31, 2016 are (in thousands):

2017	$14,235
2018	11,698
2019	9,520
2020	6,796
2021	4,776
After 2021	23,515

We have contractual obligations for the construction of assets, as well as purchases of property and equipment, of approximately $52 million at December 31, 2016, all of which are due within five years.

Purchase Obligations—We have purchase obligations for goods or services that are enforceable, legally binding, and specify all significant terms, including: fixed or minimum quantities to be purchased; fixed, minimum, or variable price provisions; and the approximate timing of the transaction. Purchase obligations exclude agreements that are cancelable without penalty. Purchase orders made in the ordinary course of business are excluded from this amount. Any amounts for which we are liable under purchase orders are reflected in our Consolidated Balance Sheets as accounts payable or accrued expenses.

Future payments for purchase obligations as of December 31, 2016 are (in thousands):

2017	$150,740
2018	163,953
2019	167,368
2020	151,066
2021	148,113
After 2021	239,740

Litigation—We are involved in legal proceedings that are incidental to our business and may include administrative or judicial actions. Some of these legal proceedings involve governmental authorities and relate to environmental matters. For further information, see “Environmental” below and Item 1 of this Form 10-K.

While it is not possible to predict or determine with certainty the outcome of any legal proceeding, we believe the outcome of any of these proceedings, or all of them combined, will not result in a material adverse effect on our consolidated results of operations, financial condition, or cash flows.

In late 2013, Afton initiated a voluntary self-audit of its compliance with certain sections of the TSCA under the EPA’s Audit Policy. If any potential TSCA violations are discovered during the audit, we would voluntarily disclose them to the EPA under the Audit Policy. In August 2014, the EPA staff began its own TSCA inspection of both Afton and Ethyl. While it is not possible to predict or determine with certainty the outcome, we do not believe that any findings identified as a result of our audit or the EPA’s TSCA inspection will have a material adverse effect on our consolidated results of operations, financial condition, or cash flows.

Asbestos

We are a defendant in personal injury lawsuits involving exposure to asbestos. These cases involve exposure to asbestos in premises owned or operated, or formerly owned or operated, by subsidiaries of NewMarket. We have never manufactured, sold, or distributed products that contain asbestos. Nearly all of these cases are pending in Texas, Louisiana, or Illinois and involve multiple defendants. We maintain an accrual for these proceedings, as well as a receivable for expected insurance recoveries.

The accrual for our premises asbestos liability related to currently asserted claims is based on the following assumptions and factors:

- We are often one of many defendants. This factor influences both the number of claims settled against us and the indemnity cost associated with such resolutions.
- The estimated percent of claimants in each case that, after discovery, will actually make a claim against us, out of the total number of claimants in a case, is based on a level consistent with past experience and current trends.
- We utilize average comparable plaintiff cost history as the basis for estimating pending premises asbestos related claims. These claims are filed by both former contractors’ employees and former employees who worked at past and present company locations. We also include an estimated inflation factor in the calculation.
- No estimate is made for unasserted claims.
- The estimated recoveries from insurance and Albemarle Corporation (a former operation of our company) for these cases are based on, and are consistent with, the 2005 settlement agreements with Travelers Indemnity Company.

Based on the above assumptions, we have provided an undiscounted liability related to premises asbestos claims of $11 million at both December 31, 2016 and December 31, 2015. The liabilities related to asbestos claims are included in accrued expenses (current portion) and other noncurrent liabilities on the Consolidated Balance Sheets. Certain of these costs are recoverable through the settlement agreement with The Travelers Indemnity Company, as well as an agreement with Albemarle Corporation. The receivable for these recoveries related to premises asbestos liabilities was $5 million at December 31, 2016 and $6 million at December 31, 2015. These receivables are included in trade and other accounts receivable, net on the Consolidated Balance Sheets for the current portion. The noncurrent portion is included in deferred charges and other assets.

Environmental—We are involved in environmental proceedings and potential proceedings relating to soil and groundwater contamination, disposal of hazardous waste, and other environmental matters at several of our current or former facilities, or at third-party sites where we have been designated as a potentially responsible party (PRP). While we believe we are currently adequately accrued for known environmental issues, it is possible that unexpected future costs could have a significant impact on our financial position, results of operations, and cash flows. Our total accruals for environmental remediation, dismantling, and decontamination were approximately $16 million at December 31, 2016 and $17 million at December 31, 2015. Of the total accrual, the current portion is included in accrued expenses and the noncurrent portion is included in other noncurrent liabilities on the Consolidated Balance Sheets.

Our more significant environmental sites include a former TEL plant site in Louisiana (the Louisiana site) and a Houston, Texas plant site (the Texas site). Together, the amounts accrued on a discounted basis related to these sites represented approximately $10 million of the total accrual above at December 31, 2016, using discount rates ranging from 4% to 9%, and $10 million of the total accrual above at December 31, 2015, using discount rates ranging from 3% to 9%. The aggregate undiscounted amount for these sites was $13 million at December 31, 2016 and $14 million at December 31, 2015. Of the total accrued for these two sites, the amount related to remediation of groundwater and soil was $4 million for the Louisiana site and $5 million for the Texas site at December 31, 2016 and $4 million for the Louisiana site and $6 million for the Texas site at December 31, 2015.

In 2000, the EPA named us as a PRP under Superfund law for the clean-up of soil and groundwater contamination at the five grouped disposal sites known as "Sauget Area 2 Sites" in Sauget, Illinois. Without admitting any fact, responsibility, fault, or liability in connection with this site, we are participating with other PRPs in site investigations and feasibility studies. In December 2013, the EPA issued its Record of Decision confirming its remedies for the selected Sauget Area 2 sites. We have accrued our estimated proportional share of the remedial costs and expenses addressed in the Record of Decision. We do not believe there is any additional information available as a basis for revision of the liability that we have established at December 31, 2016. The amount accrued for this site is not material.

17. Pension Plans and Other Postretirement Benefits

NewMarket uses a December 31 measurement date for all of our plans.

U.S. Retirement Plans

NewMarket sponsors four pension plans for all full-time U.S. employees that offer a benefit based primarily on years of service and compensation. Employees do not contribute to these pension plans. The plans are as follows:

- Salaried employees pension plan;
- Afton pension plan for union employees (the Sauget plan);
- NewMarket retirement income plan for union employees in Houston, Texas (the Houston plan); and
- Afton Chemical Additives pension plan for union employees in Port Arthur, Texas (the Port Arthur plan).

In addition, we offer an unfunded, nonqualified supplemental pension plan. This plan restores the pension benefits from our regular pension plans that would have been payable to designated participants if it were not for limitations imposed by U.S. federal income tax regulations.

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We also provide postretirement health care benefits and life insurance to eligible retired employees. A plan amendment, with an effective date of January 1, 2016, was made in 2015 to provide post-65 medical and prescription drug benefits to retirees through a private healthcare exchange with fixed subsidies to eligible retirees through a health reimbursement account. As a result, the postretirement plan liabilities were remeasured at September 1, 2015 resulting in a non-cash improvement in the funded position. The adjustment to accumulated other comprehensive loss is reflected in prior service cost (credit) and is being amortized into expense.
The components of net periodic pension and postretirement benefit cost (income), as well as other amounts recognized in other comprehensive income (loss), are shown below.

	Years Ended December 31,					
	Pension Benefits			Postretirement Benefits		
(in thousands)	2016	2015	2014	2016	2015	2014
Net periodic benefit cost (income)						
Service cost	$12,860	$13,034	$9,608	$705	$2,244	$1,849
Interest cost	13,175	11,938	10,936	1,653	2,548	2,739
Expected return on plan assets	(23,137)	(20,467)	(17,524)	(1,239)	(1,288)	(1,311)
Amortization of prior service cost (credit)	187	99	99	(3,028)	(1,008)	9
Amortization of actuarial net (gain) loss	5,243	6,891	3,825	0	0	(713)
Net periodic benefit cost (income)	8,328	11,495	6,944	(1,909)	2,496	2,573
Other changes in plan assets and benefit obligations recognized in other comprehensive income (loss)						
Actuarial net (gain) loss	9,140	11,095	56,364	156	(1,826)	16,264
Prior service cost (credit)	749	0	0	0	(35,768)	0
Amortization of actuarial net gain (loss)	(5,243)	(6,891)	(3,825)	0	0	713
Amortization of prior service (cost) credit	(187)	(99)	(99)	3,028	1,008	(9)
Total recognized in other comprehensive income (loss)	4,459	4,105	52,440	3,184	(36,586)	16,968
Total recognized in net periodic benefit cost (income) and other comprehensive income (loss)	$12,787	$15,600	$59,384	$1,275	$(34,090)	$19,541

The estimated actuarial net loss to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 is expected to be $5 million for pension plans. The estimated prior service cost to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 is not expected to be material for pension plans. The estimated prior service credit to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 related to postretirement benefits is expected to be $3 million.

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Changes in the plans' benefit obligations and assets follow.

	December 31,			
	Pension Benefits		Postretirement Benefits	
(in thousands)	2016	2015	2016	2015
Change in benefit obligation				
Benefit obligation at beginning of year	$292,728	$291,119	$38,517	$74,203
Service cost	12,860	13,034	705	2,244
Interest cost	13,175	11,938	1,653	2,548
Actuarial net (gain) loss	6,087	(14,718)	(322)	(1,884)
Plan amendment	748	0	0	(35,770)
Benefits paid	(9,232)	(8,645)	(2,443)	(2,824)
Benefit obligation at end of year	316,366	292,728	38,110	38,517
Change in plan assets				
Fair value of plan assets at beginning of year	260,911	255,571	23,972	24,270
Actual return on plan assets	20,083	(5,346)	761	1,228
Employer contributions	19,330	19,331	948	1,298
Benefits paid	(9,232)	(8,645)	(2,443)	(2,824)
Fair value of plan assets at end of year	291,092	260,911	23,238	23,972
Funded status	$(25,274)	$(31,817)	$(14,872)	$(14,545)
Amounts recognized in the Consolidated Balance Sheets				
Noncurrent assets	$15,188	$7,297	$0	$0
Current liabilities	(2,781)	(2,735)	(1,313)	(1,396)
Noncurrent liabilities	(37,681)	(36,379)	(13,559)	(13,149)
	$(25,274)	$(31,817)	$(14,872)	$(14,545)
Amounts recognized in accumulated other comprehensive loss				
Actuarial net (gain) loss	$107,061	$103,164	$(925)	$(1,081)
Prior service cost (credit)	58	(504)	(31,732)	(34,760)
	$107,119	$102,660	$(32,657)	$(35,841)

The accumulated benefit obligation for all domestic defined benefit pension plans was $272 million at December 31, 2016 and $251 million at December 31, 2015.

The fair market value of plan assets exceeded the accumulated benefit obligation for all domestic plans, except the nonqualified plan, at December 31, 2016 and December 31, 2015. The fair market value of plan assets exceeded the projected benefit obligation for all domestic plans, except the nonqualified plan, at December 31, 2016. The fair market value of plan assets exceeded the projected benefit obligation for all domestic plans, except the Salaried and the nonqualified plan, at December 31, 2015.

The net asset position for plans in which assets exceed the projected benefit obligation is included in prepaid pension cost on the Consolidated Balance Sheets.

The net liability position of plans in which the projected benefit obligation exceeds assets is included in other noncurrent liabilities on the Consolidated Balance Sheets.

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A portion of the accrued benefit cost for the nonqualified plan is included in current liabilities at both December 31, 2016 and December 31, 2015. As the nonqualified plan is unfunded, the amount reflected in current liabilities represents the expected benefit payments related to the nonqualified plan during 2017.

The first table below shows information on domestic pension plans with the accumulated benefit obligation in excess of plan assets. The second table presents information on domestic pension plans with the projected benefit obligation in excess of plan assets.

(in thousands)	December 31, 2016	2015
Plans with the accumulated benefit obligation in excess of the fair market value of plan assets		
Projected benefit obligation	$40,462	$37,637
Accumulated benefit obligation	35,939	34,526
Fair market value of plan assets	0	0

(in thousands)	December 31, 2016		2015	
Plans with the projected benefit obligation in excess of the fair market value of plan assets				
Projected benefit obligation	$	40,462	$	232,849
Fair market value of plan assets	0		193,736	

There are no assets held by the trustee for the retired beneficiaries of the nonqualified plan. Payments to retired beneficiaries of the nonqualified plan are made with cash from operations.

Assumptions—We used the following assumptions to calculate the results of our retirement plans:

	Pension Benefits			Postretirement Benefits		
	2016	2015	2014	2016	2015	2014
Weighted-average assumptions used to determine net periodic benefit cost (income) for years ended December 31,						
Discount rate	4.500%	4.125%	5.000%	4.500%	4.125%	5.000%
Expected long-term rate of return on plan assets	8.50 %	8.50 %	8.50 %	5.50 %	5.50 %	5.50 %
Rate of projected compensation increase	3.50 %	3.50 %	3.50 %			
Weighted-average assumptions used to determine benefit obligations at December 31,						
Discount rate	4.250%	4.500%	4.125%	4.250%	4.500%	4.125%
Rate of projected compensation increase	3.50 %	3.50 %	3.50 %			

For pension plans, we base the assumed expected long-term rate of return for plan assets on an analysis of our actual investments, including our asset allocation, as well as an analysis of expected returns. This analysis reflects the expected long-term rates of return for each significant asset class and economic indicator. As of January 1, 2017, the expected rates were 8.5% for U.S. large cap stocks, 4.4% for fixed income, and 3% for inflation. The range of returns relies both on forecasts and on broad-market historical benchmarks for expected return, correlation, and volatility for each asset class. Our asset allocation is predominantly weighted toward equities. Through our ongoing monitoring of our investments and review of market data, we have determined that we should maintain the expected long-term rate of return for our U.S. plans at 8.5% at December 31, 2016. For the postretirement plan, we based the assumed expected long-term rate of return for plan assets on an evaluation of projected interest rates, as well as the guaranteed interest rate for our insurance contract.

Plan Assets—Pension plan assets are held and distributed by trusts and consist principally of equity securities and investment-grade fixed income securities. We invest directly in equity securities, as well as in funds which primarily hold equity and debt securities. Our target allocation is 90% to 97% in equities and 3% to 10% in debt securities or cash.

The pension obligation is long-term in nature and the investment philosophy followed by the Pension Investment Committee is likewise long-term in its approach. The majority of the pension funds are invested in equity securities as historically, equity securities have outperformed debt securities and cash investments, resulting in a higher investment return over the long-term. While in the short-term, equity securities may underperform other investment classes, we are less concerned with short-term results and more concerned with long-term improvement. The pension funds are managed by six different investment companies who predominantly invest in U.S. and international equities. Each investment company’s performance is reviewed quarterly. A small portion of the funds is in investments such as cash or short-term bonds, which historically has been less vulnerable to short-term market swings. These funds are used to provide the cash needed to meet our monthly obligations.

There are no significant concentrations of risk within plan assets, nor do the equity securities include any NewMarket common stock for any year presented.

The assets of the postretirement benefit plan are invested completely in an insurance contract held by Metropolitan Life. No NewMarket common stock is included in these assets.

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The following table provides information on the fair value of our pension and postretirement benefit plans assets, as well as the related level within the fair value hierarchy. Investments that are measured at fair value using the net asset value per share (or its equivalent) practical expedient have not been classified by level in the fair value hierarchy.

	December 31, 2016				December 31, 2015			
		Fair Value Measurements Using				Fair Value Measurements Using		
(in thousands)	Fair Value	Level 1	Level 2	Level 3	Fair Value	Level 1	Level 2	Level 3
Pension Plans								
Equity securities:								
U. S. companies	$232,895	$232,895	$0	$ 0	$211,471	$211,471	$0	$ 0
International companies	1,757	1,757	0	0	9,512	9,512	0	0
Real estate investment trusts	2,653	2,653	0	0	3,339	3,339	0	0
Money market instruments	11,120	11,120	0	0	5,854	5,854	0	0
Pooled investment funds:								
Fixed income securities—mutual funds	8,799	8,799	0	0	8,560	8,560	0	0
International equities—mutual fund	13,104	13,104	0	0	0	0	0	0
Common collective trust measured at net asset value	19,780				19,329			
Cash and cash equivalents	0	0	0	0	1,927	1,927	0	0
Insurance contract	984	0	984	0	919	0	919	0
	$291,092	$270,328	$984	$ 0	$260,911	$240,663	$919	$ 0
Postretirement Plans								
Insurance contract	$23,238	$0	$23,238	$ 0	$23,972	$0	$23,972	$ 0

The valuation methodologies used to develop the fair value measurements for the investments in the table above is outlined below. There have been no changes in the valuation techniques used to value the investments.

- Equity securities, including common stock and real estate investment trusts, are valued at the closing price reported on a national exchange.
- Money market instruments are valued at cost, which approximates fair value.
- Mutual funds are valued at the closing price reported on a national exchange.
- The common collective trust (the trust) is valued at the net asset value of units held based on the quoted market value of the underlying investments held by the fund. The trust invests primarily in a diversified portfolio of equity securities of companies located outside of the United States and Canada, as determined by a company's jurisdiction of incorporation. We may make withdrawals from the trust on the first business day of each month with at least ten business days' notice. There are no restrictions on redemption as of December 31, 2016 or December 31, 2015.
- Cash and cash equivalents are valued at cost.

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- The insurance contracts are unallocated funds deposited with an insurance company and are stated at an amount equal to the sum of all amounts deposited less the sum of all amounts withdrawn, adjusted for investment return.

Cash Flows—For U.S. plans, NewMarket expects to contribute $19 million to our pension plans in 2017. Contributions to our postretirement benefit plans are not expected to be material. The expected benefit payments for the next ten years are as follows.

(in thousands)	Expected Pension Benefit Payments	Expected Postretirement Benefit Payments
2017	$ 10,785	$ 2,908
2018	11,614	2,737
2019	12,505	2,590
2020	13,271	2,449
2021	14,141	2,330
2022 through 2026	85,936	10,400

Foreign Retirement Plans

For most employees of our foreign subsidiaries, NewMarket has defined benefit pension plans that offer benefits based primarily on years of service and compensation. These defined benefit plans provide benefits for employees of our foreign subsidiaries located in Belgium, the United Kingdom, Germany, Canada, and Mexico. NewMarket generally contributes to investment trusts and insurance accounts to provide for these plans.

The components of net periodic pension cost (income), as well as other amounts recognized in other comprehensive income (loss), for these foreign defined benefit pension plans are shown below.

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Net periodic benefit cost (income)			
Service cost	$6,926	$8,150	$6,213
Interest cost	4,915	4,932	5,993
Expected return on plan assets	(6,638)	(7,077)	(8,012)
Amortization of prior service cost (credit)	(83)	(95)	(102)
Amortization of actuarial net (gain) loss	1,021	1,587	1,092
Settlements and curtailments	0	0	1,817
Net periodic benefit cost (income)	6,141	7,497	7,001
Other changes in plan assets and benefit obligations recognized in other comprehensive income (loss)			
Actuarial net (gain) loss	3,215	(5,461)	13,004
Settlements and curtailments	0	0	(1,069)
Amortization of actuarial net gain (loss)	(1,021)	(1,587)	(1,092)
Amortization of prior service (cost) credit	83	95	102
Total recognized in other comprehensive income (loss)	2,277	(6,953)	10,945
Total recognized in net periodic benefit cost (income) and other comprehensive income (loss)	$8,418	$544	$17,946

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The settlements and curtailments amounts for 2014 in the table above reflect the termination of the Canadian Hourly pension plan and the settlement of the Canadian Salary pension plan.
The estimated actuarial net loss to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 is expected to be $1 million. The estimated prior service credit expected to be amortized from accumulated other comprehensive loss into net periodic benefit cost (income) during 2017 is expected to be $0.1 million. Changes in the benefit obligations and assets of the foreign defined benefit pension plans follow.

	December 31,	
(in thousands)	2016	2015
Change in benefit obligation		
Benefit obligation at beginning of year	$146,748	$158,279
Service cost	6,926	8,150
Interest cost	4,915	4,932
Employee contributions	832	917
Actuarial net (gain) loss	25,794	(10,736)
Benefits paid	(3,501)	(5,203)
Foreign currency translation	(24,613)	(9,591)
Benefit obligation at end of year	157,101	146,748
Change in plan assets		
Fair value of plan assets at beginning of year	138,646	142,986
Actual return on plan assets	29,026	1,923
Employer contributions	5,441	5,981
Employee contributions	832	917
Benefits paid	(3,501)	(5,203)
Foreign currency translation	(25,567)	(7,958)
Fair value of plan assets at end of year	144,877	138,646
Funded status	$(12,224)	$(8,102)
Amounts recognized in the Consolidated Balance Sheets		
Noncurrent assets	$10,612	$13,133
Current liabilities	(295)	(302)
Noncurrent liabilities	(22,541)	(20,933)
	$(12,224)	$(8,102)
Amounts recognized in accumulated other comprehensive loss		
Actuarial net (gain) loss	$42,809	$40,615
Prior service cost (credit)	39	(44)
Transition obligation	10	10
	$42,858	$40,581

The accumulated benefit obligation for all foreign defined benefit pension plans was $132 million at December 31, 2016 and $125 million at December 31, 2015.

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The fair market value of plan assets exceeded both the accumulated benefit obligation and projected benefit obligation for the United Kingdom and the Canadian Salary plans at both year-end 2016 and 2015. The net asset position of the United Kingdom and Canadian Salary plans are included in prepaid pension cost on the Consolidated Balance Sheets at December 31, 2016 and December 31, 2015. The accumulated benefit obligation and projected benefit obligation exceeded the fair market value of plan assets for the German, Belgian, and Mexican plans at December 31, 2016 and December 31, 2015. The accrued benefit cost of these plans is included in other noncurrent liabilities on the Consolidated Balance Sheets.

As the German plan is unfunded, a portion of the accrued benefit cost for the German plan is included in current liabilities at year-end 2016 and 2015, reflecting the expected benefit payments related to the plan for the following year.

The first table below shows information on foreign pension plans with the accumulated benefit obligation in excess of plan assets. The second table shows information on foreign pension plans with the projected benefit obligation in excess of plan assets.

(in thousands)	December 31, 2016	2015
Plans with the accumulated benefit obligation in excess of the fair market value of plan assets		
Projected benefit obligation	$32,407	$30,521
Accumulated benefit obligation	21,310	20,005
Fair market value of plan assets	9,568	9,286

(in thousands)	December 31, 2016	2015
Plans with the projected benefit obligation in excess of the fair market value of plan assets		
Projected benefit obligation	$ 32,407	$ 30,521
Fair market value of plan assets	9,568	9,286

Assumptions—The information in the table below provides the weighted-average assumptions used to calculate the results of our foreign defined benefit pension plans.

	2016	2015	2014
Weighted-average assumptions used to determine net periodic benefit cost (income) for the years ended December 31,			
Discount rate	3.58%	3.11%	4.01%
Expected long-term rate of return on plan assets	5.10%	5.03%	5.66%
Rate of projected compensation increase	4.28%	4.27%	4.25%
Weighted-average assumptions used to determine benefit obligations at December 31,			
Discount rate	2.53%	3.58%	3.11%
Rate of projected compensation increase	4.20%	4.28%	4.27%

The actuarial assumptions used by the various foreign locations are based upon the circumstances of each particular country and pension plan. The factors impacting the determination of the long-term rate of return for a particular foreign pension plan include the market conditions within a particular country, as well as the investment strategy and asset allocation of the specific plan.

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Plan Assets—Pension plan assets vary by foreign location and plan. Assets are held and distributed by trusts and, depending upon the foreign location and plan, consist primarily of pooled equity funds, pooled corporate and government debt securities funds, a pooled investment property fund, cash, and insurance contracts. The combined weighted-average target allocation of our foreign pension plans is 51% in pooled equity funds, 38% in pooled debt securities funds, 6% in insurance contracts, and 5% in a pooled investment property fund.

While the pension obligation is long-term in nature for each of our foreign plans, the investment strategies followed by each plan vary to some degree based upon the laws of a particular country, as well as the provisions of the specific pension trust. The United Kingdom and Canadian plans are invested predominantly in pooled equity securities funds and pooled debt securities funds. The funds of these plans are managed by various trustees and investment companies whose performance is reviewed throughout the year. The Belgian plan is invested in an insurance contract. The Mexican plan is invested in various mutual funds. The German plan has no assets.

There are no significant concentrations of risk within plan assets, nor do the equity securities include any NewMarket common stock for any year presented.

The following table provides information on the fair value of our foreign pension plans assets, as well as the related level within the fair value hierarchy. Investments that are measured at fair value using the net asset value per share (or its equivalent) practical expedient have not been classified by level in the fair value hierarchy.

	December 31, 2016				December 31, 2015			
		Fair Value Measurements Using				Fair Value Measurements Using		
(in thousands)	Fair Value	Level 1	Level 2	Level 3	Fair Value	Level 1	Level 2	Level 3
Insurance contract	$9,399	$0	$9,399	$ 0	$9,139	$0	$9,139	$ 0
Mutual funds	169	169	0	0	146	146	0	0
Cash and cash equivalents	427	427	0	0	321	321	0	0
Pooled investment funds (measured at net asset value):								
Equity securities—U.S. companies	9,341				9,522			
Equity securities—international companies	64,903				61,588			
Debt securities—corporate	284				22,890			
Debt securities—government	55,273				28,696			
Cash and cash equivalents	349				405			
Property	4,732				5,939			
	$144,877	$596	$9,399	$ 0	$138,646	$467	$9,139	$ 0

The valuation methodologies used to develop the fair value measurements for the investments in the table above are outlined below. There have been no changes in the valuation techniques used to value the investments.

- The insurance contract represents funds deposited with an insurance company and is stated at an amount equal to the sum of all amounts deposited less the sum of all amounts withdrawn, adjusted for investment return.
- Mutual funds are valued at the closing price reported on a national exchange.
- Cash and cash equivalents are valued at cost.

- The pooled investment funds are valued at the net asset value of units held by the plans based on the quoted market value of the underlying investments held by the fund. The United Kingdom pension plan is invested in units of a property fund and units of life insurance policies that are linked to equity securities funds and government bond funds. The underlying assets of the equity funds and bond funds are traded on a national exchange and are based on tracking various indices of the London Stock Exchange. Both the equity and bond funds can trade 46 days per year with notice of two days prior to the transaction day. The property fund invests primarily in direct United Kingdom commercial property and has no redemption restrictions. There were no unfunded commitments for the United Kingdom pension plan funds. The Canadian pension plan is invested in a pooled Canadian equity fund and a pooled diversified fund. The Canadian equity fund invests in a diversification (sector and industry) of equities listed on a recognized Canadian exchange. The diversified fund invests in a balanced portfolio of marketable securities and controls short-term risk by diversification in equities, bonds and cash. There are no redemption restrictions on the pooled Canadian funds and there were no unfunded commitments.

Cash Flows—For foreign pension plans, NewMarket expects to contribute $5 million to the plans in 2017. The expected benefit payments for the next ten years for our foreign pension plans are shown in the table below.

(in thousands)	Expected Pension Benefit Payments
2017	$ 2,975
2018	3,865
2019	3,276
2020	4,555
2021	3,683
2022 through 2026	22,336

18. Other Income (Expense), Net

Other income (expense), net was expense of $3 million in 2016, $3 million in 2015, and $7 million in 2014, primarily representing losses on the Goldman Sachs interest rate swap derivative instrument recorded at fair value. See Note 14 for additional information on the interest rate swap. We terminated the interest swap on September 7, 2016.

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19. Income Taxes

Our income before income tax expense, as well as our provision for income taxes is shown in the table below.

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Income before income tax expense			
Domestic	$161,687	$229,561	$226,777
Foreign	181,521	109,410	112,322
	$343,208	$338,971	$339,099
Income tax expense			
Current income taxes			
Federal	$34,213	$62,491	$61,866
State	9,020	11,216	13,763
Foreign	37,349	26,511	22,007
	80,582	100,218	97,636
Deferred income taxes			
Federal	13,876	1,287	5,199
State	3,095	(936)	774
Foreign	2,214	(201)	2,235
	19,185	150	8,208
Total income tax expense	$99,767	$100,368	$105,844

The reconciliation of the U.S. federal statutory rate to the effective income tax rate follows:

	% of Income Before Income Tax Expense		
	2016	2015	2014
Federal statutory rate	35.0 %	35.0 %	35.0 %
State taxes, net of federal tax	2.3	2.0	2.8
Foreign operations	(5.8)	(4.3)	(4.3)
Domestic research tax credit	(1.2)	(1.2)	(1.0)
Domestic manufacturing tax benefit	(0.8)	(1.9)	(2.0)
Other items and adjustments	(0.4)	0.0	0.7
Effective income tax rate	29.1 %	29.6 %	31.2 %

Certain foreign operations have a U.S. tax impact due to our election to include their earnings in our federal income tax return.

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Our deferred income tax assets and liabilities follow.

	December 31,	
(in thousands)	2016	2015
Deferred income tax assets		
Future employee benefits	$30,178	$31,932
Environmental and future shutdown reserves	5,737	6,051
Loss on derivatives	0	8,454
Trademark expenses	5,810	5,747
Foreign currency translation adjustments	6,687	7,489
Other	7,458	6,720
	55,870	66,393
Deferred income tax liabilities		
Depreciation and amortization	29,736	25,119
Other	6,305	6,201
	36,041	31,320
Net deferred income tax assets	$19,829	$35,073
Reconciliation to financial statements		
Deferred income tax assets	$29,063	$44,729
Deferred income tax liabilities	9,234	9,656
Net deferred income tax assets	$19,829	$35,073

Deferred income tax liabilities are included in other noncurrent liabilities on our Consolidated Balance Sheets. Our deferred taxes are in a net asset position at December 31, 2016. Based on current forecast operating plans and historical profitability, we believe that we will recover nearly the full benefit of our deferred tax assets. We have recorded an immaterial valuation allowance at certain foreign subsidiaries for the remainder.

A reconciliation of the beginning and ending balances of the unrecognized tax benefits from uncertain positions is as follows:

	December 31,		
(in thousands)	2016	2015	2014
Balance at beginning of year	$2,322	$1,465	$3,321
Increases for tax positions of prior years	773	1,035	730
Decreases for tax positions of prior years	0	0	(882)
Increases for tax positions of the current year	5,826	533	425
Settlements	(111)	(497)	(1,509)
Lapses of statutes	0	(214)	(620)
Balance at end of year	$8,810	$2,322	$1,465

The primary reason for the decrease in unrecognized tax benefits during 2014 was the conclusion of the Internal Revenue Service examination of the 2011 and 2012 tax years. Unrecognized tax benefits increased during 2016 primarily relating to foreign exchange losses recognized during the year. At December 31, 2016, $8 million of the amount of unrecognized tax benefits, if recognized, would affect our effective tax rate.

We expect the amount of unrecognized tax benefits to change in the next twelve months; however, we do not expect the change to have a material impact on our financial statements.
Our U.S. subsidiaries file a U.S. federal consolidated income tax return. We are currently under examination by various U.S. state and foreign jurisdictions and remain subject to examination until the statute of limitations expires for the respective tax jurisdiction. We have concluded all U.S. federal tax matters through 2012. Foreign and U.S. state jurisdictions have statutes of limitations generally ranging from three to five years. Years still open to examination by foreign tax authorities in major jurisdictions include: the United Kingdom (2015 and forward); Singapore (2011 and forward); Belgium (2015 and forward); and Brazil (2012 and forward).

20. Other Comprehensive Income (Loss) and Accumulated Other Comprehensive Loss
The balances of, and changes in, the components of accumulated other comprehensive loss, net of tax, consist of the following:

(in thousands)	Pension Plans and Other Postretirement Benefits	Foreign Currency Translation Adjustments	Accumulated Other Comprehensive (Loss) Income
Balance at December 31, 2013	$ (44,493)	$ (15,593)	$ (60,086)
Other comprehensive income (loss) before reclassifications	(54,473)	(28,448)	(82,921)
Amounts reclassified from accumulated other comprehensive loss (a)	3,847	0	3,847
Other comprehensive income (loss)	(50,626)	(28,448)	(79,074)
Balance at December 31, 2014	(95,119)	(44,041)	(139,160)
Other comprehensive income (loss) before reclassifications	20,524	(30,687)	(10,163)
Amounts reclassified from accumulated other comprehensive loss (a)	4,797	0	4,797
Other comprehensive income (loss)	25,321	(30,687)	(5,366)
Balance at December 31, 2015	(69,798)	(74,728)	(144,526)
Other comprehensive income (loss) before reclassifications	(8,565)	(31,595)	(40,160)
Amounts reclassified from accumulated other comprehensive loss (a)	2,176	0	2,176
Other comprehensive income (loss)	(6,389)	(31,595)	(37,984)
Balance at December 31, 2016	$ (76,187)	$ (106,323)	$ (182,510)

(a) The pension plan and other postretirement benefit components of accumulated other comprehensive loss are included in the computation of net periodic benefit cost (income). See Note 17 for further information.

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21. Segment and Geographic Area Information

Segment Information—The tables below show our consolidated segment results. The “All other” category includes the operations of the TEL business, as well as certain contracted manufacturing and services associated with Ethyl.

The segment accounting policies are the same as those described in Note 1. We evaluate the performance of the petroleum additives business based on segment operating profit. NewMarket Services departments and other expenses are billed to Afton and Ethyl based on the services provided under the holding company structure. Depreciation on segment property, plant, and equipment, as well as amortization of segment intangible assets, are included in segment operating profit. No transfers occurred between the petroleum additives segment and the “All other” category during the periods presented. The table below reports net sales and operating profit by segment, as well as a reconciliation to income before income tax expense, for the last three years.

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Net sales			
Petroleum additives			
Lubricant additives	$1,672,523	$1,740,956	$1,901,279
Fuel additives	362,122	384,039	423,803
Total	2,034,645	2,124,995	2,325,082
All other	14,806	15,835	10,323
Net sales (a)	$2,049,451	$2,140,830	$2,335,405
Segment operating profit			
Petroleum additives	$384,906	$374,934	$385,084
All other	530	4,372	1,279
Segment operating profit	385,436	379,306	386,363
Corporate, general, and administrative expenses	(21,783)	(22,779)	(23,397)
Interest and financing expenses, net	(16,785)	(14,652)	(16,567)
Other income (expense), net	(3,660)	(2,904)	(7,300)
Income before income tax expense	$343,208	$338,971	$339,099

(a) Net sales to one customer of our petroleum additives segment exceeded 10% of consolidated net sales in 2014. Sales to Shell amounted $261 million (11% of consolidated net sales) in 2014. These sales represented a wide range of products sold to multiple Shell affiliates around the world. No customer exceeded 10% of net sales in 2016 or 2015.

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Notes to Consolidated Financial Statements

The following tables show asset information by segment and the reconciliation to consolidated assets. Segment assets consist of accounts receivable, inventory, and long-lived assets. Long-lived assets included in the petroleum additives segment amounts in the table below include property, plant, and equipment, net of depreciation, as well as intangibles (net of amortization) and goodwill. The additions to long-lived assets include only property, plant, and equipment for each year presented.

	December 31,	
(in thousands)	2016	2015
Segment assets		
Petroleum additives	$1,083,585	$1,011,047
All other	16,019	14,324
	1,099,604	1,025,371
Cash and cash equivalents	192,154	93,424
Other accounts receivable	7,547	4,184
Deferred income taxes	29,063	44,729
Prepaid expenses and other current assets	26,301	35,370
Non-segment property, plant, and equipment, net	29,870	29,640
Prepaid pension cost	25,800	20,430
Deferred charges and other assets	6,097	33,101
Total assets	$1,416,436	$1,286,249

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Additions to long-lived assets			
Petroleum additives	$145,768	$124,605	$57,065
All other	21	22	0
Corporate	1,895	1,872	2,651
Total additions to long-lived assets	$147,684	$126,499	$59,716
Depreciation and amortization			
Petroleum additives	$42,128	$39,365	$38,844
All other	15	12	27
Corporate	2,750	2,888	2,667
Total depreciation and amortization	$44,893	$42,265	$41,538

Geographic Area Information - The tables below report net sales, total assets, and long-lived assets by geographic area, as well as by country for those countries with significant net sales or long-lived assets. Since our foreign operations are significant to our overall business, we are also presenting net sales in the table below by the major regions in which we operate. NewMarket assigns net sales to geographic areas based on the location to which the product was shipped to a third party. Long-lived assets in the table below include property, plant, and equipment, net of depreciation.

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Net sales			
United States	$701,209	$775,591	$810,766
Europe, Middle East, Africa, India	653,341	669,198	783,988
Asia Pacific	470,616	436,396	471,508
Other foreign	224,285	259,645	269,143
Net sales	$2,049,451	$2,140,830	$2,335,405

	December 31,	
(in thousands)	2016	2015
Total assets		
United States	$539,792	$581,549
Foreign	876,644	704,700
Total assets	$1,416,436	$1,286,249
Long-lived assets		
United States	$224,790	$197,724
Singapore	189,485	113,219
Other foreign	89,470	91,503
Total long-lived assets	$503,745	$402,446

22. Selected Quarterly Consolidated Financial Data (unaudited)

(in thousands, except per-share amounts)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
2016				
Net sales	$509,927	$521,807	$516,090	$501,627
Gross profit	175,550	178,400	177,401	149,410
Net income	61,931	64,389	71,449	45,672
Earnings per share - basic and diluted	5.22	5.43	6.03	3.86

2015	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Net sales	$559,566	$560,709	$540,933	$479,622
Gross profit	181,272	169,708	174,771	153,305
Net income	63,947	58,733	62,009	53,914
Earnings per share - basic and diluted	5.14	4.72	5.08	4.50

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23. Recent Accounting Pronouncements

Recently Adopted Accounting Pronouncements

On January 1, 2016, we retrospectively adopted Accounting Standards Update (ASU) No. 2015-03, “Interest - Imputation of Interest (Subtopic 835-30): Simplifying the Presentation of Debt Issuance Costs” (ASU 2015-03), which requires an entity to present debt issuance costs related to recognized debt liability in the balance sheet as a direct deduction from the carrying amount of the debt liability. The adoption of ASU 2015-03 resulted in a $3.6 million reduction of both “Deferred charges and other assets” and “Long-term debt” on the consolidated balance sheet at December 31, 2015. Also on January 1, 2016, we adopted ASU No. 2015-15, “Interest - Imputation of Interest (Subtopic 835-30): Presentation and Subsequent Measurement of Debt Issuance Costs Associated with Line-of-Credit Arrangements” (ASU 2015-15), which allows a company to defer debt issuance costs associated with line-of-credit arrangements, including arrangements with no outstanding borrowings, classify them as an asset, and amortize them over the term of the arrangements. We adopted ASU 2015-15 concurrent with the adoption of ASU 2015-03, as required.

Also on January 1, 2016, we early adopted ASU No. 2015-17, “Income Taxes (Topic 740) - Balance Sheet Classification of Deferred Taxes” (ASU 2015-17), which requires the reporting of deferred tax liabilities and deferred tax assets as noncurrent items on the classified balance sheet. We retrospectively adopted the provisions of ASU 2015-17 resulting in $6.4 million of current deferred income taxes being reclassified to non-current on the consolidated balance sheet at December 31, 2015.

Also on January 1, 2016, we adopted ASU No. 2015-07, "Disclosures for Investments in Certain Entities that Calculate Net Asset Value per Share (or Its Equivalent)" (ASU 2015-07), which eliminates the requirement to categorize investments in the fair value hierarchy if their fair value is measured using net asset value per share as a practical expedient. The adoption of ASU 2015-07 is reflected retrospectively in the fair value hierarchy table in Note 17 where the investments valued using net asset value per share as a practical expedient are excluded from categorization in the fair value hierarchy.

On April 1, 2016, we early adopted ASU No. 2016-09, "Compensation - Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting" (ASU 2016-09). The update involves several aspects of the accounting for share-based payment transactions, including income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. As required by the ASU, we adopted all of the amendments in the same period. The adoption of ASU 2016-09 did not have a material impact on our consolidated financial statements.

Recently Issued Accounting Pronouncements

In May 2014, the Financial Accounting Standards Board (FASB) issued ASU No. 2014-09, “Revenue from Contracts with Customers (Topic 606)” (ASU 2014-09). ASU 2014-09 replaces the previous guidance and clarifies the principles for revenue recognition. It requires a five-step process for revenue recognition that represents the transfer of goods or services to customers in an amount that reflects the consideration expected to be received by a company. ASU 2014-09 also requires enhanced disclosures regarding the nature, amount, timing, and uncertainty of revenues and cash flows from contracts with customers. ASU 2014-09 is effective for our reporting period beginning January 1, 2018. Entities are permitted to adopt this standard one year early. Entities can transition to the standard either retrospectively or as a cumulative-effect adjustment as of the date of adoption. We expect to adopt the standard on January 1, 2018 and continue to evaluate whether we will adopt the standard retrospectively or as a cumulative-effect adjustment. We expect to continue the evaluation, analysis, and documentation of our adoption of ASU 2014-09 (including those subsequently issued updates that clarify its provisions) throughout most of this year as we work towards the implementation and finalize the impact the adoption will have on our consolidated financial statements.

In February 2016, the FASB issued ASU No. 2016-02, "Leases (Topic 842)" (ASU 2016-02). The FASB issued ASU 2016-02 to increase transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheet and requiring disclosures related to certain information about leasing arrangements. Under the new guidance, operating leases are, in most cases, required to be recognized on the balance sheet as a lease asset and liability. A modified retrospective approach is required for the adoption of ASU 2016-02, which is effective for our reporting period beginning January 1, 2019. Early adoption is permitted. We are currently assessing the impact that the adoption of ASU 2016-02 will have on our consolidated financial statements.

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

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We maintain a system of internal control over financial reporting to provide reasonable, but not absolute, assurance of the reliability of the financial records and the protection of assets. Our controls and procedures include written policies and procedures, careful selection and training of qualified personnel, and an internal audit program. We use third-party firms, separate from our independent registered public accounting firm, to assist with internal audit services.

We work closely with the business groups, operations personnel, and information technology to ensure transactions are recorded properly. Environmental and legal staff are consulted to determine the appropriateness of our environmental and legal liabilities for each reporting period. We regularly review the regulations and rule changes that affect our financial disclosures.

Our disclosure controls and procedures include signed representation letters from our regional senior management. We have a Financial Disclosure Committee (the committee), which is made up of the president of Afton, the general counsel of NewMarket, and the controller of NewMarket. The committee makes representations with regard to the financial statements that, to the best of their knowledge, the statements do not contain any misstatement of a material fact or omit a material fact that is necessary to make the statements not misleading with respect to the periods covered by the report. They also represent that, to the best of their knowledge, the financial statements fairly present, in all material respects, our financial condition, results of operations, and cash flows as of and for the periods presented in the report.

Management personnel from our geographic regions also represent that, to the best of their knowledge, the financial statements and other financial information from their respective regions, which are included in our consolidated financial statements, fairly present, in all material respects, the financial condition and results of operations of their respective regions as of and for the periods presented in the report.

Pursuant to Rule 13a-15(b) under the Securities Exchange Act of 1934 (the Exchange Act), we carried out an evaluation, with the participation of our management, including our principal executive officer and our principal financial officer, of the effectiveness of our disclosure controls and procedures, as such term is defined in Rule 13a-15(e) under the Exchange Act, as of the end of the period covered by this report. Based upon that evaluation, our principal executive officer and our principal financial officer concluded that our disclosure controls and procedures are effective.

There has been no change in our internal control over financial reporting, as such term is defined in Rule 13a-15(f) under the Exchange Act, during the quarter ended December 31, 2016 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rule 13a-15(f), under the Securities Exchange Act of 1934.

Our 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 accounting principles generally accepted in the United States of America. Internal control over financial reporting includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets;

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- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with accounting principles generally accepted in the United States of America and that our receipts and expenditures are being made only in accordance with authorization of our management and directors; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of assets that could have a material effect on the consolidated 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.

Under the supervision and with the participation of our management, including our principal executive officer and principal financial officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in “Internal Control—Integrated Framework (2013)” issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on our evaluation under the framework in “Internal Control—Integrated Framework (2013),” our management concluded that our internal control over financial reporting was effective at the reasonable assurance level as of December 31, 2016. The effectiveness of our internal control over financial reporting as of December 31, 2016, has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which is included in Item 8 of this Annual Report on Form 10-K.

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 is incorporated by reference to our definitive Proxy Statement for our 2017 annual meeting of shareholders (Proxy Statement) under the headings entitled “Election of Directors,” “Committees of Our Board,” “Certain Relationships and Related Transactions,” and “Section 16(a) Beneficial Ownership Reporting Compliance” and is included in Part I of this Form 10-K under the heading entitled “Executive Officers of the Registrant.”

We have adopted a Code of Conduct that applies to our directors, officers, and employees (including our principal executive officer, principal financial officer, and principal accounting officer) and have posted the Code of Conduct on our internet website. We intend to satisfy the disclosure requirement under Item 5.05 of Form 8-K relating to amendments to or waivers from any provision of our Code of Conduct applicable to the principal executive officer, principal financial officer, and principal accounting officer by posting this information on our internet website. Our internet website address is www.newmarket.com.

We have filed, as exhibits to this Annual Report on Form 10-K, the certifications of our principal executive officer and principal financial officer required under Sections 906 and 302 of the Sarbanes Oxley Act of 2002 to be filed with the SEC regarding the quality of our public disclosure.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item is incorporated by reference to our Proxy Statement under the headings (including the narrative disclosures following a referenced table) entitled “Compensation Discussion and Analysis,” “The Compensation Committee Report,” “Compensation of Executive Officers,” and “Compensation of Directors.”

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

Except as noted below, the information required by this item is incorporated by reference to our Proxy Statement under the heading “Stock Ownership.”

The following table presents information as of December 31, 2016 with respect to equity compensation plans under which shares of our common stock are authorized for issuance.

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	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans
Equity compensation plans approved by shareholders:			
2014 Incentive Compensation and Stock Plan	0	$ 0	981,067
Equity compensation plans not approved by shareholders (b):	0	0	0
Total	0	$ 0	981,067

(a) There are no outstanding options, rights, or warrants.

(b) We do not have any equity compensation plans that have not been approved by shareholders.

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

The information required by this item is incorporated by reference to our Proxy Statement under the headings entitled "Board of Directors" and "Certain Relationships and Related Transactions."

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information required by this item is incorporated by reference to our Proxy Statement under the heading "Ratification of Appointment of Independent Registered Public Accounting Firm."

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PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(A)(1) Management's Report on Internal Control Over Financial Reporting

Report of Independent Registered Public Accounting Firm

Consolidated Statements of Income for each of the three years in the period ended December 31, 2016

Consolidated Statements of Comprehensive Income for each of the three years in the period ended December 31, 2016

Consolidated Balance Sheets as of December 31, 2016 and 2015

Consolidated Statements of Shareholders' Equity for each of the three years in the period ended December 31, 2016

Consolidated Statements of Cash Flows for each of the three years in the period ended December 31, 2016

Notes to Consolidated Financial Statements

(A)(2) Financial Statement Schedules—none required

(A)(3) Exhibits

2.1	Share Sale Agreement dated December 16, 2016, by and among Afton Chemical de México, S.A. de C.V., Chevron Oronite Company LLC, the individual Local Sellers listed therein, the Local Sellers' Representative listed therein and NewMarket Corporation, as Buyer Guarantor (incorporated by reference to Exhibit 2.1 to Form 8-K (File No. 1-32190) filed December 19, 2016
3.1	Articles of Incorporation Amended and Restated effective April 27, 2012 (incorporated by reference to Exhibit 3.1 to Form 8-K (File No. 1-32190) filed April 30, 2012)
3.2	NewMarket Corporation Bylaws Amended and Restated effective August 6, 2015 (incorporated by reference to Exhibit 3.1 to Form 8-K (File No. 1- 32190) filed August 6, 2015)
4.1	Indenture, dated as of December 20, 2012, among NewMarket Corporation, the guarantors listed on the signature pages thereto and U.S. Bank National Association, as trustee, (incorporated by reference to Exhibit 4.1 to Form 8-K (File No. 1-32190) filed December 21, 2012)
4.2	Form of 4.10% Senior Notes due 2022 (included in Exhibit 4.1) (incorporated by reference to Exhibit 4.1 to Form 8-K (File No. 1-32190) filed December 21, 2012)
4.3	Registration Rights Agreement, dated as of December 20, 2012, among NewMarket Corporation, the guarantors listed on the signature pages thereto and J.P. Morgan Securities LLC and the other several initial purchasers of the Notes (incorporated by reference to Exhibit 4.3 to Form 8-K (File No. 1-32190) filed December 21, 2012)
10.1	

	Credit Agreement dated as of October 28, 2014, by and among the Company and the Foreign Subsidiary Borrowers party thereto; the Lenders party thereto; JPMorgan Chase Bank, N.A. as Administrative Agent; Bank of America, N.A. and PNC Bank, National Association as Co-Syndication Agents; and Citizens Bank of Pennsylvania and U.S. Bank National Association as Co-Documentation Agents (incorporated by reference to Exhibit 10.1 to Form 8-K (File No. 1-32190) filed November 3, 2014)
10.2	Amendment No. 1, dated as of July 15, 2016, to the Credit Agreement dated as of October 14, 2014, by and among NewMarket Corporation, the financial institutions listed on the signature pages, and JPMorgan Chase Bank, N.A. (incorporated by reference to Exhibit 4.1 to Form 8-K (File No. 1-32190) filed July 28, 2016)
10.3	2014 Incentive Compensation and Stock Plan (incorporated by reference to Exhibit 10.1 to Form 8-K (File No. 1-32190) filed April 24, 2014)*
10.4	Excess Benefit Plan (incorporated by reference to Exhibit 10.4 to Ethyl Corporation's Form 10-K (File No. 1-5112) filed February 25, 1993)*
10.5	Trust Agreement between Ethyl Corporation and Merrill Lynch Trust Company of America (incorporated by reference to Exhibit 4.5 to Ethyl Corporation's Registration Statement on Form S-8 (Registration No. 333-60889) filed August 7, 1998)

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10.6	NewMarket Corporation and Affiliates Bonus Plan (incorporated by reference to Exhibit 10.9 to Ethyl Corporation's Form 10-K (File No. 1-5112) filed March 14, 2003)*
10.7	Indemnification Agreement, dated as of July 1, 2004 by and among NewMarket Corporation, Ethyl Corporation and Afton Chemical Corporation (incorporated by reference to Exhibit 10.5 to Form 10-Q (File No. 1-32190) filed August 5, 2004)
10.8	Services Agreement, dated as of July 1, 2004, by and between NewMarket Services Corporation and Afton Chemical Corporation (incorporated by reference to Exhibit 10.2 to Form 10-Q (File No. 1-32190) filed November 5, 2004)
10.9	Services Agreement, dated as of July 1, 2004, by and between NewMarket Services Corporation and Ethyl Corporation (incorporated by reference to Exhibit 10.3 to Form 10-Q (File No. 1-32190) filed November 5, 2004)
10.10	Services Agreement, dated as of July 1, 2004, by and between NewMarket Services Corporation and NewMarket Corporation (incorporated by reference to Exhibit 10.4 to Form 10-Q (File No. 1-32190) filed November 5, 2004)
10.11	Summary of Compensation of Named Executive Officers*
10.12	Summary of Directors' Compensation*
10.13	Restricted Stock Award Agreement with Robert A. Shama (incorporated by reference to Exhibit 99.2 to Form 8-K (File No. 1-32190) filed October 27, 2014)*
10.14	Form of Performance Stock Award Agreement (incorporated by reference to Exhibit 10.1 to Form 8-K (File No. 1-32190) filed December 14, 2016)*
10.15	Note Purchase Agreement dated January 4, 2017, by and among NewMarket Corporation, The Prudential Life Insurance Company of America, The Gibraltar Life Insurance Co., Ltd, The Lincoln National Life Insurance Company and The Prudential Life Insurance Company, Ltd., (incorporated by reference to Exhibit 10.1 to Form 8-K (File No. 1-32190) filed January 5, 2017)
12	Computation of Ratio of Earnings to Fixed Charges
21	Subsidiaries of the Registrant
23	Consent of Independent Registered Public Accounting Firm
31(a)	Certification pursuant to Rule 13a-14(a) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, by Thomas E. Gottwald
31(b)	Certification pursuant to Rule 13a-14(a) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, by Brian D. Paliotti
32(a)	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, by Thomas E. Gottwald

32(b)	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, by Brian D. Paliotti
101	XBRL Instance Document and Related Items

* Indicates management contracts, compensatory plans or arrangements of the company required to be filed as an exhibit

(B) Exhibits—The response to this portion of Item 15 is submitted as a separate section of this Annual Report on Form 10-K.

ITEM 16. FORM 10-K SUMMARY

None.

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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.

NEWMARKET CORPORATION

By: /s/ Thomas E. Gottwald
(Thomas E. Gottwald, Chairman of the Board, President, and Chief Executive Officer)
Date: February 15, 2017

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities indicated as of February 15, 2017.

SIGNATURE	TITLE
/S/ THOMAS E. GOTTWALD (Thomas E. Gottwald)	Chairman of the Board, President, Chief Executive Officer, and Director (Principal Executive Officer)
/S/ BRIAN D. PALIOTTI (Brian D. Paliotti)	Chief Financial Officer and Vice President (Principal Financial Officer)
/S/ WILLIAM J. SKROBACZ (William J. Skrobacz)	Controller (Principal Accounting Officer)
/S/ PHYLLIS L. COTHRAN (Phyllis L. Cothran)	Director
/S/ MARK M. GAMBILL (Mark M. Gambill)	Director
/S/ BRUCE C. GOTTWALD (Bruce C. Gottwald)	Director
/S/ P. D. HANLEY (Patrick D. Hanley)	Director
/s/ H. HITER HARRIS (H. Hiter Harris III)	Director
/S/ J. E. ROGERS (James E. Rogers)	Director

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EXHIBIT INDEX

Exhibit 10.11	Summary of Compensation of Named Executive Officers
Exhibit 10.12	Summary of Directors' Compensation
Exhibit 12	Computation of Ratio of Earnings to Fixed Charges
Exhibit 21	Subsidiaries of the Registrant
Exhibit 23	Consent of Independent Registered Public Accounting Firm
Exhibit 31(a)	Certification pursuant to Rule 13a-14(a) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, by Thomas E. Gottwald
Exhibit 31(b)	Certification pursuant to Rule 13a-14(a) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, by Brian D. Paliotti
Exhibit 32(a)	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, by Thomas E. Gottwald
Exhibit 32(b)	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, by Brian D. Paliotti
Exhibit 101	XBRL Instance Document and Related Items