VALHI INC /DE/
Form 10-K
March 13, 2017

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934—For the fiscal year ended December 31, 2016
Commission file number 1-5467

VALHI, INC.

(Exact name of Registrant as specified in its charter)

Delaware (State or other jurisdiction of Incorporation or organization)	87-0110150 (IRS Employer Identification No.)
5430 LBJ Freeway, Suite 1700, Dallas, Texas (Address of principal executive offices)	75240-2697 (Zip Code)

Registrant's telephone number, including area code: (972) 233-1700

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

Title of each class	Name of each exchange on which registered
Common stock ($.01 par value per share)	New York Stock Exchange

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

None.

Indicate by check mark:

If the Registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

If the Registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

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

Whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes No

If disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. Yes No

Whether the Registrant is a large accelerated filer, an accelerated filer or a non-accelerated filer or a smaller reporting company (as defined in Rule 12b-2 of the Act).

Large accelerated filer	Accelerated filer
Non-accelerated filer	Smaller reporting company

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

The aggregate market value of the 25.1 million shares of voting common stock held by nonaffiliates of Valhi, Inc. as of June 30, 2016 (the last business day of the Registrant's most recently-completed second fiscal quarter) approximated $39.4 million.

As of March 3, 2017, 339,158,949 shares of the Registrant's common stock were outstanding.

Documents incorporated by reference

The information required by Part III is incorporated by reference from the Registrant's definitive proxy statement to be filed with the Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this report.

PART I

ITEM 1. BUSINESS

Valhi, Inc. (NYSE: VHI) is primarily a holding company. We operate through our wholly-owned and majority-owned subsidiaries, including NL Industries, Inc., Kronos Worldwide, Inc., CompX International Inc. and Waste Control Specialists LLC ("WCS"). Kronos (NYSE: KRO), NL (NYSE: NL) and CompX (NYSE MKT: CIX) each file periodic reports with the U.S. Securities and Exchange Commission ("SEC").

Our principal executive offices are located at Three Lincoln Center 5430 LBJ Freeway, Suite 1700, Dallas, Texas 75240. Our telephone number is (972) 233-1700. We maintain a worldwide website at www.valhi.net.

Brief History

LLC Corporation, our legal predecessor, was incorporated in Delaware in 1932. We are the successor company of the 1987 merger of LLC Corporation and another entity controlled by Contran Corporation. One of Contran's wholly-owned subsidiaries held approximately 93% of Valhi's outstanding common stock at December 31, 2016. As discussed in Note 1 to our Consolidated Financial Statements, Lisa K. Simmons and Serena Simmons Connelly may be deemed to control Contran and us.

Key events in our history include:

- 1979—Contran acquires control of LLC;
- 1981—Contran acquires control of our other predecessor company;
- 1982—Contran acquires control of Keystone Consolidated Industries, Inc., a predecessor to CompX;
- 1984—Keystone spins-off an entity that includes what is to become CompX; this entity subsequently merges with LLC;
- 1986—Contran acquires control of NL, which at the time owns 100% of Kronos and a 50% interest in Titanium Metals Corporation ("TIMET");
- 1987—LLC and another Contran controlled company merge to form Valhi, our current corporate structure;
- 1988—NL spins-off an entity that includes its investment in TIMET;
- 1995—WCS begins start-up operations;
- 1996—TIMET completes an initial public offering;
- 2003—NL completes the spin-off of Kronos through the pro-rata distribution of Kronos shares to its shareholders including us;
- 2004 through 2005—NL distributes Kronos shares to its shareholders, including us, through quarterly dividends;
- 2007—We distribute all of our TIMET common stock to our shareholders through a stock dividend;
- 2008—WCS receives a license for the disposal of byproduct material and begins construction of the byproduct facility infrastructure;
- 2009—WCS receives a license for the disposal of Class A, B and C low-level radioactive waste ("LLRW") and completes construction of the byproduct facility;
- 2010—Kronos completes a secondary offering of its common stock lowering our ownership of Kronos to 80%;
- 2011—WCS begins construction on its Compact and Federal "LLRW" and mixed LLRW disposal facilities;
- 2012—WCS completes construction of its Compact and Federal LLRW disposal facilities and commences operations at the Compact facility;
- 2012—In December we sell all of our remaining interest in TIMET and TIMET is no longer our affiliate;
- 2012—In December CompX completes the sale of its furniture components business;
- 2013—WCS commences operations at the Federal LLRW facility;

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- 2013—In December we purchased an additional ownership interest in and became the majority owner of Basic Management, Inc. and The LandWell Company; both companies are now included in our Consolidated Financial Statements effective December 31, 2013;
- 2015—The first homes in our Cadence planned community were completed by third-party builders and sold to the public; and
- 2015—In November we entered into an agreement for the sale of WCS which, assuming all closing conditions are satisfied (for which there can be no assurance), including the receipt of U.S. anti-trust approval, the sale is expected to close by sometime in the third quarter of 2017.

Unless otherwise indicated, references in this report to “we”, “us” or “our” refer to Valhi, Inc. and its subsidiaries, taken as a whole.

Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended. Statements in this Annual Report that are not historical facts are forward-looking in nature and represent management’s beliefs and assumptions based on currently available information. In some cases, you can identify forward-looking statements by the use of words such as “believes,” “intends,” “may,” “should,” “could,” “anticipates,” “expects” or comparable terminology, or by discussions of strategies or trends. Although we believe that the expectations reflected in such forward-looking statements are reasonable, we do not know if these expectations will be correct. Such statements by their nature involve substantial risks and uncertainties that could significantly impact expected results. Actual future results could differ materially from those predicted. The factors that could cause actual future results to differ materially from those described herein are the risks and uncertainties discussed in this Annual Report and those described from time to time in our other filings with the SEC include, but are not limited to, the following:

- Future supply and demand for our products;
- The extent of the dependence of certain of our businesses on certain market sectors;
- The cyclicality of certain of our businesses (such as Kronos’ TiO_2 operations);
- Customer and producer inventory levels;
- Unexpected or earlier-than-expected industry capacity expansion (such as the TiO_2 industry);
- Changes in raw material and other operating costs (such as energy, ore, zinc and brass costs) and our ability to pass those costs on to our customers or offset them with reductions in other operating costs;
- Changes in the availability of raw materials (such as ore);
- General global economic and political conditions (such as changes in the level of gross domestic product in various regions of the world and the impact of such changes on demand for, among other things, TiO_2 and component products);
- Competitive products and prices and substitute products, including increased competition from low-cost manufacturing sources (such as China);
- Possible disruption of our business or increases in the cost of doing business resulting from terrorist activities or global conflicts;
- Customer and competitor strategies;
- Potential difficulties in integrating future acquisitions;
- Potential difficulties in upgrading or implementing new accounting and manufacturing software systems;
- Potential consolidation of our competitors;
- Potential consolidation of our customers;
- The impact of pricing and production decisions;
- Competitive technology positions;
- The introduction of trade barriers;
- The ability of our subsidiaries to pay us dividends;

- The impact of current or future government regulations (including employee healthcare benefit related regulations);
- Uncertainties associated with new product development and the development of new product features;
- Fluctuations in currency exchange rates (such as changes in the exchange rate between the U.S. dollar and each of the euro, the Norwegian krone and the Canadian dollar) or possible disruptions to our business resulting from potential instability resulting from uncertainties associated with the euro or other currencies;
- Operating interruptions (including, but not limited to, labor disputes, leaks, natural disasters, fires, explosions, unscheduled or unplanned downtime, transportation interruptions and cyber attacks);
- Decisions to sell operating assets other than in the ordinary course of business;
- The timing and amounts of insurance recoveries;
- Our ability to renew, amend, refinance or establish credit facilities;
- Our ability to maintain sufficient liquidity;
- The ultimate outcome of income tax audits, tax settlement initiatives or other tax matters;
- Our ultimate ability to utilize income tax attributes, the benefits of which may not presently have been recognized under the more-likely-than-not recognition criteria;
- Environmental matters (such as those requiring compliance with emission and discharge standards for existing and new facilities, or new developments regarding environmental remediation at sites related to our former operations);
- Government laws and regulations and possible changes therein (such as changes in government regulations which might impose various obligations on former manufacturers of lead pigment and lead-based paint, including NL, with respect to asserted health concerns associated with the use of such products);
- The ultimate resolution of pending litigation (such as NL's lead pigment litigation, environmental and other litigation and Kronos' class action litigation);
- Our ability to comply with covenants contained in our revolving bank credit facilities;
- Our ability to complete and comply with the conditions of our licenses and permits;
- Our ability to successfully defend against any possible future challenge to WCS' operating licenses and permits;
- Unexpected delays in the operational start-up of shipping containers procured by WCS;
- Our ability to increase disposal volumes and obtain new business at WCS;
- Our ability to generate positive operating results or cash flows at WCS;
- The impact of our inability to complete the sales of WCS;
- Changes in real estate values and construction costs in Henderson, Nevada;
- Water levels in Lake Mead; and
- Possible future litigation.

Should one or more of these risks materialize (or the consequences of such development worsen), or should the underlying assumptions prove incorrect, actual results could differ materially from those currently forecasted or expected. We disclaim any intention or obligation to update or revise any forward-looking statement whether as a result of changes in information, future events or otherwise.

Segments

We have four consolidated reportable operating segments at December 31, 2016:

Chemicals Kronos Worldwide, Inc.	Our chemicals segment is operated through our majority control of Kronos. Kronos is a leading global producer and marketer of value-added titanium dioxide pigments ("TiO_2"). TiO_2 is used to impart whiteness, brightness, opacity and durability to a wide variety of products, including paints, plastics, paper, fibers and ceramics. Additionally, TiO_2 is a critical component of everyday applications, such as coatings, plastics and paper, as well as many specialty products such as inks, foods and cosmetics.
Component Products CompX International Inc.	We operate in the component products industry through our majority control of CompX. CompX is a leading manufacturer of security products used in the recreational transportation, postal, office and institutional furniture, cabinetry, tool storage, healthcare and a variety of other industries. CompX is also a leading manufacturer of stainless steel exhaust systems, gauges, throttle controls and trim tabs for the recreational marine industry.
Waste Management Waste Control Specialists LLC	WCS is our subsidiary which operates a West Texas facility for the processing, treatment, storage and disposal of a broad range of low-level radioactive, hazardous, toxic and other wastes. WCS obtained a byproduct disposal license in 2008 and began disposal operations at this facility in 2009. WCS received a LLRW disposal license in 2009. The Compact LLRW disposal facility commenced operations in 2012, and the Federal LLRW commenced operations in 2013. We reached an agreement for the sale of our Waste Management Segment in November 2015, which sale is still pending at December 31, 2016 and which sale is subject to certain customary closing conditions, including the receipt of antitrust approval. See Note 3 to our Consolidated Financial Statements.
Real Estate Management and Development Basic Management, Inc. and The LandWell Company	We operate in real estate management and development through our majority control of BMI and LandWell. BMI provides utility services to certain industrial and municipal customers and owns real property in Henderson, Nevada. LandWell is engaged in efforts to develop certain land holdings for commercial, industrial and residential purposes in Henderson, Nevada. 20142015

For additional information about our segments and equity investments see "Part II—Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations" and Notes 2 and 7 to our Consolidated Financial Statements.

CHEMICALS SEGMENT—KRONOS WORLDWIDE, INC.

Business Overview

Through our majority-controlled subsidiary, Kronos, we are a leading global producer and marketer of value-added titanium dioxide pigments, or TiO_2, a base industrial product used in a wide range of applications. We, along with our distributors and agents, sell and provide technical services for our products to approximately 4,000 customers in 100 countries with the majority of sales in Europe and North America. We believe we have developed considerable expertise and efficiency in the manufacture, sale, shipment and service of our products in domestic and international markets.

TiO_2 is a white inorganic pigment used in a wide range of products for its exceptional durability and its ability to impart whiteness, brightness and opacity. TiO_2 is a critical component of everyday applications, such as coatings, plastics and paper, as well as many specialty products such as inks, food and cosmetics. TiO_2 is widely considered to be superior to alternative white pigments in large part due to its hiding power (or opacity), which is the ability to cover or mask other materials effectively and efficiently. TiO_2 is designed, marketed and sold based on specific end-use applications.

TiO_2 is the largest commercially used whitening pigment because it has a high refractive rating, giving it more hiding power than any other commercially produced white pigment. In addition, TiO_2 has excellent resistance to interaction with other chemicals, good thermal stability and resistance to ultraviolet degradation. Although there are other white pigments on the market, we believe there are no effective substitutes for TiO_2 because no other white pigment has the physical properties for achieving comparable opacity and brightness or can be incorporated in as cost-effective a manner. Pigment extenders such as kaolin clays, calcium carbonate and polymeric opacifiers are used together with TiO_2 in a number of end-use markets. However, these products are not able to duplicate the opacity performance characteristics of TiO_2 and we believe these products are unlikely to have a significant impact on the use of TiO_2.

TiO_2 is considered a "quality-of-life" product. Demand for TiO_2 has generally been driven by worldwide gross domestic product and has generally increased with rising standards of living in various regions of the world. According to industry estimates, TiO_2 consumption has grown at a compound annual growth rate of approximately 3% since 1990. Per capita consumption of TiO_2 in Western Europe and the United States far exceeds that in other areas of the world, and these regions are expected to continue to be the largest consumers of TiO_2 on a per capita basis. We believe that Western Europe and North America currently account for approximately 20% and 17% of global TiO_2 consumption, respectively. Markets for TiO_2 are generally increasing in South America, Eastern Europe, the Asia Pacific region and China and we believe these are significant markets where we expect continued growth as economies in these regions continue to develop and quality-of-life products, including TiO_2, experience greater demand.

Products and end-use markets

Including our predecessors, we have produced and marketed TiO_2 in North America and Europe, our primary markets, for over 100 years. We believe that we are the largest producer of TiO_2 in Europe with approximately one-half of our sales volumes attributable to markets in Europe. The table below shows our market share for our significant markets, Europe and North America, for the last three years.

	2014	2015	2016
Europe	18%	18%	17%
North America	17%	15%	16%

We believe we are the leading seller of TiO_2 in several countries, including Germany, with an estimated 9% share of worldwide TiO_2 sales volume in 2016. Overall, we are one of the top five producers of TiO_2 in the world.

We offer our customers a broad portfolio of products that include over 40 different TiO_2 pigment grades under the Kronos® trademark, which provide a variety of performance properties to meet customers' specific requirements. Our major customers include domestic and international paint, plastics, decorative laminate and paper manufacturers. We ship TiO_2 to our customers in either a powder or slurry form via rail, truck and/or ocean carrier. Sales of our core TiO_2 pigments represented approximately 93% of our net sales in 2016. We and our agents and distributors primarily sell our products in three major end-use markets: coatings, plastics and paper.

The following tables show our approximate TiO_2 sales volume by geographic region and end use for the year ended December 31, 2016:

Sales volumes percentages by geographic region		Sales volumes percentages by end-use	
Europe	51%	Coatings	56%
North America	29%	Plastics	31%
Asia Pacific	10%	Other	7 %
Rest of World	10%	Paper	6 %

Some of the principal applications for our products include the following:

TiO_2 for coatings - Our TiO_2 is used to provide opacity, durability, tinting strength and brightness in industrial coatings, as well as coatings for commercial and residential interiors and exteriors, automobiles, aircraft, machines, appliances, traffic paint and other special purpose coatings. The amount of TiO_2 used in coatings varies widely depending on the opacity, color and quality desired. In general, the higher the opacity requirement of the coating, the greater the TiO_2 content.

TiO_2 for plastics - We produce TiO_2 pigments that improve the optical and physical properties in plastics, including whiteness and opacity. TiO_2 is used to provide opacity in items such as containers and packaging materials, and vinyl products such as windows, door profiles and siding. TiO_2 also generally provides hiding power, neutral undertone, brightness and surface durability for housewares, appliances, toys, computer cases and food packages. TiO_2's high brightness along with its opacity, is used in some engineering plastics to help mask their undesirable natural color. TiO_2 is also used in masterbatch, which is a concentrate of TiO_2 and other additives and is one of the largest uses for TiO_2 in the plastics end-use market. In masterbatch, the TiO_2 is dispersed at high concentrations into a plastic resin and is then used by manufacturers of plastic containers, bottles, packaging and agricultural films.

TiO_2 for paper - Our TiO_2 is used in the production of several types of paper, including laminate (decorative) paper, filled paper and coated paper to provide whiteness, brightness, opacity and color stability. Although we sell our TiO_2 to all segments of the paper end-use market, our primary focus is on the TiO_2 grades used in paper laminates, where several layers of paper are laminated together using melamine resin under high temperature and pressure. The top layer of paper contains TiO_2 and plastic resin and is the layer that is printed with decorative patterns. Paper laminates are used to replace materials such as wood and tile for such applications as counter tops, furniture and wallboard. TiO_2 is beneficial in these applications because it assists in preventing the material from fading or changing color after prolonged exposure to sunlight and other weathering agents.

TiO_2 for other applications - We produce TiO_2 to improve the opacity and hiding power of printing inks. TiO_2 allows inks to achieve very high print quality while not interfering with the technical requirements of printing machinery, including low abrasion, high printing speed and high temperatures. Our TiO_2 is also used in textile applications where TiO_2 functions as an opacifying and delustering agent. In man-made fibers such as rayon and polyester, TiO_2 corrects an otherwise undesirable glossy and translucent appearance. Without the presence of TiO_2, these materials would be unsuitable for use in many textile applications.

We produce high purity sulfate process anatase TiO_2 used to provide opacity, whiteness and brightness in a variety of cosmetic and personal care products, such as skin cream, lipstick, eye shadow and toothpaste. Our TiO_2 is also found in food products, such as candy and confectionaries, and in pet foods where it is used to obtain uniformity of color and appearance. In pharmaceuticals, our TiO_2 is used commonly as a colorant in pill and capsule coatings as well as in liquid medicines to provide uniformity of color and appearance. Kronos® purified anatase grades meet the applicable requirements of the CTFA (Cosmetics, Toiletries and Fragrances Association), USP and BP (United States Pharmacopoeia and British Pharmacopoeia) and the FDA (United States Food and Drug Administration).

Our TiO_2 business is enhanced by the following three complementary businesses, which comprised approximately 7% of our net sales in 2016:

We own and operate two ilmenite mines in Norway pursuant to a governmental concession with an unlimited term. Ilmenite is a raw material used directly as a feedstock by some sulfate-process TiO_2 plants. We also sell ilmenite ore to third parties, some of whom are our competitors, and we sell an ilmenite-based specialty product to the oil and gas industry. The mines have estimated ilmenite reserves that are expected to last at least 50 years.

We manufacture and sell iron-based chemicals, which are co-products and processed co-products of the sulfate and chloride process TiO_2 pigment production. These co-product chemicals are marketed through our Ecochem division and are primarily used as treatment and conditioning agents for industrial effluents and municipal wastewater as well as in the manufacture of iron pigments, cement and agricultural products.

We manufacture and sell titanium oxychloride and titanyl sulfate, which are side-stream specialty products from the production of TiO_2. Titanium oxychloride is used in specialty applications in the formulation of pearlescent pigments, production of electroceramic capacitors for cell phones and other electronic devices. Titanyl sulfate productions are used in pearlescent pigments, natural gas pipe and other specialty applications.

Manufacturing, operations and properties

We produce TiO_2 in two crystalline forms: rutile and anatase. Rutile TiO_2 is manufactured using both a chloride production process and a sulfate production process, whereas anatase TiO_2 is only produced using a sulfate production process. Manufacturers of many end-use applications can use either form, especially during periods of tight supply for TiO_2. The chloride process is the preferred form for use in coatings and plastics, the two largest end-use markets. Due to environmental factors and customer considerations, the proportion of TiO_2 industry sales represented by chloride process pigments has increased relative to sulfate process pigments, and in 2016, chloride process production facilities represented approximately 50% of industry capacity. The sulfate process is preferred for use in selected paper products, ceramics, rubber tires, man-made fibers, food products and cosmetics. Once an intermediate TiO_2 pigment has been produced by either the chloride or sulfate process, it is “finished” into products with specific performance characteristics for particular end-use applications through proprietary processes involving various chemical surface treatments and intensive micronizing (milling).

Chloride process - The chloride process is a continuous process in which chlorine is used to extract rutile TiO_2. The chloride process produces less waste than the sulfate process because much of the chlorine is recycled and feedstock bearing higher titanium content is used. The chloride process also has lower energy requirements and is less labor-intensive than the sulfate process, although the chloride process requires a higher-skilled labor force. The chloride process produces an intermediate base pigment with a wide range of properties.

Sulfate process - The sulfate process is a batch process in which sulfuric acid is used to extract the TiO_2 from ilmenite or titanium slag. After separation from the impurities in the ore (mainly iron), the TiO_2 is precipitated and calcined to form an intermediate base pigment ready for sale or can be upgraded through finishing treatments.

We produced 546,000 metric tons of TiO_2 in 2016, up from the 528,000 metric tons we produced in 2015. Our production amounts include our share of the output produced by our TiO_2 manufacturing joint venture discussed below in “TiO_2 Manufacturing Joint Venture.” Our average production capacity utilization rates were approximately 92%, 95% and 98% of capacity in 2014, 2015 and 2016, respectively. Our production utilization rates in 2014 were impacted by the previously-reported lockout at our Canadian production facility that began in June 2013. We operated our Canadian plant at approximately 15% of the plant’s capacity with non-union management employees during the lockout. The restart of production at the facility did not begin until February 2014. Our production rates in 2014 and in the first quarter of 2015 were also impacted by the implementation of certain productivity-enhancing improvement projects at other facilities, as well as necessary improvements to ensure continued compliance with our permit regulations, which resulted in longer-than-normal maintenance shutdowns in some instances.

We operate four TiO_2 plants in Europe (one in each of Leverkusen, Germany; Nordenham, Germany; Langerbrugge, Belgium; and Fredrikstad, Norway). In North America, we have a TiO_2 plant in Varennes, Quebec, Canada and, through the manufacturing joint venture described below in “TiO_2 Manufacturing Joint Venture,” a 50% interest in a TiO_2 plant in Lake Charles, Louisiana.

Our production capacity in 2016 was 555,000 metric tons, approximately three-fourths of which was from the chloride production process.

The following table presents the division of our expected 2017 manufacturing capacity by plant location and type of manufacturing process:

Facility	Description	% of capacity by TiO_2 manufacturing process Chloride	Sulfate
Leverkusen, Germany (1)	TiO_2 production, chloride and sulfate process, co-products	40 %	22 %
Nordenham, Germany	TiO_2 production, sulfate process, co-products	-	40
Langerbrugge, Belgium	TiO_2 production, chloride process, co-products, titanium chemicals products	21	-
Fredrikstad, Norway (2)	TiO_2 production, sulfate process, co-products	-	24
Varennes, Canada	TiO_2 production, chloride and sulfate process, slurry facility, titanium chemicals products	21	14
Lake Charles, LA, US (3)	TiO_2 production, chloride process	18	-
Total		100 %	100 %

(1) The Leverkusen facility is located within an extensive manufacturing complex owned by Bayer AG. We own the Leverkusen facility, which represents about one-third of our current TiO_2 production capacity, but we lease the land under the facility from

Bayer under a long-term agreement which expires in 2050. Lease payments are periodically negotiated with Bayer for periods of at least two years at a time. A majority-owned subsidiary of Bayer provides some raw materials including chlorine, auxiliary and operating materials, utilities and services necessary to operate the Leverkusen facility under separate supplies and services agreements.

(2) The Fredrikstad plant is located on public land and is leased until 2063.

(3) We operate the Lake Charles facility in a joint venture with Huntsman P&A Investments LLC (HPA) (formerly Tioxide Americas LLC), a subsidiary of Huntsman Corporation and the amount indicated in the table above represents the share of TiO_2 produced by the joint venture to which we are entitled. See Note 5 to our Consolidated Financial Statements and "TiO_2 Manufacturing Joint Venture."

We own the land underlying all of our principal production facilities unless otherwise indicated in the table above.

Our production capacity has increased by approximately 9% over the past ten years due to debottlenecking programs, with only moderate capital expenditures. We believe that our annual attainable production capacity for 2017 is approximately 555,000 metric tons, and we currently expect our production capacity rate will be at near-capacity levels in 2017.

We also operate two ilmenite mines in Norway pursuant to a governmental concession with an unlimited term. In addition, we operate a rutile slurry manufacturing plant in Lake Charles, Louisiana, which converts dry pigment manufactured for us at the Lake Charles TiO_2 facility into a slurry form that is then shipped to customers.

We have various corporate and administrative offices located in the U.S., Germany, Norway, Canada and Belgium and various sales offices located in the U.S., Canada, Belgium, France and the United Kingdom.

TiO_2 Manufacturing Joint Venture

Kronos Louisiana, Inc., one of our subsidiaries, and HPA each own a 50% interest in a manufacturing joint venture, Louisiana Pigment Company, L.P., or LPC. LPC owns and operates a chloride-process TiO_2 plant located in Lake Charles, Louisiana. We and Huntsman share production from the plant equally pursuant to separate offtake agreements, unless we and Huntsman otherwise agree (such as in 2015, when we purchased approximately 52% of the production from the plant).

A supervisory committee directs the business and affairs of the joint venture, including production and output decisions. This committee is composed of four members, two of whom we appoint and two of whom Huntsman appoints. Two general managers manage the operations of the joint venture acting under the direction of the supervisory committee. We appoint one general manager and Huntsman appoints the other.

The joint venture is not consolidated in our financial statements, because we do not control it. We account for our interest in the joint venture by the equity method. The joint venture operates on a break-even basis and therefore we do not have any equity in earnings of the joint venture. We are required to purchase one half of the TiO_2 produced by the joint venture. All costs and capital expenditures are shared equally with Huntsman with the exception of feedstock (purchased natural rutile ore or slag) and packaging costs for the pigment grades produced. Our share of net costs is reported as cost of sales as the TiO_2 is sold. See Notes 7 and 16 to our Consolidated Financial Statements.

Raw materials

The primary raw materials used in chloride process TiO_2 are titanium-containing feedstock (purchased natural rutile ore or slag), chlorine and coke. Chlorine is available from a number of suppliers, while petroleum coke is available from a limited number of suppliers. Titanium-containing feedstock suitable for use in the chloride process is available from a limited but increasing number of suppliers principally in Australia, South Africa, Canada, India and the United

States. We purchase chloride process grade slag from Rio Tinto Iron and Titanium Limited under a long-term supply contract that expires at the end of 2018, subject to two-year renewal periods if both parties agree. We also purchase upgraded slag from Rio Tinto Iron and Titanium Limited under a long-term supply contract that expires at the end of 2019. We purchase natural rutile ore under contracts primarily from Iluka Resources, Limited and Sierra Rutile Limited, and rutile ore under contracts with Sibelco Australia, all of which expire in 2017. In the past we have been, and we expect that we will continue to be, successful in obtaining short-term and long-term extensions to these and other existing supply contracts prior to their expiration. We expect the raw materials purchased under these contracts, and contracts that we may enter into, will meet our chloride process feedstock requirements over the next several years.

The primary raw materials used in sulfate process TiO_2 are titanium-containing feedstock, primarily ilmenite or purchased sulfate grade slag and sulfuric acid. Sulfuric acid is available from a number of suppliers. Titanium-containing feedstock suitable for use in the sulfate process is available from a limited number of suppliers principally in Norway, Canada, Australia, India and South Africa. As one of the few vertically-integrated producers of sulfate process TiO_2, we operate two rock ilmenite mines in Norway, which provided all of the feedstock for our European sulfate process TiO_2 plants in 2016. We expect ilmenite production from our mines to meet our European sulfate process feedstock requirements for the foreseeable future. For our Canadian sulfate process plant, we purchase sulfate grade slag primarily from Rio Tinto Fer et Titane Inc. under a supply contract that renews annually, subject to termination upon twelve months written notice. We expect the raw materials purchased under these contracts, and contracts that we may enter into, to meet our sulfate process feedstock requirements over the next several years.

Many of our raw material contracts contain fixed quantities we are required to purchase, or specify a range of quantities within which we are required to purchase. The pricing under these agreements is generally negotiated quarterly.

The following table summarizes our raw materials purchased or mined in 2016.

Production process/raw material	Raw materials procured or mined (In thousands of metric tons)
Chloride process plants -	
Purchased slag or rutile ore	477
Sulfate process plants:	
Ilmenite ore mined and used internally	335
Purchased slag	26

Sales and marketing

Our marketing strategy is aimed at developing and maintaining strong customer relationships with new and existing accounts. Because TiO_2 represents a significant raw material cost for our customers, the purchasing decisions are often made by our customers' senior management. We work to maintain close relationships with the key decision makers, through in-depth and frequent in-person meetings. We endeavor to extend these commercial and technical relationships to multiple levels within our customers' organization using our direct sales force and technical service group to accomplish this objective. We believe this has helped build customer loyalty to Kronos and strengthened our competitive position. Close cooperation and strong customer relationships enable us to stay closely attuned to trends in our customers' businesses. Where appropriate, we work in conjunction with our customers to solve formulation or application problems by modifying specific product properties or developing new pigment grades. We also focus our sales and marketing efforts on those geographic and end-use market segments where we believe we can realize higher selling prices. This focus includes continuously reviewing and optimizing our customer and product portfolios.

Our marketing strategy is also aimed at working directly with customers to monitor the success of our products in their end-use applications, evaluate the need for improvements in product and process technology and identify opportunities to develop new product solutions for our customers. Our marketing staff closely coordinates with our sales force and technical specialists to ensure that the needs of our customers are met, and to help develop and commercialize new grades where appropriate.

We sell a majority of our products through our direct sales force operating from five sales offices in Europe and one sales office in North America. We also utilize sales agents and distributors who are authorized to sell our products in specific geographic areas. In Europe, our sales efforts are conducted primarily through our direct sales force and our sales agents. Our agents do not sell any TiO_2 products other than Kronos® brand products. In North America, our sales are made primarily through our direct sales force and supported by a network of distributors. In addition to our direct sales force and sales agents, many of our sales agents also act as distributors to service our smaller customers in all regions. We offer customer and technical service to the customers who purchase our products through distributors as well as to our larger customers serviced by our direct sales force.

We sell to a diverse customer base with only one customer representing 10% or more of our sales in 2016 (Behr Process Corporation – 10%). Our largest ten customers accounted for approximately 33% of sales in 2016.

Neither our business as a whole nor any of our principal product groups is seasonal to any significant extent. However, TiO_2 sales are generally higher in the second and third quarters of the year, due in part to the increase in paint production in the spring to meet demand during the spring and summer painting seasons. With certain exceptions, we have historically operated our production facilities at near full capacity rates throughout the entire year, which among other things helps to minimize our per-unit production costs. As a result, we normally will build inventories during the first and fourth quarters of each year, in order to maximize our product availability during the higher demand periods normally experienced in the second and third quarters.

Competition

The TiO_2 industry is highly competitive. We compete primarily on the basis of price, product quality, technical service and the availability of high performance pigment grades. Since TiO_2 is not a traded commodity, its pricing is largely a product of negotiation between suppliers and their respective customers. Although certain TiO_2 grades are considered specialty pigments, the majority of our grades and substantially all of our production are considered commodity pigments with price and availability being the most significant competitive factors along with quality and customer service. During 2016, we had an estimated 9% share of worldwide TiO_2 sales volume, and based on sales volumes, we believe we are the leading seller of TiO_2 in several countries, including Germany.

Our principal competitors are The Chemours Company, or Chemours (which was spun-off from E.I. du Pont de Nemours & Co. into a separate publicly-traded company in 2015); Millennium Inorganic Chemicals, Inc. (a subsidiary of National Titanium Dioxide Company Ltd.), or Cristal; Huntsman Corporation; and Tronox Incorporated. The top five TiO_2 producers (i.e. we and our four principal competitors) account for approximately 58% of the world's production capacity. Huntsman completed its purchase of the TiO_2 business of Sachtleben Chemie GmbH in 2014, and has also announced its intent to exit the TiO_2 business (which, based on the latest public statements by Huntsman, is expected to occur during 2017). In 2015, Huntsman announced it was reducing its TiO_2 capacity by approximately 100,000 metric tons at one of its European sulfate process facilities. In August 2015, Chemours announced it was closing its plant in Delaware and shut down a production line at its facility in Tennessee, reducing its overall capacity by approximately 150,000 metric tons. In 2016, Huntsman announced it was closing its sulfate process facility in South Africa, reducing its overall capacity by 25,000 metric tons.

The following chart shows our estimate of worldwide production capacity in 2016:

Worldwide production capacity - 2016	
Chemours	18%
Huntsman	11%
Cristal	13%
Kronos	9 %
Tronox	7 %
Other	42%

Chemours has over one-half of total North American TiO_2 production capacity and is our principal North American competitor. In February 2017, Tronox announced a definitive agreement to acquire the TiO_2 business of Cristal. Tronox expects the acquisition, if it is completed, to occur by the end of 2017.

Over the past ten years, we and our competitors increased industry capacity through debottlenecking projects, which in part compensated for the shut-down of various TiO_2 plants in France, the United States, the United Kingdom and China. Chemours added a new 200,000 metric ton capacity line at its plant in Mexico which commenced production in the second quarter of 2016. Although overall industry demand is expected to remain strong in 2017 as a result of improving worldwide economic conditions, we do not expect any other significant efforts will be undertaken by us or our principal competitors to further increase capacity for the foreseeable future, other than through debottlenecking projects. If actual developments differ from our expectations, the TiO_2 industry's performance and that of our own could be unfavorably affected.

The TiO_2 industry is characterized by high barriers to entry consisting of high capital costs, proprietary technology and significant lead times (typically three to five years in our experience) required to construct new facilities or to expand existing capacity. We believe it is unlikely any new TiO_2 plants will be constructed in Europe or North America in the foreseeable future.

Research and development

We employ scientists, chemists, process engineers and technicians who are engaged in research and development, process technology and quality assurance activities in Leverkusen, Germany. These individuals have the responsibility for improving our chloride and sulfate production processes, improving product quality and strengthening our competitive position by developing new applications. Our expenditures for these activities were approximately $19 million in 2014, $16 million in 2015 and $13 million in 2016. We expect to spend approximately $15 million on research and development in 2017.

We continually seek to improve the quality of our grades and have been successful at developing new grades for existing and new applications to meet the needs of our customers and increase product life cycles. Since the beginning of 2012, we have added four new grades for pigments and other applications.

Patents, trademarks, trade secrets and other intellectual property rights

We have a comprehensive intellectual property protection strategy that includes obtaining, maintaining and enforcing our patents, primarily in the United States, Canada and Europe. We also protect our trademark and trade secret rights and have entered into license agreements with third parties concerning various intellectual property matters. We have also from time to time been involved in disputes over intellectual property.

Patents - We have obtained patents and have numerous patent applications pending that cover our products and the technology used in the manufacture of our products. Our patent strategy is important to us and our continuing business activities. In addition to maintaining our patent portfolio, we seek patent protection for our technical developments, principally in the United States, Canada and Europe. U.S. Patents are generally in effect for 20 years from the date of filing. Our U.S. patent portfolio includes patents having remaining terms ranging from less than one year to 20 years.

Trademarks and trade secrets - Our trademarks, including Kronos®, are covered by issued and/or pending registrations, including in Canada and the United States. We protect the trademarks that we use in connection with the products we manufacture and sell and have developed goodwill in connection with our long-term use of our trademarks. We conduct research activities in secret and we protect the confidentiality of our trade secrets through reasonable measures, including confidentiality agreements and security procedures, including data security. We rely upon unpatented proprietary knowledge and continuing technological innovation and other trade secrets to develop and maintain our competitive position. Our proprietary chloride production process is an important part of our technology and our business could be harmed if we fail to maintain confidentiality of our trade secrets used in this technology.

Employees

As of December 31, 2016, we employed the following number of people:

Europe	1,850
Canada	365
United States (1)	45
Total	2,260

(1) Excludes employees of our Louisiana joint venture.

Certain employees at each of our production facilities are organized by labor unions. In Europe, our union employees are covered by master collective bargaining agreements for the chemical industry that are generally renewed annually. In Canada, our union employees are covered by a collective bargaining agreement that expires in June 2018. At December 31, 2016, approximately 87% of our worldwide workforce is organized under collective bargaining agreements. It is possible that there could be future work stoppages or other labor disruptions that could materially and adversely affect our business, results of operations, financial position or liquidity.

Regulatory and environmental matters

Our operations and properties are governed by various environmental laws and regulations, which are complex, change frequently and have tended to become stricter over time. These environmental laws govern, among other things, the generation, storage, handling, use and transportation of hazardous materials; the emission and discharge of hazardous materials into the ground, air or water; and the health and safety of our employees. Certain of our operations are, or have been, engaged in the generation, storage, handling, manufacture or use of substances or compounds that may be considered toxic or hazardous within the meaning of applicable environmental laws and regulations. As with other companies engaged in similar businesses, certain of our past and current operations and products have the potential to cause environmental or other damage. We have implemented and continue to implement various policies and programs in an effort to minimize these risks. Our policy is to comply with applicable environmental laws and regulations at all our facilities and to strive to improve our environmental performance. It is possible that future developments, such as stricter requirements in environmental laws and enforcement policies, could adversely affect our operations, including production, handling, use, storage, transportation, sale or disposal of hazardous or toxic substances or require us to make capital and other expenditures to comply, and could adversely affect our consolidated financial position and results of operations or liquidity.

Our U.S. manufacturing operations are governed by federal, state and local environmental and worker health and safety laws and regulations. These include the Resource Conservation and Recovery Act, or RCRA, the Occupational Safety and Health Act, the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, the Toxic Substances Control Act and the Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, or CERCLA, as well as the state counterparts of these statutes. Some of these laws hold current or previous owners or operators of real property liable for the costs of cleaning up contamination, even if these owners or operators did not know of, and were not responsible for, such contamination. These laws also assess liability on any person who arranges for the disposal or treatment of hazardous substances, regardless of whether the affected site is owned or operated by such person. Although we have not incurred and do not currently anticipate any material liabilities in connection with such environmental laws, we may be required to make expenditures for environmental remediation in the future.

While the laws regulating operations of industrial facilities in Europe vary from country to country, a common regulatory framework is provided by the European Union, or the EU. Germany and Belgium are members of the EU and follow its initiatives. Norway is not a member but generally patterns its environmental regulatory actions after the EU.

At our sulfate plant facilities in Germany, we recycle spent sulfuric acid either through contracts with third parties or at our own facilities. In addition, at our German locations we have a contract with a third-party to treat certain sulfate-process effluents. At our Norwegian plant, we ship spent acid to a third party location where it is used as a neutralization agent. These contracts may be terminated by either party after giving three or four years advance notice, depending on the contract.

From time to time, our facilities may be subject to environmental regulatory enforcement under U.S. and non-U.S. statutes. Typically we establish compliance programs to resolve these matters. Occasionally, we may pay penalties. To date such penalties have not involved amounts having a material adverse effect on our consolidated financial position, results of operations or liquidity. We believe that all of our facilities are in substantial compliance with applicable environmental laws.

Our capital expenditures related to ongoing environmental compliance, protection and improvement programs, including capital expenditures which are primarily focused on increased operating efficiency but also result in improved environmental protection such as lower emissions from our manufacturing facilities, were $11.7 million in 2016 and are currently expected to be approximately $14 million in 2017.

COMPONENT PRODUCTS SEGMENT—COMPX INTERNATIONAL INC.

Business Overview

Through our majority-controlled subsidiary, CompX, we are a leading manufacturer of security products used in the recreational transportation, postal, office and institutional furniture, cabinetry, tool storage, healthcare and a variety of other industries. CompX is also a leading manufacturer of stainless steel exhaust systems, gauges, throttle controls, and trim tabs for the recreational marine industry. Our products are principally designed for use in medium to high-end product applications, where design, quality and durability are valued by our customers.

Manufacturing, Operations and Products

Security Products. CompX’s security products reporting unit manufactures mechanical and electronic cabinet locks and other locking mechanisms used in a variety of applications including ignition systems, mailboxes, file cabinets, desk drawers, tool storage cabinets, vending and gaming machines, high security medical cabinetry, electronic circuit panels, storage compartments and gas station security. Our Security Products segment has one manufacturing facility in Mauldin, South Carolina and one in Grayslake, Illinois shared with Marine Components. We believe we are a North American market leader in the manufacture and sale of cabinet locks and other locking mechanisms. These products include:

- disc tumbler locks which provide moderate security and generally represent the lowest cost lock to produce;
- pin tumbler locking mechanisms which are more costly to produce and are used in applications requiring higher levels of security, including KeSet® and System 64® (which each allow the user to change the keying on a single lock 64 times without removing the lock from its enclosure) TuBar® and Turbine™; and
- our innovative CompX eLock® and StealthLock® electronic locks which provide stand-alone or networked security and audit trail capability for drug storage and other valuables through the use of a proximity card, magnetic stripe or keypad credentials.

A substantial portion of our Security Products' sales consist of products with specialized adaptations to an individual customer's specifications, some of which are listed above. We also have a standardized product line suitable for many customers, which is offered through a North American distribution network to locksmith and smaller original equipment manufacturer distributors via our STOCK LOCKS® distribution program.

Marine Components. CompX's marine components reporting unit manufactures and distributes stainless steel exhaust components, gauges, throttle controls, trim tabs, hardware and accessories primarily for performance and ski/wakeboard boats. Our Marine Components segment has a facility in Neenah, Wisconsin and a facility in Grayslake, Illinois shared with Security Products. Our specialty Marine Component products are high precision components designed to operate within tight tolerances in the highly demanding marine environment. These products include:

- original equipment and aftermarket stainless steel exhaust headers, exhaust pipes, mufflers and other exhaust components;
- high performance gauges such as GPS speedometers and tachometers;
- mechanical and electronic controls and throttles;
- steering wheels, trim tabs and other billet aluminum accessories; and
- dash panels, LED lighting, wire harnesses and other accessories.

Our Component Products Segment operated three manufacturing facilities at December 31, 2016 as shown below. For additional information, see also "Item 2 – Properties", including information regarding leased and distribution-only facilities.

Facility Name	Reporting Unit	Location	Size (square feet)
Owned Facilities:			
National [1]	SP	Mauldin, SC	198,000
Grayslake[1]	SP/MC	Grayslake, IL	133,000
Custom[2]	MC	Neenah, WI	95,000
Leased Facilities:			
Distribution Center	SP/MC	Rancho Cucamonga, CA	11,500

(1) ISO-9001 registered facilities
(2) ISO-9002 registered facility

Raw Materials

CompX's primary raw materials are:

- zinc and brass (used in the Security Products segment for the manufacture of locking mechanisms); and
- stainless steel (used primarily in the Marine Components segment for the manufacture of exhaust headers and pipes), aluminum (used for the manufacture of throttles and trim tabs), and other components.

These raw materials are purchased from several suppliers, are readily available from numerous sources and accounted for approximately 10% of our total cost of sales for 2016. Total material costs, including purchased components, represented approximately 45% of our cost of sales in 2016.

We occasionally enter into short-term commodity-related raw material supply arrangements to mitigate the impact of future increases in commodity-related raw material costs. These arrangements generally provide for stated unit prices based upon specified purchase volumes, which help us to stabilize our commodity-related raw material costs to a certain extent. We periodically enter into such arrangements for zinc and brass. During 2015 and 2016, markets for our primary commodity-related raw materials, including zinc, brass and stainless steel, have generally been stable and relatively soft compared to historical levels. Markets for our primary commodity-related raw materials are expected to remain relatively stable into 2017 with the possible exception of zinc, which has increased in price over the final months of 2016. When purchased on the spot market, each of these raw materials may be subject to sudden and unanticipated price increases. We generally seek to mitigate the impact of fluctuations in these raw material costs on our margins through improvements in production efficiencies or other operating cost reductions. In the event we are unable to offset raw material cost increases with other cost reductions, it may be difficult to recover those cost increases through increased product selling prices or raw material surcharges due to the competitive nature of the markets served by our products. Consequently, overall operating margins can be affected by commodity-related raw material cost pressures. Commodity market prices are cyclical, reflecting overall economic trends, specific developments in consuming industries and speculative investor activities.

Patents and Trademarks

We hold a number of patents relating to our component products, certain of which we believe to be important to us and our continuing business activity. Patents generally have a term of 20 years, and our patents have remaining terms ranging from less than 1 year to 17 years at December 31, 2016. Our major trademarks and brand names in addition to CompX® include:

Security Products	Security Products	Marine Components
CompX® Security Products™	Lockview®	CompX Marine®
National Cabinet Lock®	System 64®	Custom Marine®
Fort Lock®	SlamCAM®	Livorsi® Marine
Timberline® Lock	RegulatoR®	Livorsi II® Marine
Chicago Lock®	CompXpress®	CMI Industrial®
STOCK LOCKS®	GEM®	Custom Marine® Stainless Exhaust
KeSet®		The #1 Choice in Performance Boating®
TuBar®		Mega Rim®
StealthLock®		Race Rim®
ACE®		Vantage View®
ACE® II		GEN-X®
CompX eLock®		

Sales, Marketing and Distribution

A majority of our component sales are direct to large OEM customers through our factory-based sales and marketing professionals supported by engineers working in concert with field salespeople and independent manufacturer's representatives. We select manufacturer's representatives based on special skills in certain markets or relationships with current or potential customers.

In addition to sales to large OEM customers, a substantial portion of our Security Products sales are made through distributors. We have a significant North American market share of cabinet lock security product sales as a result of the locksmith distribution channel. We support our locksmith distributor sales with a line of standardized products used by the largest segments of the marketplace. These products are packaged and merchandised for easy availability and handling by distributors and end users.

We sell to a diverse customer base with only two customers representing 10% or more of our sales in 2016 (United States Postal Service and Harley Davidson representing 14% and 11%, respectively). Our largest ten customers accounted for approximately 46% of our sales in 2016.

Competition

The markets in which we participate are highly competitive. We compete primarily on the basis of product design, including space utilization and aesthetic factors, product quality and durability, price, on-time delivery, service and technical support. We focus our efforts on the middle and high-end segments of the market, where product design, quality, durability and service are valued by the customer. Our Security Products segment competes against a number of domestic and foreign manufacturers. Our Marine Components segment competes with small domestic manufacturers and is minimally affected by foreign competitors.

Regulatory and Environmental Matters

Our operations are subject to federal, state and local laws and regulations relating to the use, storage, handling, generation, transportation, treatment, emission, discharge, disposal, remediation of and exposure to hazardous and non-hazardous substances, materials and wastes ("Environmental Laws"). Our operations also are subject to federal, state and local laws and regulations relating to worker health and safety. We believe we are in substantial compliance with all such laws and regulations. To date, the costs of maintaining compliance with such laws and regulations have not significantly impacted our results. We currently do not anticipate any significant costs or expenses relating to such matters; however, it is possible future laws and regulations may require us to incur significant additional expenditures.

Employees

As of December 31, 2016, we employed 516 people, all in the United States. We believe our labor relations are good at all of our facilities.

WASTE MANAGEMENT SEGMENT—WASTE CONTROL SPECIALISTS LLC

On November 18, 2015, we entered into an agreement with Rockwell Holdco, Inc. ("Rockwell"), for the sale of WCS to Rockwell. The agreement, as amended, is for $270 million in cash plus the assumption of all of WCS' third-party indebtedness incurred prior to the date of the agreement. Additionally, Rockwell and its affiliates will assume all financial assurance obligations related to the WCS business. Rockwell is the parent company of EnergySolutions, Inc. Completion of the sale is subject to certain customary closing conditions, including the receipt of U.S. anti-trust approval. On November 16, 2016, the U.S. Department of Justice filed an anti-trust action in the U.S. federal district court for the District of Delaware styled United States of America vs. Energy Solutions, Inc., et al (Case No. 1:16-cv-01056-UNA), seeking an injunction to enjoin completion of the sale of WCS. Pursuant to our agreement with Rockwell, Rockwell and its affiliates are required, with our cooperation and assistance, to vigorously contest and resist such antitrust action. Assuming all closing conditions are satisfied, including the receipt of U.S. anti-trust approval, the sale is expected to close by sometime in the third quarter of 2017. There can be no assurance, however, that the parties will be successful in contesting and resisting such antitrust action, that receipt of U.S. anti-trust approval will be obtained, that all closing conditions will be satisfied, or that any such sale of WCS would be completed. See Note 3 to our Consolidated Financial Statements for additional information regarding the operations of the Waste Management Segment.

Business Overview

Our Waste Management Segment was formed in 1995, and in early 1997 we completed construction of the initial phase of our waste management facility in West Texas. The original facility was initially designed for the processing, treatment, storage and disposal of certain hazardous and toxic wastes. We received the first wastes for disposal in 1997. Subsequently, we expanded our authorizations to include the processing, treatment and storage of LLRW and mixed LLRW and the disposal of certain types of exempt LLRW. In 2008, the Texas Commission on Environmental Quality ("TCEQ") issued a byproduct materials disposal license to us. In 2009, TCEQ issued a near-surface LLRW disposal license to us.

We began construction of the byproduct facility infrastructure at our site in Andrews County, Texas in the third quarter of 2008, and this facility began disposal operations in 2009. Construction of the Compact and Federal LLRW sites began in 2011. The Compact LLRW site was fully certified, operational and received its first waste for disposal in 2012. The Federal LLRW site was fully certified and operational in 2012 and received its first waste for disposal in 2013.

Facility, Operations and Services

Our Waste Management Segment operates one waste management facility located on a 1,338-acre site in West Texas. The facility is permitted for 3.8 million cubic yards of airspace landfill capacity for the disposal of RCRA, Toxic Substance Control Act ("TSCA"), Byproduct and LLRW and mixed LLRW wastes. We also own approximately 13,000 acres of additional land surrounding the permitted site, a small portion of which is located in New Mexico, which is available for future expansion. We believe our facility has superior geological characteristics which make it an environmentally-desirable location for this type of waste disposal. The facility is located in a relatively remote and arid section of West Texas. The possibility of leakage into any underground water table is considered highly remote because the ground is composed of Triassic red bed clay, and we do not believe there are any usable sources of water below the site based in part on extensive drilling by the oil and gas industry and our own test wells. Pursuant to the requirements of WCS' LLRW disposal license, the State of Texas, acting by and through the TCEQ, owns the real property for WCS' licensed "compact waste disposal facility" and leases it back to WCS; and WCS owns the real property for its licensed "federal waste disposal facility". The remainder of WCS' permitted site, and the Texas portion of the surrounding land described above, is subject to the sale-leaseback transaction WCS entered into with the County of Andrews, Texas, as discussed in Note 9 to our Consolidated Financial Statements.

The waste management facility operates under various licenses and permits, including in the following categories:

- LLRW Disposal. The LLRW disposal license allows WCS to dispose of Class A, B and C LLRW in the Compact LLRW disposal facility and the Federal LLRW disposal facility. The Federal LLRW disposal facility is for LLRW that is the responsibility of the U.S. government under applicable law, and is also permitted for disposal of mixed LLRW. The Compact LLRW disposal facility is licensed to accept LLRW that was either generated in Texas or Vermont, or has been approved for importation to Texas by the Texas Low-Level Radioactive Waste Disposal Compact Commission. Both facilities were fully certified and operational in 2012. We accepted our first Compact waste disposal shipments in April 2012, but routine Compact disposal receipts did not occur until July 2012. We received a national disposal contract for our Federal LLRW disposal facility from the Department of Energy ("DOE") in April 2013, and we have received waste for disposal in the Federal LLRW disposal facility since mid-2013.

- LLRW Treatment/Storage. In 1997, the Texas Department of State Health Services ("TDSHS") issued a license to us for the treatment and storage, but not disposal, of LLRW and mixed LLRW. In 2007, the TDSHS regulatory authority for this license was transferred to TCEQ. The current provisions of this license generally enable us to accept such wastes for treatment and storage from U.S. commercial and federal generators, including the DOE and other governmental agencies. We accepted the first shipments of such wastes in 1998.
- RCRA/Exempt. Our Waste Management Segment has permits from the TCEQ to accept hazardous wastes governed by RCRA, for treatment, storage and/or disposal. In March 2015, we submitted our renewal application for our RCRA permit for a new ten-year period. The application is still pending, but we are permitted to continue to accept hazardous waste governed by RCRA while under review. We have obtained additional authority to dispose of certain categories of low activity LLRW, including naturally-occurring radioactive material ("NORM") and waste that is exempt from radioactive waste disposal regulations (radioactive materials that do not exceed certain specified radioactive concentrations and are exempt from licensing). Waste disposed of under these permits and authorizations are disposed of in what we call the "RCRA landfill."
- TSCA. Our Waste Management Segment has permits from the U.S. Environmental Protection Agency ("EPA") to accept toxic wastes governed by TSCA for treatment, storage and/or disposal. In March 2016 this authorization was renewed by EPA until 2021.
- Byproduct Disposal. In 2008, TCEQ issued us a license for the disposal of byproduct material. Byproduct material includes uranium or thorium mill tailings as well as equipment, pipe and other materials used to handle and process the mill tailings. We completed construction of the byproduct facility infrastructure and began disposal operations at our site in Andrews County, Texas in 2009. Byproduct materials are disposed of in what we call the "Byproduct landfill."

Our LLRW Treatment/Storage facility also serves as a staging and processing location for material that requires other forms of treatment prior to final disposal as mandated by the EPA or other regulatory bodies. Our 20,000 square foot treatment facility provides for waste treatment/stabilization, warehouse storage and treatment facilities for hazardous, toxic and mixed LLRW, drum to bulk, and bulk to drum materials handling and repackaging capabilities. Treatment operations involve processing wastes through one or more chemical or other treatment methods, depending upon the particular waste being disposed and regulatory and customer requirements. Chemical treatment uses chemical oxidation and reduction, chemical precipitation of heavy metals, hydrolysis and neutralization of acid and alkaline wastes, and results in the transformation of waste into inert materials through one or more of these chemical processes. Certain treatment processes involve technology which we may acquire, license or subcontract from third parties. Once treated and stabilized, waste currently is either: (i) placed in our landfills, (ii) stored onsite in drums or other specialized containers or (iii) shipped to third-party facilities for final disposition. Only waste that meets certain specified regulatory requirements can be disposed of in our landfills.

In February 2015, we sent a notification to the Nuclear Regulatory Commission ("NRC") expressing our intent to apply for a license for the consolidated interim storage of used nuclear fuel at our facility. Currently used nuclear fuel is stored under 77 NRC licenses in 34 states. If approved and constructed, we would become the nation's first centralized storage facility for such high level waste. WCS submitted a license application in April 2016, which was docketed for formal review by the NRC in January 2017. In addition to the license, federal legislation is needed to provide a mechanism for DOE to take title of such waste and fund such storage. We do not know if a license will be granted by NRC or if federal legislation will be enacted for such storage. If a license is granted and federal legislation is passed, WCS would endeavor to enter into a storage agreement with DOE. However; congressional appropriations, facility financing and financial assurance, DOE transportation approvals and construction of the interim storage facility must all take place prior to commencement of any operations. Subject to the forgoing, storage revenue, if any, under an interim storage license would not be expected to begin until 2021 or later. We do not know if all of the forgoing prerequisites can be achieved, or that WCS would receive any such storage revenues.

Sales

Our Waste Management Segment's target customers are industrial companies, including nuclear utilities, chemical, aerospace and electronics businesses and governmental agencies, including the DOE, which generate low-level radioactive, hazardous, mixed low-level radioactive and other wastes. We employ our own salespeople to market our services to potential customers. During 2016 we had sales to three customers that each exceed 10% of our Waste Management Segment's total sales: U.S. Department of Energy (27%), Pacific Gas & Electric Company (13%) and Exelon Generation (12%).

Competition

The hazardous waste industry (other than LLRW and mixed LLRW) currently has excess industry capacity caused by a number of factors, including a relative decline in the number of environmental remediation projects generating hazardous waste and efforts on the part of waste generators to reduce the volume of waste and/or manage waste onsite at their facilities. These factors have led to reduced demand and increased price pressure for non-radioactive hazardous waste management services.

Competition within the hazardous waste industry is diverse and based primarily on facility location/proximity to customers, pricing and customer service. We expect price competition to continue to be intense for RCRA- and TSCA-related wastes.

This price competition resulted in minimal use of our RCRA landfill in the past. Beginning in 2014, we gained the ability to accept a broader range of waste for disposal in the RCRA landfill. This has increased the use of our RCRA landfill because it has allowed us to be more competitive for “low activity waste,” which is hazardous waste that possesses very low levels of radioactivity and has been exempted by law from management and disposal requirements applicable to LLRW. We believe our broad range of permits for the treatment, storage and disposal of exempt waste, LLRW and mixed LLRW streams may position us better than our competitors and are a key element of our long-term strategy to provide “one-stop shopping” for exempt waste, LLRW and mixed LLRW.

The LLRW industry is very competitive. Our principal competitors with respect to LLRW are EnergySolutions, Inc., US Ecology Inc., and Perma-Fix Environmental Services, Inc. These competitors are well established, and some may have significantly greater resources than we do, which could be important factors to our potential customers. We believe we may be better positioned than our competitors due to our environmentally-desirable location, a broad level of local community support, a rail transportation network leading to our facility, our capability for future site expansion and the fact that the State of Texas takes title to the LLRW in our Compact disposal facility.

LLRW, mixed LLRW and exempt waste can be and currently is stored in numerous sites around the U.S. and, alternatively, generators can dispose of LLRW, mixed LLRW and exempt waste in facilities operated by us and our competitors. Many of our customers store these waste streams onsite, which serves as a significant competitive alternative to our and our competitors’ disposal services.

Other commercial options are, and may in the future become, available for the disposal of Class B and C LLRW. For example, an option offered by our competitors is the “downblending” of Class B and C LLRW in order to permit the reclassification and disposal of this waste as Class A LLRW. WCS does not offer a downblending option to its customers, and WCS does not support downblending because we believe that direct disposal of Class B and C LLRW results in a more environmentally safe solution that is less complex and less likely to be subject to regulatory changes. In addition, the State of Texas does not permit LLRW to be reclassified as a result of downblending.

Regulatory and Environmental Matters

While the waste management industry has benefited from increased governmental regulation, it has also become subject to extensive and evolving regulation by federal, state and local authorities. The regulatory process requires waste management businesses to obtain and retain numerous operating permits covering various aspects of their operations, any of which could be subject to revocation, modification or denial. Regulations also allow public participation in the permitting process. Individuals as well as companies may oppose the granting of permits. In addition, governmental policies and the exercise of broad discretion by regulators are subject to change. It is possible our ability to modify, obtain or retain permits on a timely basis could be impaired in the future. The loss of an individual permit or the failure to modify or obtain a permit could have a significant impact on our Waste Management Segment’s future operating plans, financial condition, results of operations or liquidity, especially because we only operate one disposal site. For example, adverse decisions by governmental authorities on our permit applications could cause us to abandon projects, prematurely close our facility or restrict operations. See “Facility, Operations and Services” above for a discussion of some of our Waste Management Segment’s permits. We believe our permits will be renewed in the ordinary course of business. Our byproduct material disposal license expires in 2018 and our LLRW disposal license expires in 2024. Our RCRA permit for the Federal LLRW disposal facility expires in 2018. Our LLRW treatment/storage license was combined into one license with our LLRW disposal license and now expires in 2024. Our TSCA authorization expires in 2021. Such permits, licenses and authorizations can be renewed subject to compliance with the requirements of the application process and approval by the TCEQ or the EPA, as applicable.

The Texas Low-Level Radioactive Waste Disposal Compact Commission (“Texas Compact Commission”) is responsible for managing the disposal capacity of the Compact LLRW disposal facility. They do this by approving or denying export petitions from Texas Compact generators that wish to ship their waste to a different disposal site or approving or denying import applications from out-of-compact generators that wish to ship their waste to the Compact LLRW disposal facility. The Texas Compact Commission has approved rules for the export and import of LLRW and began approving import and export agreements in 2012.

Facilities that dispose of LLRW, mixed LLRW and exempt waste, such as our facility in Texas, are generally subject to the following requirements: (i) commercial LLRW disposal facilities can only be licensed by the NRC or states that have an agreement with NRC to assume portions of its regulatory authority ("Agreement States"); (ii) the facilities must be designed, constructed and operated to meet strict safety standards and (iii) the operator of a facility must extensively characterize the site on which the facility is located and analyze how the facility will perform for thousands of years into the future. Further, certain LLRW disposal sites are restricted from accepting Class B or C LLRW from generators located in states which do not have a formal agreement with the state in which the disposal facility is located (a "Compact"). Upon approval by our Compact Commission, our facility may accept Class B or C LLRW from generators that are not located in our Compact.

From time to time federal, state and local authorities have proposed or adopted other types of laws and regulations for the waste management industry, including laws and regulations restricting or banning the interstate or intrastate shipment of certain waste, changing the regulatory agency issuing a license, imposing higher taxes on out-of-state waste shipments compared to in-state shipments, reclassifying certain categories of hazardous waste as non-hazardous and regulating disposal facilities as public utilities. Certain states have issued regulations that attempt to prevent waste generated within a particular Compact from being sent to disposal sites outside that Compact. The U.S. Congress has also considered legislation that would enable or facilitate such bans, restrictions, taxes and regulations. Due to the complex nature of industry regulation, implementation of existing or future laws and regulations by different levels of government could be inconsistent and difficult to foresee. While we attempt to monitor and anticipate regulatory, political and legal developments that affect the industry, we cannot assure you we will be able to comply with such developments. Nor can we predict the extent to which legislation or regulations that may be enacted, or any failure of legislation or regulations to be enacted, may affect our operations in the future.

The demand for certain hazardous and radioactive waste services we intend to provide is dependent in large part upon the existence and enforcement of federal, state and local environmental laws and regulations governing the discharge of those wastes into the environment. We and the industry as a whole could be adversely affected to the extent such laws or regulations are amended or repealed or their enforcement is lessened.

Because of the high degree of public awareness of environmental issues, companies in the waste management business may be, in the normal course of their business, subject to judicial and administrative proceedings. Governmental agencies may seek to impose fines or revoke, deny renewal of, or modify any applicable operating permits or licenses. In addition, private parties and special interest groups could bring actions against us alleging, among other things, a violation of operating permits or opposition or challenges to current or new license authorizations.

Employees

At December 31, 2016, WCS had 194 employees. We believe our labor relations are good.

REAL ESTATE MANAGEMENT AND DEVELOPMENT SEGMENT—BASIC MANAGEMENT, INC. AND THE LANDWELL COMPANY

Business Overview

Our Real Estate Management and Development Segment consists of BMI and LandWell. BMI, which among other things provides utility services to an industrial park located in Henderson, Nevada and is responsible for the delivery of water to the city of Henderson and various other users through a water distribution system owned by BMI. LandWell is actively engaged in efforts to develop certain real estate in Henderson, Nevada including approximately 2,100 acres zoned for residential/planned community purposes and approximately 400 acres zoned for commercial and light industrial use.

Operations and Services

Over the years, LandWell and BMI have focused on developing and selling the land transferred to LandWell as part of its formation in the early 1950's as well as additional land holdings acquired by LandWell in the surrounding area subsequent to LandWell's formation (although BMI and LandWell have not had significant real property acquisitions since 2004). Since LandWell's formation, LandWell and BMI have a history of successfully developing and selling over 1,200 acres of retail, light industrial, commercial and residential projects in the Henderson, Nevada area. However, a substantial portion of such projects, had been completed prior to the 2008 economic downturn which was particularly acute in the Las Vegas area real estate market which includes Henderson. Following such economic downturn, LandWell's land sales were substantially reduced as compared to prior years, and LandWell did not recognize any material amount of land sales in the 2008 to 2013 time period. During this time period, LandWell focused primarily on the development of a large tract of land in Henderson zoned for residential/planned community purposes (approximately 2,100 acres). Planning and zoning work on such project began in 2007, but LandWell delayed significant development efforts until economic conditions had improved. As general economic conditions improved in 2011 and 2012, LandWell began intensive development efforts of the residential/planned community in 2013 (with LandWell acting as the master developer for all such development efforts). We market and sell our residential/planned community to established home builders in tracts of land that are pre-zoned for a maximum number of home lots. We support the builders efforts to market and sell specific residential homes within our residential/planned community through joint marketing campaign and community wide education efforts.

In addition, BMI delivers utility services to an industrial park located in Henderson, Nevada and also delivers water to the city of Henderson and various other users through a water delivery system owned by BMI.

Sales

Through December 31, 2016, LandWell has closed or entered into escrow on approximately 475 acres of the residential/planned community and certain other acreage. Contracts for land sales are negotiated on an individual basis and sales terms and prices will vary based on such factors as location (including location within a planned community), expected development work and individual buyer needs. Although land may be under contract, we do not recognize revenue until we have satisfied the criteria for revenue recognition set forth in Accounting Standards Codification ("ASC") Topic 976. In some instances, we will receive cash proceeds at the time the contract closes and record deferred revenue for some or all of the cash amount received, with such deferred revenue being recognized in subsequent periods. Because land held for development was initially recognized at estimated fair value at the acquisition date as required by ASC Topic 805, we do not expect to recognize significant operating income on land sales for the land currently under contract. We expect the development work to continue for 10 to 15 years on the rest of the land held for development, consisting primarily of the residential/planned community.

Our Real Estate Management and Development Segment's sales consist principally of land sales and water and electric delivery fees. During 2016 we had sales to three customers that each exceeded 10% of our Real Estate Management and Development Segment's net sales: Grey Stone Nevada LLC (34%), Richmond Homes of Nevada (15%) and Henderson Interchange Centers LLC (12%).

Competition

There are multiple new construction residential communities in the greater Las Vegas, Nevada area. We compete with these communities on the basis of location; planned community amenities and features; proximity to major retail and recreational activities; and the perception of quality of life within the new community. We believe our residential/planned community is unique within the greater Las Vegas area due to its location and planned amenities which include: 490 acres of major and neighborhood parks and open space interconnected with major regional trails and parks; and features that no other new construction residential community currently offers including builder floorplans designed exclusively for our community. We are marketing our residential/planned community to builders who target a range of home buyers to maximize sales.

Regulatory and Environmental Matters

We and the subcontractors we use must comply with many federal, state and local laws and regulations, including zoning, density and development requirements, building, environmental, advertising, labor and real estate sales rules and regulations. These regulations and requirements affect substantially all aspects of our land development. Our operations are subject to federal, state and local laws and regulations relating to the use, storage, handling, generation, transportation, treatment, emission, discharge, disposal, remediation of and exposure to hazardous and non-hazardous substances, materials and wastes. Our operations also are subject to federal, state and local laws and regulations relating to worker health and safety. We believe we are in substantial compliance with all such laws and regulations. To date, the costs of maintaining compliance with such laws and regulations have not significantly impacted our results. We currently do not anticipate any significant costs or expenses relating to such matters; however, it is possible future laws and regulations may require us to incur significant additional expenditures.

Employees

At December 31, 2016, BMI had 25 employees. We believe our labor relations are good.

OTHER

NL Industries, Inc.—At December 31, 2016, NL owned 87% of CompX and 30% of Kronos. NL also owns 100% of EWI RE, Inc., an insurance brokerage and risk management services company and also holds certain marketable securities and other investments. See Note 17 to our Consolidated Financial Statements for additional information.

Tremont LLC—Tremont is primarily a holding company through which we hold our 63% ownership interest in BMI and our 77% ownership interest in LandWell. Such 77% ownership interest in LandWell includes 27% we hold through our ownership of Tremont and 50% held by a subsidiary of BMI. Tremont also owns 100% of Tall Pines Insurance Company, an insurance company that also holds certain marketable securities and other investments. See Note 17 to our Consolidated Financial Statements.

In addition, we also own real property related to certain of our former business units.

Business Strategy—We routinely compare our liquidity requirements and alternative uses of capital against the estimated future cash flows to be received from our subsidiaries and unconsolidated affiliates, and the estimated sales value of those businesses. As a result, we have in the past, and may in the future, seek to raise additional capital, refinance or restructure indebtedness, repurchase indebtedness in the market or otherwise, modify our dividend policy, consider the sale of an interest in our subsidiaries, business units, marketable securities or other assets, or take a combination of these or other steps, to increase liquidity, reduce indebtedness and fund future activities, which have in the past and may in the future involve related companies. From time to time, we and our related entities consider restructuring ownership interests among our subsidiaries and related companies. We expect to continue this activity in the future.

We and other entities that may be deemed to be controlled by or affiliated with Ms. Simmons and Ms. Connelly routinely evaluate acquisitions of interests in, or combinations with, companies, including related companies, we perceive to be undervalued in the marketplace. These companies may or may not be engaged in businesses related to our current businesses. In some instances we actively manage the businesses we acquire with a focus on maximizing return-on-investment through cost reductions, capital expenditures, improved operating efficiencies, selective marketing to address market niches, disposition of marginal operations, use of leverage and redeployment of capital to more productive assets. In other instances, we have disposed of our interest in a company prior to gaining control. We intend to consider such activities in the future and may, in connection with such activities, consider issuing additional equity securities and increasing our indebtedness.

Website and Available Information—Our fiscal year ends December 31. We furnish our stockholders with annual reports containing audited financial statements. In addition, we file annual, quarterly and current reports, proxy and information statements and other information with the SEC. Certain of our consolidated subsidiaries (Kronos, NL and CompX) also file annual, quarterly and current reports, proxy and information statements and other information with the SEC. We also make our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments thereto, available free of charge through our website at www.valhi.net as soon as reasonably practical after they have been filed with the SEC. We also provide to anyone, without charge, copies of such documents upon written request. Requests should be directed to the attention of the Corporate Secretary at our address on the cover page of this Form 10-K.

Additional information, including our Audit Committee charter, our Code of Business Conduct and Ethics and our Corporate Governance Guidelines, can also be found on our website. Information contained on our website is not part of this Annual Report.

The general public may read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, NE, Washington, DC 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. We are an electronic filer. The SEC maintains an Internet website at www.sec.gov that contains reports, proxy and information statements and other information regarding issuers, such as us, that file electronically with the SEC.

ITEM 1A. RISK FACTORS

Listed below are certain risk factors associated with us and our businesses. See also certain risk factors discussed in Item 7 — "Management's Discussion and Analysis of Financial Condition and Results of Operations — Critical Accounting Policies and Estimates." In addition to the potential effect of these risk factors, any risk factor which could result in reduced earnings or increased operating losses, or reduced liquidity, could in turn adversely affect our ability to service our liabilities or pay dividends on our common stock or adversely affect the quoted market prices for our securities.

Our assets consist primarily of investments in our operating subsidiaries, and we are dependent upon distributions from our subsidiaries to service our liabilities.

The majority of our operating cash flows are generated by our operating subsidiaries, and our ability to service liabilities and to pay dividends on our common stock depends to a large extent upon the cash dividends or other distributions we receive from our subsidiaries. Our subsidiaries are separate and distinct legal entities and they have no obligation, contingent or otherwise, to pay such cash dividends or other distributions to us. In addition, the payment of dividends or other distributions from our subsidiaries could be subject to restrictions on, or taxation of, dividends or repatriation of earnings under applicable law, monetary transfer restrictions, currency exchange regulations in jurisdictions in which our subsidiaries operate or any other restrictions imposed by current or future agreements to which our subsidiaries may be a party, including debt instruments. Events beyond our control, including changes in general business and economic conditions, could adversely impact the ability of our subsidiaries to pay dividends or make other distributions to us. If our subsidiaries were to become unable to make sufficient cash dividends or other distributions to us, our ability to service our liabilities and to pay dividends on our common stock could be adversely affected.

In addition, a significant portion of our assets consist of ownership interests in our subsidiaries. If we were required to liquidate any of such securities in order to generate funds to satisfy our liabilities, we may be required to sell such securities at a time or times at which we would not be able to realize what we believe to be the long-term value of such assets.

Demand for, and prices of, certain of our products are influenced by changing market conditions for our products, which may result in reduced earnings or operating losses.

In 2016, 93% of our Chemicals Segment's revenues are attributable to sales of TiO_2. Pricing within the global TiO_2 industry over the long term is cyclical and changes in economic conditions, especially in Western industrialized nations, can significantly impact our earnings and operating cash flows. Historically, the markets for many of our products have experienced alternating periods of increasing and decreasing demand. Relative changes in the selling prices for our products are one of the main factors that affect the level of our profitability. In periods of increasing demand, our selling prices and profit margins generally will tend to increase, while in periods of decreasing demand our selling prices and profit margins generally tend to decrease. In addition, pricing may affect customer inventory levels as customers may from time to time accelerate purchases of TiO_2 in advance of anticipated price increases or defer purchases of TiO_2 in advance of anticipated price decreases. Our ability to further increase capacity without additional investment in greenfield or brownfield capacity increases may be limited and as a result, our profitability may become even more dependent upon the selling prices of our products.

The TiO_2 industry is concentrated and highly competitive and we face price pressures in the markets in which we operate, which may result in reduced earnings or operating losses.

The global market in which we operate our business is concentrated with the top five TiO_2 producers accounting for over 50% of the world's production capacity and is highly competitive. Competition is based on a number of factors, such as price, product quality and service. Some of our competitors may be able to drive down prices for our products if their costs are lower than our costs. In addition, some of our competitors' financial, technological and other resources may be greater than our resources and such competitors may be better able to withstand changes in market conditions. Our competitors may be able to respond more quickly than we can to new or emerging technologies and changes in customer requirements. Further, consolidation of our competitors or customers may result in reduced demand for our products or make it more difficult for us to compete with our competitors. The occurrence of any of these events could result in reduced earnings or operating losses.

Higher costs or limited availability of our raw materials may reduce our earnings and decrease our liquidity. In addition, many of our raw material contracts contain fixed quantities we are required to purchase.

The number of sources for and availability of certain raw materials is specific to the particular geographical region in which a facility is located. For example, titanium-containing feedstocks suitable for use in our TiO_2 facilities are available from a limited number of suppliers around the world. Political and economic instability in the countries from which we purchase our raw material supplies could adversely affect their availability. If our worldwide vendors were unable to meet their contractual obligations and we were unable to obtain necessary raw materials, we could incur higher costs for raw materials or may be required to reduce production levels. We experienced significantly higher ore costs in 2012 which carried over into 2013. We have seen moderation in the purchase cost of third-party feedstock ore since 2013. We may also experience higher operating costs such as energy costs, which could affect our profitability. We may not always be able to increase our selling prices to offset the impact of any higher costs or reduced production levels, which could reduce our earnings and decrease our liquidity.

We have long-term supply contracts that provide for our TiO_2 feedstock requirements that currently expire through 2019. While we believe we will be able to renew these contracts, there can be no assurance we will be successful in renewing them or in obtaining long-term extensions to them prior to expiration. Our current agreements (including those entered into through February 2017) require us to purchase certain minimum quantities of feedstock with minimum purchase commitments aggregating approximately $605 million in years subsequent to December 31, 2016. In addition, we have other long-term supply and service contracts that provide for various raw materials and services. These agreements require us to purchase certain minimum quantities or services with minimum purchase commitments aggregating approximately $158 million at December 31, 2016. Our commitments under these contracts could adversely affect our financial results if we significantly reduce our production and were unable to modify the contractual commitments.

Certain of the raw materials used in our Component Products Segment's products are commodities that are subject to significant fluctuations in price in response to world-wide supply and demand as well as speculative investor activity. Zinc and brass are the principal raw materials used in the manufacture of security products. Stainless steel tubing is the major raw material used in the manufacture of marine exhaust systems. These raw materials are purchased from several suppliers and are generally readily available from numerous sources. We occasionally enter into short-term raw material supply arrangements to mitigate the impact of future increases in commodity-related raw material costs. Materials purchased outside of these arrangements are sometimes subject to unanticipated and sudden price increases. Should our vendors not be able to meet their contractual obligations or should we be otherwise unable to obtain necessary raw materials, we may incur higher costs for raw materials or may be required to reduce production levels, either of which may decrease our liquidity or negatively impact our financial condition or results of operations as we may be unable to offset the higher costs with increases in our selling prices or reductions in other operating costs.

We could incur significant costs related to legal and environmental remediation matters.

NL formerly manufactured lead pigments for use in paint. NL and others have been named as defendants in various legal proceedings seeking damages for personal injury, property damage and governmental expenditures allegedly caused by the use of lead-based paints. These lawsuits seek recovery under a variety of theories, including public and private nuisance, negligent product design, negligent failure to warn, strict liability, breach of warranty, conspiracy/concert of action, aiding and abetting, enterprise liability, market share or risk contribution liability, intentional tort, fraud and misrepresentation, violations of state consumer protection statutes, supplier negligence and similar claims. The plaintiffs in these actions generally seek to impose on the defendants responsibility for lead paint abatement and health concerns associated with the use of lead-based paints, including damages for personal injury, contribution and/or indemnification for medical expenses, medical monitoring expenses and costs for educational programs. As with all legal proceedings, the outcome is uncertain. Any liability we might incur in the future could be material. See also Item 3 - "Legal Proceedings - Lead Pigment Litigation - NL."

Certain properties and facilities used in NL's former operations are the subject of litigation, administrative proceedings or investigations arising under various environmental laws. These proceedings seek cleanup costs, personal injury or property damages and/or damages for injury to natural resources. Some of these proceedings involve claims for substantial amounts. Environmental obligations are difficult to assess and estimate for numerous reasons, and we may incur costs for environmental remediation in the future in excess of amounts currently estimated. Any liability we might incur in the future could be material. See also Item 3 - "Legal Proceedings - Environmental Matters and Litigation."

Many of the markets in which our Component Products Segment operates are mature and highly competitive resulting in pricing pressure and the need to continuously reduce costs.

Many of the markets our Component Products Segment serves are highly competitive, with a number of competitors offering similar products. We focus our efforts on the middle and high-end segment of the market where we feel that we can compete due to the importance of product design, quality and durability to the customer. However, our ability to effectively compete is impacted by a number of factors. The occurrence of any of these factors could result in reduced earnings or operating losses.

- Competitors may be able to drive down prices for our products beyond our ability to adjust costs because their costs are lower than ours, especially products sourced from Asia.
- Competitors' financial, technological and other resources may be greater than our resources, which may enable them to more effectively withstand changes in market conditions.
- Competitors may be able to respond more quickly than we can to new or emerging technologies and changes in customer requirements.

- Consolidation of our competitors or customers in any of the markets in which we compete may result in reduced demand for our products.
- New competitors could emerge by modifying their existing production facilities to manufacture products that compete with our products.
- We may not be able to sustain a cost structure that enables us to be competitive.
- Customers may no longer value our product design, quality or durability over the lower cost products of our competitors.

Our development of innovative features for current products is critical to sustaining and growing our Component Product Segment's sales.

Historically, our Component Products Segment's ability to provide value-added custom engineered products that address requirements of technology and space utilization has been a key element of our success. We spend a significant amount of time and effort to refine, improve and adapt our existing products for new customers and applications. Since expenditures for these types of activities are not considered research and development expense under accounting principles generally accepted in the United States of America ("GAAP"), the amount of our research and development expenditures, which is not significant, is not indicative of the overall effort involved in the development of new product features. The introduction of new product features requires the coordination of the design, manufacturing and marketing of the new product features with current and potential customers. The ability to coordinate these activities with current and potential customers may be affected by factors beyond our control. While we will continue to emphasize the introduction of innovative new product features that target customer-specific opportunities, we do not know if any new product features we introduce will achieve the same degree of success that we have achieved with our existing products. Introduction of new product features typically requires us to increase production volume on a timely basis while maintaining product quality. Manufacturers often encounter difficulties in increasing production volumes, including delays, quality control problems and shortages of qualified personnel or raw materials. As we attempt to introduce new product features in the future, we do not know if we will be able to increase production volume without encountering these or other problems, which might negatively impact our financial condition or results of operations.

Failure to protect our intellectual property rights or claims by others that we infringe their intellectual property rights could substantially harm our business.

Our Component Products Segment relies on patent, trademark and trade secret laws in the United States and similar laws in other countries to establish and maintain our intellectual property rights in our technology and designs. Despite these measures, any of our intellectual property rights could be challenged, invalidated, circumvented or misappropriated. Others may independently discover our trade secrets and proprietary information, and in such cases we could not assert any trade secret rights against such parties. Further, we do not know if any of our pending trademark or patent applications will be approved. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our intellectual property rights. In addition, the laws of certain countries do not protect intellectual property rights to the same extent as the laws of the United States. Therefore, in certain jurisdictions, we may be unable to protect our technology and designs adequately against unauthorized third party use, which could adversely affect our competitive position.

Third parties may claim that we or our customers are infringing upon their intellectual property rights. Even if we believe that such claims are without merit, they can be time-consuming and costly to defend and distract our management's and technical staff's attention and resources. Claims of intellectual property infringement also might require us to redesign affected technology, enter into costly settlement or license agreements or pay costly damage awards, or face a temporary or permanent injunction prohibiting us from marketing or selling certain of our technology. If we cannot or do not license the infringed technology on reasonable pricing terms or at all, or substitute similar technology from another source, our business could be adversely impacted.

Our Waste Management Segment operates in a highly regulated industry, and third parties may from time to time seek to challenge our Waste Management Segment's licenses and permits. We may not be successful in obtaining new business to a level sufficient to generate positive operating results or cash flows.

Our Waste Management Segment is required to comply with various federal, state and local regulations, as well as comply with the terms of our operating permits and licenses as they may be modified or amended. Failure to comply with any such regulation or permit requirements, or failure to obtain renewals, could adversely impact our operations. In addition, we must be successful in obtaining new business from our commercial and governmental customers in order to effectively operate our Compact and Federal LLRW disposal facilities. Third parties may from time to time seek to challenge our current operating licenses and permits. Because many large commercial generators of waste have chosen to store waste onsite rather than dispose of such waste, because of the competitive nature of obtaining federal and commercial contracts for waste disposal, and because there are generally no legal or regulatory obligations requiring disposal of such wastes, we do not know if we will be successful in increasing our disposal volumes and obtaining such new business to a level sufficient to generate positive operating results or cash flows. Failure to obtain a sufficient amount of new business to effectively operate our LLRW disposal facilities could adversely impact our earnings and decrease our liquidity. Our Waste Management Segment has never been profitable and throughout its history has required our financial support to maintain its operations. We do not know if our Waste Management Segment will ever generate positive operating results or cash flows.

Our Waste Management Segment is currently subject to a contract to be sold, but the U.S. Department of Justice has filed an anti-trust action seeking an injunction to enjoin completion of the sale. We may not be successful in contesting and resisting such anti-trust action or in completing such sale.

On November 18, 2015, we entered into an agreement with Rockwell Holdco, Inc. ("Rockwell"), for the sale of our Waste Management Segment to Rockwell. The agreement, as amended, is for $270 million in cash plus the assumption of all of the Segment’s third-party indebtedness incurred prior to the date of the agreement. Additionally, Rockwell and its affiliates will assume all financial assurance obligations related to the business. On November 16, 2016, the U.S. Department of Justice filed an anti-trust action, seeking an injunction to enjoin completion of the sale. There can be no assurance, however, that the parties will be successful in contesting and resisting such antitrust action, that receipt of U.S. anti-trust approval will be obtained, that all closing conditions will be satisfied, or that any such sale of the Waste Management Segment would be completed. We have in the past considered and evaluated various strategic alternatives with respect to our Waste Management Segment. If such pending sale transaction were not to be successfully closed, we would continue to consider and evaluate various other alternatives with respect to our Waste Management Segment, including alternatives aimed at minimizing or ultimately discontinuing any continued financial support of the Waste Management Segment. Some of such alternatives could result in the recognition of a material impairment loss as required under U.S. generally accepted accounting principles.

Our Real Estate Management and Development Segment owns a significant amount of real property in Henderson, Nevada. A prolonged downturn in the local real estate market in Nevada could negatively impact our ability to successfully complete the development of such real property.

A substantial portion of the revenues and assets associated with our Real Estate Management and Development Segment relate to certain real estate under development in Henderson, Nevada, including approximately 2,100 acres zoned for residential/planned community purposes and approximately 400 acres zoned for commercial and light industrial use. A prolonged downturn in the local real estate market in Nevada or other events could negatively impact our ability to successfully complete the development of such real property, either by requiring us to incur future development costs in excess of our current estimates, or by resulting in selling prices for future retail land sales lower than what we currently expect. If any of these events were to occur, revenue and profits in our Real Estate Management and Development segment may be significantly and negatively affected.

Our leverage may impair our financial condition or limit our ability to operate our businesses.

We have a significant amount of debt, primarily related to Kronos' term loan, our loan from Contran Corporation, our loans from Snake River Sugar Company and the WCS financing capital lease. As of December 31, 2016, our total consolidated debt was approximately $965.0 million. Our level of debt could have important consequences to our stockholders and creditors, including:

- making it more difficult for us to satisfy our obligations with respect to our liabilities;
- increasing our vulnerability to adverse general economic and industry conditions;
- requiring that a portion of our cash flows from operations be used for the payment of interest on our debt, which reduces our ability to use our cash flow to fund working capital, capital expenditures, dividends on our common stock, acquisitions or general corporate requirements;
- limiting the ability of our subsidiaries to pay dividends to us;

- limiting our ability to obtain additional financing to fund future working capital, capital expenditures, acquisitions or general corporate requirements;
- limiting our flexibility in planning for, or reacting to, changes in our business and the industry in which we operate; and
- placing us at a competitive disadvantage relative to other less leveraged competitors.

In addition to our indebtedness, we are party to various lease and other agreements (including feedstock ore purchase contracts as previously described) pursuant to which, along with our indebtedness, we are committed to pay approximately $507.5 million in 2017. Our ability to make payments on and refinance our debt and to fund planned capital expenditures depends on our future ability to generate cash flow. To some extent, this is subject to general economic, financial, competitive, legislative, regulatory and other factors that are beyond our control. In addition, our ability to borrow funds under certain of our revolving credit facilities in the future will, in some instances, depend in part on these subsidiaries' ability to maintain specified financial ratios and satisfy certain financial covenants contained in the applicable credit agreement.

Our businesses may not generate cash flows from operating activities sufficient to enable us to pay our debts when they become due and to fund our other liquidity needs. As a result, we may need to refinance all or a portion of our debt before maturity. We may not be able to refinance any of our debt in a timely manner on favorable terms, if at all, in the current credit markets. Any inability to generate sufficient cash flows or to refinance our debt on favorable terms could have a material adverse effect on our financial condition.

Global climate change legislation could negatively impact our financial results or limit our ability to operate our businesses.

We operate production facilities in several countries. In many of the countries in which we operate, legislation has been passed, or proposed legislation is being considered, to limit greenhouse gases through various means, including emissions permits and/or energy taxes. In several of our production facilities, we consume large amounts of energy, primarily electricity and natural gas. To date, the permit system in effect in the various countries in which we operate has not had a material adverse effect on our financial results. However, if further greenhouse gas legislation were to be enacted in one or more countries, it could negatively impact our future results from operations through increased costs of production, particularly as it relates to our energy requirements or our need to obtain emissions permits. If such increased costs of production were to materialize, we may be unable to pass price increases onto our customers to compensate for increased production costs, which may decrease our liquidity, operating income and results of operations.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We along with our subsidiaries: Kronos, CompX, WCS and NL lease office space through Contran for our principal executive offices in Dallas, Texas. Our BMI and LandWell subsidiaries' principal offices are in an owned building in Henderson, Nevada. A list of operating facilities for each of our subsidiaries is described in the applicable business sections of Item 1—"Business." We believe our facilities are generally adequate and suitable for their respective uses.

ITEM 3. LEGAL PROCEEDINGS

We are involved in various legal proceedings. In addition to information included below, certain information called for by this Item is included in Note 18 to our Consolidated Financial Statements, which is incorporated herein by reference.

Lead Pigment Litigation—NL

NL's former operations included the manufacture of lead pigments for use in paint and lead-based paint. NL, other former manufacturers of lead pigments for use in paint and lead-based paint (together, the "former pigment manufacturers"), and the Lead Industries Association ("LIA"), which discontinued business operations in 2002, have been named as defendants in various legal proceedings seeking damages for personal injury, property damage and governmental expenditures allegedly caused by the use of lead-based paints. Certain of these actions have been filed by or on behalf of states, counties, cities or their public housing authorities and school districts, and certain others have been asserted as class actions. These lawsuits seek recovery under a variety of theories, including public and private nuisance, negligent product design, negligent failure to warn, strict liability, breach of warranty, conspiracy/concert of action, aiding and abetting, enterprise liability, market share or risk contribution liability, intentional tort, fraud and misrepresentation, violations of state consumer protection statutes, supplier negligence and similar claims.

The plaintiffs in these actions generally seek to impose on the defendants responsibility for lead paint abatement and health concerns associated with the use of lead-based paints, including damages for personal injury, contribution and/or indemnification for medical expenses, medical monitoring expenses and costs for educational programs. To the extent the plaintiffs seek compensatory or punitive damages in these actions, such damages are generally unspecified. In some cases, the damages are unspecified pursuant to the requirements of applicable state law. A number of cases are inactive or have been dismissed or withdrawn. Most of the remaining cases are in various pre-trial stages. Some are on appeal following dismissal or summary judgment rulings or a trial verdict in favor of either the defendants or the plaintiffs.

NL believes that these actions are without merit, and NL intends to continue to deny all allegations of wrongdoing and liability and to defend against all actions vigorously. NL does not believe it is probable that it has incurred any liability with respect to all of the lead pigment litigation cases to which NL is a party, and liability to us that may result, if any, in this regard cannot be reasonably estimated, because:

- NL has never settled any of the market share, intentional tort, fraud, nuisance, supplier negligence, breach of warranty, conspiracy, misrepresentation, aiding and abetting, enterprise liability, or statutory cases,
- no final, non-appealable adverse verdicts have ever been entered against NL, and
- NL has never ultimately been found liable with respect to any such litigation matters, including over 100 cases over a twenty-year period for which NL was previously a party and for which NL has been dismissed without any finding of liability.

Accordingly, neither we nor NL have accrued any amounts for any of the pending lead pigment and lead-based paint litigation cases filed by or on behalf of states, counties, cities or their public housing authorities and school districts, or those asserted as class actions. In addition, we have determined that liability to us which may result, if any, cannot be reasonably estimated because there is no prior history of a loss of this nature on which an estimate could be made and there is no substantive information available upon which an estimate could be based.

In one of these lead pigment cases, in April 2000 NL was served with a complaint in County of Santa Clara v. Atlantic Richfield Company, et al. (Superior Court of the State of California, County of Santa Clara, Case No. 1-00-CV-788657) brought by a number of California government entities against the former pigment manufacturers, the LIA and certain paint manufacturers. The County of Santa Clara sought to recover compensatory damages for funds the plaintiffs have expended or would in the future expend for medical treatment, educational expenses, abatement or other costs due to exposure to, or potential exposure to, lead paint, disgorgement of profit, and punitive damages. In July 2003, the trial judge granted defendants' motion to dismiss all remaining claims. Plaintiffs appealed and the intermediate appellate court reinstated public nuisance, negligence, strict liability, and fraud claims in March 2006. A fourth amended complaint was filed in March 2011 on behalf of The People of California by the County Attorneys of Alameda, Ventura, Solano, San Mateo, Los Angeles and Santa Clara, and the City Attorneys of San Francisco, San Diego and Oakland. That complaint alleged that the presence of lead paint created a public nuisance in each of the prosecuting jurisdictions and sought its abatement. In July and August 2013, the case was tried. In January 2014, the Judge issued a judgment finding NL, The Sherwin Williams Company and ConAgra Grocery Products Company jointly and severally liable for the abatement of lead paint in pre-1980 homes, and ordered the defendants to pay an aggregate $1.15 billion to the people of the State of California to fund such abatement. In February 2014, NL filed a motion for a new trial, and in March 2014 the court denied the motion. Subsequently in March 2014, NL filed a notice of appeal with the Sixth District Court of Appeal for the State of California and the appeal is proceeding with the appellate court. NL believes that this judgment is inconsistent with California law and is unsupported by the evidence, and NL will defend vigorously against all claims.

The Santa Clara case is unusual in that this is the second time that an adverse verdict in the lead pigment litigation has been entered against NL (the first adverse verdict against NL was ultimately overturned on appeal). We have concluded that the likelihood of a loss in this case has not reached a standard of "probable" as contemplated by ASC 450, given (i) the substantive, substantial and meritorious grounds on which the adverse verdict in the Santa Clara case will be appealed, (ii) the uniqueness of the Santa Clara verdict (i.e. no final, non-appealable verdicts have ever been rendered against NL, or any of the other former lead pigment manufacturers, based on the public nuisance theory of liability or otherwise), and (iii) the rejection of the public nuisance theory of liability as it relates to lead pigment matters in many other jurisdictions (no jurisdiction in which a plaintiff has asserted a public nuisance theory of liability has ever successfully been upheld). In addition, liability that may result, if any, cannot be reasonably estimated, as NL continues to have no basis on which an estimate of liability could be made, as discussed above. However, as with any legal proceeding, there is no assurance that any appeal would be successful, and it is reasonably possible, based on the outcome of the appeals process, that NL may in the future incur some liability resulting in the recognition of a loss contingency accrual that could have a material adverse impact on our results of operations, financial position and liquidity.

In June 2000, a complaint was filed in Illinois state court, Lewis, et al. v. Lead Industries Association, et al (Circuit Court of Cook County, Illinois, County Department, Chancery Division, Case No. 00CH09800.) Plaintiffs seek to represent two classes, one consisting of minors between the ages of six months and six years who resided in housing in Illinois built before 1978, and another consisting of individuals between the ages of six and twenty years who lived in Illinois housing built before 1978 when they were between the ages of six months and six years and who had blood lead levels of 10 micrograms/deciliter or more. The complaint seeks damages jointly and severally from the former pigment manufacturers and the LIA to establish a medical screening fund for the first class to determine blood lead levels, a medical monitoring fund for the second class to detect the onset of latent diseases and a fund for a public education campaign. In April 2008, the trial court judge certified a class of children whose blood lead levels were screened venously between August 1995 and February 2008 and who had incurred expenses associated with such screening. In March 2012, the trial court judge decertified the class. In June 2012, the trial court judge granted plaintiffs the right to appeal his decertification order, and in August 2012 the appellate court granted plaintiffs permission to appeal. In March 2013, the appellate court agreed with the trial court's rationale regarding legislative requirements to screen children's blood lead levels and remanded the case for further proceedings in the trial court. In July 2013, plaintiffs moved to vacate the decertification. In October 2013, the judge denied plaintiffs' motion to vacate the decertification of the class. In March 2014, plaintiffs filed a new class certification motion. In April 2015, a class was certified consisting of parents or legal guardians of children who lived in certain "high risk" areas in Illinois between August 18, 1995 and February 19, 2008, and incurred an expense or liability for having their children's blood lead levels tested.

In addition to the foregoing litigation, various legislation and administrative regulations have, from time to time, been proposed that seek to (a) impose various obligations on present and former manufacturers of lead pigment and lead-based paint with respect to asserted health concerns associated with the use of such products and (b) effectively overturn court decisions in which we and other pigment manufacturers have been successful. Examples of such proposed legislation include bills which would permit civil liability for damages on the basis of market share, rather than requiring plaintiffs to prove that the defendant's product caused the alleged damage, and bills which would revive actions barred by the statute of limitations. While no legislation or regulations have been enacted to date that are expected to have a material adverse effect on our consolidated financial position, results of operations or liquidity, the imposition of market share liability or other legislation could have such an effect.

New cases may continue to be filed against us. We do not know if we will incur liability in the future in respect of any of the pending or possible litigation in view of the inherent uncertainties involved in court and jury rulings. In the future, if new information regarding such matters becomes available to us (such as a final, non-appealable adverse verdict against us or otherwise ultimately being found liable with respect to such matters), at that time we would consider such information in evaluating any remaining cases then-pending against us as to whether it might then have become probable we have incurred liability with respect to these matters, and whether such liability, if any, could have become reasonably estimable. The resolution of any of these cases could result in the recognition of a loss contingency accrual that could have a material adverse impact on our net income for the interim or annual period during which such liability is recognized and a material adverse impact on our consolidated financial condition and liquidity.

Environmental Matters and Litigation

Our operations are governed by various environmental laws and regulations. Certain of our businesses are and have been engaged in the handling, manufacture or use of substances or compounds that may be considered toxic or hazardous within the meaning of applicable environmental laws and regulations. As with other companies engaged in similar businesses, certain of our past and current operations and products have the potential to cause environmental or other damage. We have implemented and continue to implement various policies and programs in an effort to minimize these risks. Our policy is to maintain compliance with applicable environmental laws and regulations at all of our plants and to strive to improve environmental performance. From time to time, we may be subject to environmental regulatory enforcement under U.S. and non-U.S. statutes, the resolution of which typically involves the establishment of compliance programs. It is possible that future developments, such as stricter requirements of environmental laws and enforcement policies, could adversely affect our production, handling, use, storage, transportation, sale or disposal of such substances. We believe that all of our facilities are in substantial compliance with applicable environmental laws.

Certain properties and facilities used in NL's former operations, including divested primary and secondary lead smelters and former mining locations, are the subject of civil litigation, administrative proceedings or investigations arising under federal and state environmental laws and common law. Additionally, in connection with past operating practices, we are currently involved as a defendant, potentially responsible party ("PRP") or both, pursuant to CERCLA, and similar state laws in various governmental and private actions associated with waste disposal sites, mining locations, and facilities that we or our predecessors, our subsidiaries or their predecessors currently or previously owned, operated or used, certain of which are on the United States EPA's Superfund National Priorities List or similar state lists. These proceedings seek cleanup costs, damages for personal injury or property damage and/or damages for injury to natural resources. Certain of these proceedings involve claims for substantial amounts. Although we may be jointly and severally liable for these costs, in most cases we are only one of a number of PRPs who may also be jointly and severally liable, and among whom costs may be shared or allocated. In addition, we are also a party to a number of personal injury lawsuits filed in various jurisdictions alleging claims related to environmental conditions alleged to have resulted from our operations.

Obligations associated with environmental remediation and related matters are difficult to assess and estimate for numerous reasons including the:

- complexity and differing interpretations of governmental regulations;
- number of PRPs and their ability or willingness to fund such allocation of costs;
- financial capabilities of the PRPs and the allocation of costs among them;
- solvency of other PRPs;
- multiplicity of possible solutions;
- number of years of investigatory, remedial and monitoring activity required;
- uncertainty over the extent, if any, to which our former operations might have contributed to the conditions allegedly giving rise to such personal injury, property damage, natural resource and related claims; and
- number of years between former operations and notice of claims and lack of information and documents about the former operations.

In addition, the imposition of more stringent standards or requirements under environmental laws or regulations, new developments or changes regarding site cleanup costs or the allocation of costs among PRPs, solvency of other PRPs, the results of future testing and analysis undertaken with respect to certain sites or a determination that we are potentially responsible for the release of hazardous substances at other sites, could cause our expenditures to exceed our current estimates. We cannot assure you that actual costs will not exceed accrued amounts or the upper end of the range for sites for which estimates have been made, and we cannot assure you that costs will not be incurred for sites where no estimates presently can be made. Further, additional environmental and related matters may arise in the future. If we were to incur any future liability, this could have a material adverse effect on our consolidated financial statements, results of operations and liquidity.

We record liabilities related to environmental remediation and related matters (including costs associated with damages for personal injury or property damage and/or damages for injury to natural resources) when estimated future expenditures are probable and reasonably estimable. We adjust such accruals as further information becomes available to us or as circumstances change. Unless the amounts and timing of such estimated future expenditures are fixed and reasonably determinable, we generally do not discount estimated future expenditures to their present value due to the uncertainty of the timing of the payout. We recognize recoveries of costs from other parties, if any, as assets when their receipt is deemed probable. At December 31, 2015 and 2016, we have not recognized any material receivables for recoveries.

We do not know and cannot estimate the exact time frame over which we will make payments for our accrued environmental and related costs. The timing of payments depends upon a number of factors, including but not limited to the timing of the actual remediation process; which in turn depends on factors outside of our control. At each balance sheet date, we estimate the amount of our accrued environmental and related costs which we expect to pay within the next twelve months, and we classify this estimate as a current liability. We classify the remaining accrued environmental costs as a noncurrent liability.

On a quarterly basis, we evaluate the potential range of our liability for environmental remediation and related costs at sites where we have been named as a PRP or defendant, including sites for which NL's wholly-owned environmental management subsidiary, NL Environmental Management Services, Inc., ("EMS"), has contractually assumed our obligations. At December 31, 2016, NL had accrued approximately $117 million related to approximately 41 sites associated with remediation and related matters that we believe are at the present time and/or in their current phase reasonably estimable. The upper end of the range of reasonably possible costs to us for remediation and related matters for which we believe it is possible to estimate costs is approximately $160 million, including the amount currently accrued.

We believe that it is not reasonably possible to estimate the range of costs for certain sites. At December 31, 2016, there were approximately 5 sites for which NL is not currently able to estimate a range of costs. For these sites, generally the investigation is in the early stages, and NL is unable to determine whether or not we actually had any association with the site, the nature of its responsibility, if any, for the contamination at the site and the extent of contamination at and cost to remediate the site. The timing and availability of information on these sites is dependent on events outside of our control, such as when the party alleging liability provides information to us. At certain of these previously inactive sites, NL has received general and special notices of liability from the EPA and/or state agencies alleging that we, sometimes with other PRPs, are liable for past and future costs of remediating environmental contamination allegedly caused by former operations. These notifications may assert that NL, along with any other alleged PRPs, are liable for past and/or future clean-up costs. As further information becomes available to us for any of these sites which would allow us to estimate a range of costs, we would at that time adjust our accruals. Any such adjustment could result in the recognition of an accrual that would have a material effect on our consolidated financial statements, results of operations and liquidity.

In June 2006, NL and several other PRPs received a Unilateral Administrative Order (UAO) from the EPA regarding a formerly-owned mine and milling facility located in Park Hills, Missouri. The Doe Run Company is the current owner of the site, which was purchased by a predecessor of Doe Run from us in approximately 1936. Doe Run is also named in the Order. In April 2008, the parties signed a definitive cost sharing agreement for sharing of the costs anticipated in connection with the order and in May 2008, the parties began work at the site as required by the UAO and in accordance with the cost sharing agreement. In the fourth quarter of 2010, NL reached its capped payment obligation under the cost sharing agreement with Doe Run. In the fourth quarter of 2013, Doe Run completed the remainder of the construction work. A Removal Action Report and Post-Removal Site Control plan were submitted to the EPA by Doe Run in 2016, and we are awaiting final approval from the EPA.

In June 2008, NL received a Directive and Notice to Insurers from the New Jersey Department of Environmental Protection (NJDEP) regarding the Margaret's Creek site in Old Bridge Township, New Jersey. NJDEP alleged that a waste hauler transported waste from one of our former facilities for disposal at the site in the early 1970s. NJDEP referred the site to the EPA, and in November 2009, the EPA added the site to the National Priorities List under the name "Raritan Bay Slag Site." In 2012, EPA notified NL of its potential liability at this site. In May 2013, EPA issued its Record of Decision for the site. In June 2013, NL filed a contribution suit under CERCLA and the New Jersey Spill Act titled NL Industries, Inc. v. Old Bridge Township, et al. (United States District Court for the District of New Jersey, Civil Action No. 3:13-cv-03493-MAS-TJB) against the current owner, Old Bridge Township, and several federal and state entities NL alleges designed and operated the site and who have significant potential liability as compared to NL which is alleged to have been a potential source of material placed at the site by others. NL's suit also names certain former NL customers of the former NL facility alleged to be the source of some of the materials. In January 2014, EPA issued a UAO to NL for clean-up of the site based on the EPA's preferred remedy set forth in the Record of Decision. NL is in discussions with EPA about NL's performance of a defined amount of the work at the site and is otherwise taking actions necessary to respond to the UAO. If these discussions and actions are unsuccessful, NL will defend vigorously against all claims while continuing to seek contribution from other PRPs.

In September 2008, NL received a Special Notice letter from the EPA for liability associated with the Tar Creek Superfund site in Ottawa County, Oklahoma (Tar Creek) and a demand for related past and future costs. We responded with a good-faith offer to pay certain of the EPA's past costs and to complete limited work in the areas in which we operated. In October 2008, we received a claim from the State of Oklahoma for past, future and relocation costs in connection with the site. In November 2015, the United States Department of Justice lodged with the federal court a fully-executed consent decree between the United States, the State of Oklahoma and NL that resolves the claims of the United States and the State of Oklahoma for past and future cleanup costs at Tar Creek. The consent decree will become effective after it has been reviewed and officially approved by the federal court.

In August 2009, NL was served with a complaint in Raritan Baykeeper, Inc. d/b/a NY/NJ Baykeeper et al. v. NL Industries, Inc. et al. (United States District Court, District of New Jersey, Case No. 3:09-cv-04117). This is a citizen's suit filed by two local environmental groups pursuant to the Resource Conservation and Recovery Act and the Clean Water Act against NL, current owners, developers and state and local government entities. The complaint alleges that hazardous substances were and continue to be discharged from our former Sayreville, New Jersey property into the sediments of the adjacent Raritan River. The former Sayreville site is currently being remediated by owner/developer parties under the oversight of the NJDEP. The plaintiffs seek a declaratory judgment, injunctive relief, imposition of civil penalties and an award of costs. We have denied liability and will defend vigorously against all claims.

In June 2011, NL was served in ASARCO LLC v. NL Industries, Inc., et al. (United States District Court, Western District of Missouri, Case No. 4:11-cv-00138-DGK). The plaintiff brought this CERCLA contribution action against several defendants to recover a portion of the amount it paid in settlement with the U.S. Government during its Chapter 11 bankruptcy in relation to the Tar

Creek site, the Cherokee County Superfund Site in southeast Kansas, the Oronogo-Duenweg Lead Mining Belt Superfund Site in Jasper County, Missouri and the Newton County Mine Tailing Site in Newton County, Missouri. We have denied liability and will defend vigorously against all of the claims. In the second quarter of 2012, NL filed a motion to stay the case. In the first quarter of 2013, NL's motion was granted and the court entered an indefinite stay. In the first quarter of 2015, Asarco was granted permission to seek an interlocutory appeal of that stay order. In March 2015, the Eighth Circuit Court of Appeals denied Asarco's request for an interlocutory appeal of the stay order and the trial court's indefinite stay remains in place.

In September 2011, NL was served in ASARCO LLC v. NL Industries, Inc., et al. (United States District Court, Eastern District of Missouri, Case No. 4:11-cv-00864). The plaintiff brought this CERCLA contribution action against several defendants to recover a portion of the amount it paid in settlement with the U.S. Government during its Chapter 11 bankruptcy in relation to the Southeast Missouri Mining District. In May 2015, the trial court on its own motion entered an indefinite stay of the litigation. In June 2015, Asarco filed an appeal of the stay in the Eighth Circuit Court of Appeals. NL has moved to dismiss that appeal as improperly filed. In October 2015, the Eighth Circuit Court of Appeals granted NL's motion to dismiss Asarco's appeal and the trial court's indefinite stay remains in place.

In July 2012, NL was served in EPEC Polymers, Inc., v. NL Industries, Inc., (United States District Court for the District of New Jersey, Case 3:12-cv-03842-PGS-TJB). The plaintiff, a landowner of property located across the Raritan River from our former Sayreville, New Jersey operation, claims that contaminants from NL's former Sayreville operation came to be located on its land. The complaint seeks compensatory and punitive damages and alleges, among other things, trespass, private nuisance, negligence, strict liability, and claims under CERCLA and the New Jersey Spill Act. In April 2016, the case was stayed and administratively terminated pending court-ordered mediation. If the mediation is unsuccessful, the case will become active, and we will continue to deny liability and defend vigorously against all of the claims.

In March 2013, NL received Special Notice from EPA for Operable Unit 1, residential area, at the Big River Mine Tailings Superfund Site in St. Francois County, Missouri. The site encompasses approximately eight former mine and mill areas, only one of which is associated with former NL operations, as well as adjacent residential areas. NL initiated a dialog with EPA regarding a potential settlement for this operable unit.

In September 2013, EPA issued to NL and 34 other PRPs general notice of potential liability and a demand for payment of past costs and performance of a Remedial Design for the Gowanus Canal Superfund Site in Brooklyn, New York. In March 2014, EPA issued a UAO to NL and approximately 27 other PRPs for performance of the Remedial Design at the site. EPA contends that NL is liable as the alleged successor to the Doehler Die Casting Company, and therefore responsible for any potential contamination at the Site resulting from Doehler's ownership/operation of a warehouse and a die casting plant it owned 90 years ago. NL believes that it has no liability at the Site. NL is currently in discussions with EPA regarding a de minimis settlement and is otherwise taking actions necessary to respond to the UAO. If these discussions are unsuccessful, NL will continue to deny liability and will defend vigorously against all of the claims.

In June 2016, NL and one other party received special notice from EPA for Operable Unit 2 of the Madison County Mines Superfund Site near Fredericktown, Missouri. The Site includes several mining properties in Madison County, Missouri. Operable Unit 2 is a former cobalt mine and refinery that is now owned by another mining company. In the special notice, EPA requested that NL and the other mining company agree to perform a Remedial Investigation/Feasibility Study for Operable Unit 2. NL initiated a dialog with EPA regarding the special notice.

In February 2017, the United States lodged a consent decree in United States v. NL Industries, Inc. (United States District Court, Western District of New York, Case No. 17-cv-124). The consent decree between NL and EPA is one of several consent decrees that will together resolve all private and government claims related to the NL Industries, Inc. Superfund Site in Depew, New York ("Depew Site"). In 2007, we completed the remediation of one area of the Depew Site under an Administrative Order on Consent. EPA later cleaned up another part of the site. In 2010, we filed a lawsuit, captioned NL Industries, Inc. v. ACF Industries, Inc. (United States District Court, Western District of New York, No. 10-cv-1989), seeking contribution from other responsible parties that contributed to the contamination at the site. In 2016, with all cleanups complete, NL, EPA, and the defendant responsible parties negotiated a global settlement. The consent decrees for this global settlement resolve all government and private party claims relating to the site, including those set forth in our lawsuit. The consent decree will become effective after it has been reviewed and officially entered by the court.

See also Item 1 "Regulatory and Environmental Matters" and Note 18 to our Consolidated Financial Statements.

Other—We have also accrued approximately $5.6 million at December 31, 2016 for other environmental cleanup matters. This accrual is near the upper end of the range of our estimate of reasonably possible costs for such matters.

Other Litigation

In addition to the matters described above, we and our affiliates are also involved in various other environmental, contractual, product liability, patent (or intellectual property), employment and other claims and disputes incidental to present and former businesses. In certain cases, we have insurance coverage for these items, although we do not expect additional material insurance coverage for environmental claims.

We currently believe that the disposition of all claims and disputes, individually or in the aggregate, should not have a material adverse effect on our consolidated financial position, results of operations or liquidity beyond the accruals already provided.

Insurance Coverage Claims

NL is involved in certain legal proceedings with a number of its former insurance carriers regarding the nature and extent of the carriers' obligations to NL under insurance policies with respect to certain lead pigment and asbestos lawsuits. The issue of whether insurance coverage for defense costs or indemnity or both will be found to exist for our lead pigment and asbestos litigation depends upon a variety of factors and we cannot assure you that such insurance coverage will be available.

NL has agreements with four former insurance carriers pursuant to which the carriers reimburse it for a portion of our future lead pigment litigation defense costs, and one such carrier reimburses us for a portion of its future asbestos litigation defense costs. We are not able to determine how much we will ultimately recover from these carriers for defense costs incurred by us because of certain issues that arise regarding which defense costs qualify for reimbursement. While NL continues to seek additional insurance recoveries, we do not know if it will be successful in obtaining reimbursement for either defense costs or indemnity. Accordingly, we recognize insurance recoveries in income only when receipt of the recovery is probable and we are able to reasonably estimate the amount of the recovery. See Note 18 to our Consolidated Financial Statements.

NL has settled insurance coverage claims concerning environmental claims with certain of its principal former carriers. We do not expect further material settlements relating to environmental remediation coverage.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

Common Stock and Dividends—Our common stock is listed and traded on the New York Stock Exchange (symbol: VHI). As of March 3, 2017, there were approximately 1,900 holders of record of our common stock. The following table sets forth the high and low closing per share sales prices for our common stock and dividends for the periods indicated. On March 3, 2017 the closing price of our common stock was $3.27.

	High	Low	Cash dividends paid
Year ended December 31, 2015			

First Quarter	$6.54	$5.31	$ .02
Second Quarter	7.10	5.66	.02
Third Quarter	5.31	1.89	.02
Fourth Quarter	2.81	1.21	.02
Year ended December 31, 2016			
First Quarter	$1.71	$.93	$ .02
Second Quarter	2.40	1.14	.02
Third Quarter	2.80	1.39	.02
Fourth Quarter	3.72	1.86	.02
First Quarter 2017 through March 6	$4.03	$3.01	$ —

We paid regular quarterly cash dividends of $.02 per share during 2015 and 2016. In March 2017, our board of directors declared a first quarter 2017 dividend of $.02 per share to be paid on March 23, 2017 to stockholders of record as of March 13, 2017. However, declaration and payment of future dividends, and the amount thereof, is discretionary and is dependent upon our results of operations, financial condition, cash requirements for our businesses, contractual or other requirements and restrictions and other factors deemed relevant by our Board of Directors. The amount and timing of past dividends is not necessarily indicative of the amount or timing of any future dividends which we might pay.

Performance Graph—Set forth below is a line graph comparing the yearly change in our cumulative total stockholder return on our common stock against the cumulative total return of the S&P 500 Composite Stock Price Index and the S&P 500 Industrial Conglomerates Index for the period from December 31, 2010 through December 31, 2016. The graph shows the value at December 31 of each year assuming an original investment of 100 at December 31, 2010, and assumes the reinvestment of our regular quarterly dividends in shares of our stock.

	December 31,					
	2011	2012	2013	2014	2015	2016
Valhi common stock	$100	$63	$89	$34	$7	$20
S&P 500 Composite Stock Price Index	100	116	154	175	177	198
S&P 500 Industrial Conglomerates Index	100	120	169	171	200	218

The information contained in the performance graph shall not be deemed “soliciting material” or “filed” with the SEC, or subject to the liabilities of Section 18 of the Securities Exchange Act, as amended, except to the extent we specifically request that the material be treated as soliciting material or specifically incorporate this performance graph by reference into a document filed under the Securities Act or the Securities Exchange Act.

Equity Compensation Plan Information—We have an equity compensation plan, which was approved by our stockholders, pursuant to which an aggregate of 200,000 shares of our common stock can be awarded to members of our board of directors. At December 31, 2016, an aggregate of 150,500 shares were available for future award under this plan. See Note 16 to our Consolidated Financial Statements.

Treasury Stock Purchases—In March 2005, our board of directors authorized the repurchase of up to 5.0 million shares of our common stock in open market transactions, including block purchases, or in privately negotiated transactions, which may include transactions with our affiliates. In November 2006, our board of directors authorized the repurchase of an additional 5.0 million shares. We may purchase the stock from time to time as market conditions permit. The stock repurchase program does not include specific price targets or timetables and may be suspended at any time. Depending on market conditions, we could terminate the program prior to completion. We will use our cash on hand to acquire the shares. Repurchased shares will be retired and cancelled or may be added to our treasury stock and used for employee benefit plans, future acquisitions or other corporate purposes. See Note 16 to our Consolidated Financial Statements.

ITEM 6. SELECTED FINANCIAL DATA

The following selected financial data has been derived from our audited Consolidated Financial Statements. The following selected financial data should be read in conjunction with our Consolidated Financial Statements and related Notes and Item 7—"Management's Discussion and Analysis of Financial Condition and Results of Operations."

	Years ended December 31,				
	2012	2013[1]	2014[1]	2015[1]	2016[1]
	(In millions, except per share data)				
STATEMENTS OF OPERATIONS DATA:					
Net sales:					
Chemicals	$1,976.3	$1,732.4	$1,651.9	$1,348.8	$1,364.3
Component products	83.2	92.0	103.9	109.0	108.9
Waste management	27.8	39.2	66.5	45.0	47.4
Real estate management and development[1]	—	—	40.3	30.1	46.2
Total net sales	$2,087.3	$1,863.6	$1,862.6	$1,532.9	$1,566.8
Operating income (loss):					
Chemicals	$366.8	$(125.4)	$156.8	$7.1	$91.0
Component products	5.4	9.3	13.6	14.0	15.6
Waste management	(26.8)	(22.6)	(2.2)	(26.5)	(26.2)
Real estate management and development[1]	—	—	2.0	—	.8
Total operating income (loss)	$345.4	$(138.7)	$170.2	$(5.4)	$81.2
Net income (loss)	$222.1	$(126.9)	$79.5	$(171.1)	$(3.0)
Amounts attributable to Valhi stockholders:					
Income (loss) from continuing operations	$141.4	$(98.0)	$53.8	$(133.6)	$(15.9)
Income from discontinued operations[2]	18.4	—	—	—	—
Net income(loss)	$159.8	$(98.0)	$53.8	$(133.6)	$(15.9)
DILUTED EARNINGS PER SHARE DATA:					
Net income (loss) attributable to Valhi stockholders:					
Income from continuing operations	$.41	$(.29)	$.16	$(.39)	$(.05)
Income (loss) from discontinued operations[2]	.06	—	—	—	—
Net income (loss)	$.47	$(.29)	$.16	$(.39)	$(.05)
Cash dividends	$.192	$.20	$.11	$.08	$.08
Weighted average common shares outstanding	342.0	342.0	342.0	342.0	342.0
STATEMENTS OF CASH FLOW DATA:					
Cash provided by (used in):					
Operating activities[3]	$78.1	$117.1	$67.3	$22.1	$79.8
Investing activities[3]	116.6	(40.8)	(73.7)	(54.1)	(61.6)
Financing activities[3]	89.8	(286.2)	110.2	(10.6)	(45.5)
BALANCE SHEET DATA (at year end):					
Total assets	$3,151.5	$2,951.7	$2,945.2	$2,537.4	$2,443.2
Long-term debt	876.5	741.7	919.7	951.0	957.2
Valhi stockholders' equity	733.6	601.3	477.6	268.7	200.9
Total equity	1,091.7	992.8	813.9	526.9	444.4

(1) In December 2013 we acquired a controlling interest in BMI, Inc. and The LandWell Company and they are included in our Consolidated Balance Sheet beginning at December 31, 2013, and in our Consolidated Statement of Operations beginning January 1, 2014.

(2) In 2012, CompX sold its furniture components operations for a gain, net of income taxes and noncontrolling interest, of $15.7 million, which is included in discontinued operations.

(3) Prior period amounts have been reclassified to reflect the change in the statement of cash flow classification of amounts paid in respect of the early redemption of certain indebtedness. As a result, net cash provided by operating activities for the year ended December 31, 2012 increased by $6.2 million, and net cash provided by financing activities decreased by $6.2 million, as compared to previously reported amounts. In addition, prior period amounts have been reclassified to reflect the change in the statement of cash flow presentation with respect to restricted cash and cash equivalents. As a result, net cash provided by investing activities for the year ended December 31, 2012 increased by $15.7 million, and net cash used in investing activities for the years ended December 31, 2013, 2014 and 2015 increased (decreased) by $(15.4) million, $18.6 million and $(2.9) million, respectively, in each case as compared to previously reported amounts. See Note 20 to our Consolidated Financial Statements.

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

RESULTS OF OPERATIONS

Business Overview

We are primarily a holding company. We operate through our wholly-owned and majority-owned subsidiaries, including NL Industries, Inc., Kronos Worldwide, Inc., CompX International, Inc., Waste Control Specialists LLC ("WCS"), Tremont LLC, Basic Management, Inc. ("BMI") and the LandWell Company ("LandWell"). Kronos (NYSE: KRO), NL (NYSE: NL) and CompX (NYSE MKT: CIX) each file periodic reports with the SEC.

We have four consolidated reportable operating segments:

- Chemicals—Our chemicals segment is operated through our majority control of Kronos. Kronos is a leading global producer and marketer of value-added titanium dioxide pigments ("TiO_2"). TiO_2 is used to impart whiteness, brightness, opacity and durability to a wide variety of products, including paints, plastics, paper, fibers and ceramics. Additionally, TiO_2 is a critical component of everyday applications, such as coatings, plastics and paper, as well as many specialty products such as inks, foods and cosmetics.
- Component Products—We operate in the component products industry through our majority control of CompX. CompX is a leading manufacturer of security products used in the recreational transportation, postal, office and institutional furniture, cabinetry, tool storage, healthcare and a variety of other industries. CompX is also a leading manufacturer of stainless steel exhaust systems, gauges, throttle controls and trim tabs for the recreational marine industry.
- Waste Management—WCS is our subsidiary which operates a West Texas facility for the processing, treatment, storage and disposal of a broad range of low-level radioactive, hazardous, toxic and other wastes. WCS obtained a byproduct disposal license in 2008 and began disposal operations at this facility in 2009. WCS received a low-level radioactive waste ("LLRW") disposal license in 2009. The Compact LLRW disposal facility commenced operations in 2012, and the Federal LLRW site commenced operations in 2013. We reached an agreement to sell our Waste Management Segment in November 2015, which sale is subject to certain customary closing conditions, including the receipt of U.S. antitrust approval. See Note 3 to our Consolidated Financial Statements.
- Real Estate Management and Development—We operate in real estate management and development through our majority control of BMI and LandWell. BMI provides utility services to certain industrial and municipal customers and owns real property in Henderson, Nevada. LandWell is engaged in efforts to develop certain land holdings for commercial, industrial and residential purposes in Henderson, Nevada.

Income (Loss) from Operations Overview

Year Ended December 31, 2015 Compared to Year Ended December 31, 2016—

We reported a net loss attributable to Valhi stockholders of $15.9 million or $.05 per diluted share in 2016 compared to a net loss attributable to Valhi stockholders of $133.6 million or $.39 per diluted share in 2015.

Our net loss attributable to Valhi stockholders decreased from 2015 to 2016 primarily due to the net effects of:

- the recognition of an aggregate $159.0 million non-cash deferred income tax asset valuation allowance related to our Chemicals Segment's German and Belgian operations primarily in the second quarter of 2015;
- higher operating income from our Chemicals Segment in 2016 compared to 2015, in part due to a charge associated with the implementation of certain workforce reductions primarily in the second quarter of 2015;
- transaction costs related to the proposed sale of our Waste Management Segment; and

- higher insurance recoveries in 2015.

Our diluted loss per share attributable to Valhi stockholders in 2016 includes:

- a recognition of a net $.01 per diluted share current income tax benefit related to the execution and finalization of an Advanced Pricing Agreement associated with our Chemicals Segment;
- income of $.01 per diluted share related to business interruption insurance proceeds in our Chemicals Segment.

- a charge of $.01 per diluted share related to the contract related intangible asset impairment;
- a charge of $.01 per diluted share for transaction costs related to the proposed sale of our Waste Management Segment; and
- an aggregate non-cash income tax expense of $.02 (mostly in the fourth quarter) related to a net increase in our reserve for uncertain tax positions

Our diluted loss per share attributable to Valhi stockholders in 2015 includes:

- the recognition of the non-cash deferred income tax asset valuation allowance related to our Chemicals Segment's German and Belgian operations aggregating a charge of $.27;
- a charge of $.03 related to our Chemicals Segment's accrued workforce reduction costs; and
- income of $.01 related to income from insurance recoveries.

We discuss these amounts more fully below.

Year Ended December 31, 2014 Compared to Year Ended December 31, 2015—

We reported a net loss attributable to Valhi stockholders of $133.6 million or $.39 per diluted share in 2015 compared to net income attributable to Valhi stockholders of $53.8 million or $.16 per diluted share in 2014.

Our net income (loss) attributable to Valhi stockholders decreased from 2014 to 2015 primarily due to the net effects of:

- the recognition of an aggregate $159.0 million non-cash deferred income tax asset valuation allowance related to our Chemicals Segment's German and Belgian operations primarily in the second quarter of 2015;
- lower operating income from our Chemicals Segment in 2015 compared to 2014, in part due to a charge associated with the implementation of certain workforce reductions primarily in the second quarter of 2015;
- higher operating losses at our Waste Management segment in 2015; and
- higher insurance recoveries in 2014.

Our diluted loss per share attributable to Valhi stockholders in 2015 includes:

- the recognition of the non-cash deferred income tax asset valuation allowance related to our Chemicals Segment's German and Belgian operations aggregating a charge of $.27;
- a charge of $.03 related to our Chemicals Segment's accrued workforce reduction costs; and
- income of $.01 related to income from insurance recoveries.

Our diluted earnings per share attributable to Valhi stockholders in 2014 includes:

- an aggregate non-cash income tax benefit of $.01 (mostly in the second quarter) related to a net reduction in our reserve for uncertain tax positions; and
- insurance recoveries of $.03.

We discuss these amounts more fully below.

Current Forecast for 2017—

We currently expect to report higher net income attributable to Valhi stockholders for 2017 as compared to 2016 primarily due to the net effects of:

- higher operating income from our Chemicals Segment in 2017 as compared to an operating loss in 2016, principally as a result of expected higher average selling prices in 2017 as compared to 2016 and to a lesser extent from the favorable effects of anticipated higher production volumes in 2017; and
-

lower operating income from our Component Products Segment as we anticipate lower security product sales due to the completion of a large contract during 2016.

In addition, if the positive trend in our Chemicals Segment's German operating results experienced during 2016 continues during 2017, and we continue to reflect cumulative income in the most recent twelve consecutive quarters for our Chemicals Segment's German operation such that the sustainability of such positive trend in earnings would then be demonstrated, it is possible our net deferred income tax asset with respect to our Chemicals Segment's German operations could meet the more-likely-than-not recognition criteria sometime during 2017, at which time we would reverse the deferred income tax asset valuation allowance related to our Chemicals Segment's German operations, resulting in the recognition of a material non-cash income tax benefit.

Critical accounting policies and estimates

We have based the accompanying "Management's Discussion and Analysis of Financial Condition and Results of Operations" upon our Consolidated Financial Statements. We prepare our Consolidated Financial Statements in accordance with accounting principles generally accepted in the United States of America ("GAAP"). In many cases the accounting treatment of a particular transaction does not require us to make estimates and judgments. However, in other cases we are required to make estimates and judgments that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reported period. On an on-going basis, we evaluate our estimates, including those related to impairments of investments in marketable securities and investments accounted for by the equity method, the recoverability of other long-lived assets (including goodwill and other intangible assets), pension and other postretirement benefit obligations and the underlying actuarial assumptions related thereto, the realization of deferred income and other tax assets and accruals for environmental remediation, litigation, income tax contingencies. We base our estimates on historical experience and on various other assumptions we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the reported amounts of assets, liabilities, revenues and expenses. Actual results might differ significantly from previously-estimated amounts under different assumptions or conditions.

Our "critical accounting policies" relate to amounts having a material impact on our financial position and results of operations, and that require our most subjective or complex judgments. See Note 1 to our Consolidated Financial Statements for a detailed discussion of our significant accounting policies.

- Marketable securities—We own investments in certain companies that we account for as marketable securities carried at fair value or that we account for under the equity method. For these investments, we evaluate the fair value at each balance sheet date. We use quoted market prices, Level 1 inputs as defined in Accounting Standards Codification ("ASC") 820-10-35, Fair Value Measurements and Disclosures, to determine fair value for certain of our common stock, marketable debt securities and publicly traded investees. For other of our marketable debt securities, the fair value is generally determined using Level 2 inputs as defined in the ASC because although these securities are traded in many cases the market is not active and the year-end valuation is based on the last trade of the year which may be several days prior to December 31. We use Level 3 inputs to determine fair value of our investment in Amalgamated Sugar Company LLC. See Note 6 to our Consolidated Financial Statements. We record an impairment charge when we believe an investment has experienced an other than temporary decline in fair value below its cost basis (for marketable securities) or below its carrying value (for equity method investees). Further adverse changes in market conditions or poor operating results of underlying investments could result in losses or our inability to recover the carrying value of the investments that may not be reflected in an investment's current carrying value, thereby possibly requiring us to recognize an impairment charge in the future.

At December 31, 2016, the carrying value (which equals their fair value) of substantially all of our marketable securities approximated the cost basis of each investment. Our investment in The Amalgamated Sugar Company LLC represents approximately 97% of the aggregate carrying value of all of our marketable securities at December 31, 2016 and its $250 million carrying value is equal to its cost basis.

- Goodwill—Our net goodwill totaled $379.7 million at December 31, 2016 resulting primarily from our various step acquisitions of Kronos and NL (which occurred before the implementation of the current accounting standards related to noncontrolling interest) and to a lesser extent CompX's purchase of various businesses. In accordance with the applicable accounting standards for goodwill, we do not amortize goodwill.

We perform a goodwill impairment test annually in the third quarter of each year. Goodwill is also evaluated for impairment at other times whenever an event occurs or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying value. A reporting unit can be a segment or an operating division based on the operations of the segment. For example, our Chemicals Segment produces a globally coordinated homogeneous product whereas our Component Products Segment operates as two distinct business units. If the fair value of the reporting unit is less than its book value, the goodwill is written down to estimated fair value.

For our Chemicals Segment, we use Level 1 inputs of publicly traded market prices to compare the book value to assess impairment. We also consider control premiums when assessing fair value. Substantially all of the goodwill for our Component Products Segment relates to our security products reporting unit. Since 2013, we have used the qualitative assessment of ASC 350-20-35 for our annual impairment test of our security products reporting unit; one of the requirements for the permitted use of a qualitative assessment is that a quantitative assessment must be performed periodically, and we used the quantitative assessment of ASC 350-20-35 for our 2016 annual impairment test to estimate the fair value of the security products reporting unit, using Level 3 inputs of a discounted cash flow technique since Level 1 or Level 2 inputs of market prices were not available.

We performed our annual goodwill impairment test in the third quarter of 2016 for each of our reporting units and concluded there was no impairment of the goodwill for those reporting units. The impairment test as it relates to our security products reporting unit was based on our quantitative test. No goodwill impairment was deemed to exist as a result of such 2016 annual impairment review, as the estimated fair value of our security products reporting unit was in excess of its net carrying amount. Considerable management judgment is necessary to evaluate the qualitative impact of events and circumstances on the fair value of a reporting unit. Events and circumstances considered in our impairment evaluations, such as historical profits and stability of the markets served, are consistent with factors utilized with our internal projections and operating plan. However, future events and circumstances could result in materially different findings which could result in the recognition of a material goodwill impairment.

When we performed our annual goodwill impairment test in the third quarter of 2016 for our Chemicals Segment goodwill we concluded there was no impairment of such goodwill. However, future events and circumstances could change (i.e. a significant decline in quoted market prices) and result in a materially different finding which could result in the recognition of a material impairment with respect to such goodwill.

- Long-lived assets—We assess our long-lived assets, consisting principally of property, equipment, land held for development and capitalized operating permit costs for impairment only when circumstances as specified in ASC 360-10-35, Property, Plant, and Equipment, indicate an impairment may exist. As a result of continued operating losses, certain long-lived assets of our Waste Management Segment were evaluated for impairment as of December 31, 2016. WCS has had limited operations as it sought regulatory approval for several licenses it needs for full scale operations. WCS began byproduct disposal operations in 2009, Compact LLRW disposal operations in. 2012, and Federal LLRW disposal operations in mid-2013. Notwithstanding the commencement of operations at each of its disposal facilities, WCS recognized an operating loss in every year because WCS has been unable to achieve sufficient revenues to offset the high cost structure associated with operating under its byproduct and LLRW disposal licenses relative to the waste treatment and disposal volume, in part because WCS has never consistently received sufficient volume of LLRW for disposal in both our Compact and Federal LLRW disposal facilities to overcome its fixed operating cost structure. As noted in Note 3 to our Consolidated Financial Statements we reached an agreement to sell our Waste Management Segment in November 2015. The agreement, as amended, provides for cash consideration to us of $270 million and the assumption of all of WCS' third-party indebtedness incurred prior to the date of the agreement. Such third-party consideration is in excess of the carrying amount of WCS' total assets at December 31, 2016. Our long-lived asset impairment analysis primarily considered the consideration to be received in the pending sale of WCS, and to a lesser extent the estimated future undiscounted cash flows of WCS' operations. With respect to such estimated future undiscounted cash flows of WCS' operations, considerable management judgment is necessary to evaluate the impact of future operating changes and to estimate future cash flows. Assumptions used in our impairment evaluations, such as the timing and amounts of revenue associated with our LLRW facilities and forecasted sales proceeds, are consistent with our internal projections and operating plans. We concluded no impairment was present at December 31, 2016 with respect to WCS' long-lived assets because the consideration to be received in the pending sale of WCS in relation to the carrying value of WCS' assets indicates that such carrying value is recoverable. However, if the pending sale of WCS were not to be successfully closed, it is reasonably possible we would conclude an impairment was present with respect to WCS' long-lived assets. At December 31, 2016 the carrying value of WCS' total assets was $228.6 million, including long-lived assets aggregating $181.4 million.

- Except as noted below, no other long-lived assets in our other reporting units were tested for impairment during 2016 because there were no circumstances indicating an impairment might exist.

- Intangible assets— Upon acquiring a controlling interest in our Real Estate Management and Development segment in December 2013, we recognized an indefinite-lived customer relations intangible asset of $5.1 million for long-term contracts related to water delivery services to the City of Henderson, Nevada and various other users through a water system owned by BMI. These contracts generally span many years and feature automatic renewing provisions. The City of Henderson water delivery contract extended for a period of 25 years, and contained an automatic renewal provision. In assessing the intangible asset for impairment, we first perform a qualitative analysis to determine whether it is more likely than not that the intangible asset has been impaired, using the guidance specified in ASC 305-30-35. If after assessing the totality of events and circumstances and their potential effect on significant inputs to the fair value determination, an entity determines that it is not more likely than not that the indefinite-lived intangible asset is impaired, then the entity need not calculate the fair value of the intangible asset and perform the quantitative impairment test in accordance with paragraph 350-30-35-19. Based on all relevant events and circumstances considered, we concluded it was not more likely than not that the intangible asset was impaired at December 31, 2015, and accordingly we were not required to perform a quantitative impairment analysis. In January 2016, the water delivery contract with the City of Henderson was amended. As part of such amendment, required minimum volumes were reduced, pricing was lowered, the automatic renewal provision of the contract was eliminated, and the contract term now runs through June 2040. The amendment to the City of Henderson water delivery contract represents an event or circumstance which triggered the need to perform a quantitative impairment analysis with respect to the intangible asset in the first quarter of 2016, in accordance with the guidance in ASC 350-30-35. Accordingly, as a result of a quantitative impairment analysis performed in the first quarter of 2016 we concluded that the $5.1 million contract related intangible asset primarily related to the City of Henderson water delivery contract was fully impaired as a result of the amended contract (with its reduced minimum volumes and lower pricing), and we recognized an aggregate $5.1 million contract related intangible impairment loss in the first quarter of 2016. We have no other significant intangible assets.
- Percentage completion revenue recognition—Certain real estate land sales by our Real Estate Management and Development segment (generally land sales associated with our residential/planned community) require us to complete property development and improvements after title passes to the buyer and we have received all or a substantial portion of the selling price. To date, all of the land sales associated with the residential/planned community have been recognized under the percentage-of-completion method of accounting in accordance with ASC 970-605-30. Under such method, revenues and profits are recognized in the same proportion of our progress towards completion of our contractual obligations, with our progress measured by costs incurred as a percentage of total costs estimated to be incurred. Such costs incurred and total estimated costs include amounts specifically identifiable with the parcels sold as well as certain development costs for the entire residential/planned community which are allocated to the parcels sold under applicable GAAP. Estimates of total costs expected to be incurred require significant management judgment, and the amount of revenue and profits that have been recognized to date are subject to revisions throughout the development period. The impact on the amount of revenue recognized resulting from any future change in the estimate of total costs estimated to be incurred would be accounted for prospectively in accordance with GAAP.
- Benefit plans—We provide a range of benefits including various defined benefit pension and other postretirement benefits (“OPEB”) for our employees. We record annual amounts related to these plans based upon calculations required by GAAP, which make use of various actuarial assumptions, such as: discount rates, expected rates of returns on plan assets, compensation increases, employee turnover rates, expected mortality rates and expected health care trend rates. We review our actuarial assumptions annually and make modifications to the assumptions based on current rates and trends when we believe appropriate. As required by GAAP, modifications to the assumptions are generally recorded and amortized over future periods. Different assumptions could result in the recognition of materially different expense amounts over different periods of times and materially different asset and liability

amounts in our Consolidated Financial Statements. These assumptions are more fully described below under "—Assumptions on Defined Benefit Pension Plans and OPEB Plans."

• Income taxes—We recognize deferred taxes for future tax effects of temporary differences between financial and income tax reporting. Deferred income tax assets and liabilities for each tax-paying jurisdiction in which we operate are netted and presented as either a noncurrent deferred tax asset or liability, as applicable. We record a valuation allowance to reduce our deferred income tax assets to the amount that is believed to be realized under the more-likely-than-not recognition criteria. While we have considered future taxable income and ongoing prudent and feasible tax planning strategies in assessing the need for a valuation allowance, it is possible that we may change our estimate of the amount of the deferred income tax assets that would more-likely-than-not be realized in the future, resulting in an adjustment to the deferred income tax asset valuation allowance that would either increase or decrease, as applicable, reported net income in the period such change in estimate was made.

For example, at December 31, 2016 our Chemicals Segment has substantial net operating loss (NOL) carryforwards in Germany (the equivalent of $638 million for German corporate purposes and $71 million for German trade tax purposes) and in Belgium (the equivalent of $93 million for Belgian corporate tax purposes), all of which have an indefinite carryforward period. As a result, we have net deferred income tax assets with respect to these two jurisdictions, primarily related to these NOL carryforwards. The German corporate tax is similar to the U.S. federal income tax, and the German trade tax is similar to the U.S. state income tax. As more fully described below under "General Corporate Items, Interest Expense, Provision for Income Taxes (Benefit), Noncontrolling Interest and Related Party Transactions – Income tax expense (benefit)" at December 31, 2016 we have a deferred income tax asset valuation allowance recognized with respect to such net deferred income tax assets of our Belgian and German operations.

We record a reserve for uncertain tax positions where we believe it is more-likely-than-not our tax positions will not prevail with the applicable tax authorities. It is possible that in the future we may change our assessment regarding the probability that our tax positions will prevail that would require an adjustment to the amount of our reserve for uncertain tax positions that could either increase or decrease, as applicable, reported net income in the period the change in assessment was made.

In addition, we evaluate at the end of each reporting period as to whether or not some or all of the undistributed earnings of our non-U.S. subsidiaries are permanently reinvested (as that term is defined in GAAP). While we may have concluded in the past that some of such undistributed earnings are permanently reinvested, facts and circumstances can change in the future and it is possible that a change in facts and circumstances, such as a change in the expectation regarding the capital needs of our non-U.S. subsidiaries or a change in tax law, could result in a conclusion that some or all of such undistributed earnings are no longer permanently reinvested. In such an event, we would be required to recognize a deferred income tax liability in an amount equal to the estimated incremental U.S. income tax and withholding tax liability that would be generated if all of such previously-considered permanently reinvested undistributed earnings were to be distributed to the U.S.

Litigation and environmental liabilities—We are involved in numerous legal and environmental actions in part due to NL's former involvement in the manufacture of lead-based products. In accordance with applicable GAAP for accounting for contingencies, we record accruals for these liabilities when estimated future expenditures associated with such contingencies become probable, and we can reasonably estimate the amounts of such future expenditures. However, new information may become available to us, or circumstances (such as applicable laws and regulations) may change, thereby resulting in an increase or decrease in the amount we are required to accrue for such matters (and therefore a decrease or increase in our reported net income in the period of such change). At December 31, 2016 we have recorded total accrued environmental liabilities of $122.6 million.

Operating income (loss) for each of our four operating segments is impacted by certain of these significant judgments and estimates, as summarized below:

- Chemicals—allowance for doubtful accounts, reserves for obsolete or unmarketable inventories, impairment of equity method investments, goodwill and other long-lived assets, benefit plans; and loss accruals.
- Component Products—impairment of goodwill and long-lived assets and loss accruals.
- Waste Management—impairment of long-lived assets and loss accruals.
- Real Estate Management and Development—impairment of long-lived assets and revenue recognition under the percentage-of-completion method of accounting.

In addition, general corporate and other items are impacted by the significant judgments and estimates for impairment of marketable securities and equity method investees, defined benefit pension and OPEB plans, and loss accruals.

Segment Operating Results—2015 Compared to 2016 and 2014 Compared to 2015

Chemicals—

We consider TiO_2 to be a "quality of life" product, with demand affected by gross domestic product, or GDP, and overall economic conditions in our markets located in various regions of the world. Over the long-term, we expect demand for TiO_2 will grow by 2% to 3% per year, consistent with our expectations for the long-term growth in GDP. However, even if we and our competitors maintain consistent shares of the worldwide market, demand for TiO_2 in any interim or annual period may not change in the same proportion as the change in GDP, in part due to relative changes in the TiO_2 inventory levels of our customers. We believe that our customers' inventory levels are influenced in part by their expectation for future changes in market TiO_2 selling prices as well as their expectation for future availability of product. Although certain of our TiO_2 grades are considered specialty pigments, the majority of our grades and substantially all of our production are considered commodity pigment products with price and availability being the most significant competitive factors along with quality and customer service.

The factors having the most impact on our reported operating results are:

- TiO_2 selling prices,
- Our TiO_2 sales and production volumes,
- Manufacturing costs, particularly raw materials such as third-party feedstock ore, maintenance and energy-related expenses, and
- Currency exchange rates (particularly the exchange rate for the U.S. dollar relative to the euro, the Norwegian krone and the Canadian dollar).

Our key performance indicators are our TiO_2 average selling prices, our level of TiO_2 sales and production volumes and the cost of our third-party feedstock ore. TiO_2 selling prices generally follow industry trends and the selling prices will increase or decrease generally as a result of competitive market pressures.

	Years ended December 31,			% Change	
	2014	2015	2016	2014-15	2015-16
	(Dollars in millions)				
Net sales	$1,651.9	$1,348.8	$1,364.3	(18)%	1 %
Cost of sales	1,304.6	1,158.5	1,109.2	(11)%	(4)%
Gross margin	$347.3	$190.3	$255.1	(45)%	34 %
Operating income (loss)	$156.8	$7.1	$91.0	(95)%	1,185 %
Percent of net sales:					
Cost of sales	79 %	86 %	81 %		
Gross margin	21 %	14 %	19 %		
Operating income (loss)	9 %	1 %	7 %		
TiO_2 operating statistics:					
Sales volumes*	496	525	559	6 %	7 %
Production volumes*	511	528	546	3 %	3 %
Production rate as percent of capacity	92 %	95 %	98 %		
Percent change in TiO_2 net sales:					
TiO_2 product pricing				(14)%	(3)%
TiO_2 sales volumes				6	7
TiO_2 product mix				(2)	(2)
Changes in currency exchange rates				(8)	(1)
Total				(18)%	1 %

*Thousands of metric tons

Industry conditions and 2016 overview – Due to competitive pressures, our Chemicals Segment's average selling prices decreased throughout 2015 and, to a much lesser extent, into the first quarter of 2016. Our Chemicals Segment's average selling prices at the beginning of 2016 were 17% lower as compared to the beginning of 2015. In the second quarter of 2016, our average selling prices began to rise due to the successful implementation of previously-announced price increases and average selling prices continued to rise through the remainder of 2016. Our Chemicals Segment's average selling prices at the end of 2016 were 10% higher than at the end of 2015, with higher prices in all major markets, most notably in export markets. We experienced higher sales volumes in North American, European and export markets in 2016 as compared to 2015, partially offset by lower sales volumes in the Latin American market in 2016 as compared to 2015.

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The following table shows our capacity utilization rates during 2015 and 2016.

	2015	2016
First Quarter	93 %	97 %
Second Quarter	100 %	95 %
Third Quarter	95 %	100 %
Fourth Quarter	92 %	100 %
Overall	95 %	98 %

Our Chemicals Segment's production rates in the first and fourth quarters of 2015 were impacted by the implementation of certain productivity-enhancing improvement projects at certain facilities, as well as necessary improvements to ensure continued compliance with our permit regulations, which resulted in longer-than-normal maintenance shutdowns in some instances.

We continued to experience moderation in the cost of TiO_2 feedstock ore procured from third parties in 2015 and 2016. Our cost of sales per metric ton of TiO_2 sold declined throughout 2015 and 2016 due to the moderation in the cost of TiO_2 feedstock and the cost savings achieved from the 2015 implementation of a restructuring plan discussed below. Consequently, our cost of sales per metric ton of TiO_2 sold in 2016 was slightly lower than our cost of sales per metric ton of TiO_2 sold in 2015 (excluding the effect of changes in currency exchange rates).

In the second quarter of 2015, we initiated a restructuring plan designed to improve our long-term cost structure. A portion of such expected cost savings are planned to occur through workforce reductions. During the second, third and fourth quarters of 2015, we implemented certain voluntary and involuntary workforce reductions at certain of our facilities impacting approximately 160 individuals. We recognized an aggregate $21.7 million charge in 2015 (substantially all of which was recognized in the second quarter) for such workforce reductions we had implemented through December 31, 2015, $10.8 million of which is classified as part of cost of sales and $10.9 million of which is classified in selling, general and administrative expense. The charge associated with the workforce reductions implemented in the third and fourth quarters of 2015, which impacted approximately 50 individuals, was not material due to the applicable law affecting such individuals, which generally provides for a short notice period (if any) and the payment of a nominal amount of severance (if any). See Note 13 to our Consolidated Financial Statements.

Net Sales—Our Chemicals Segment's net sales increased 1% or $15.5 million in 2016 compared to 2015, primarily due to the net effect of a 7% increase in sales volumes (which increased net sales by approximately $94 million) and a 3% decrease in average TiO_2 selling prices (which decreased net sales by approximately $40 million). TiO_2 selling prices will increase or decrease generally as a result of competitive market pressures, changes in the relative level of supply and demand as well as changes in raw material and other manufacturing costs.

Our Chemicals Segment's sales volumes increased primarily due to higher sales in North American, European and export markets partially offset by lower sales in the Latin American market. Our sales volumes in 2016 set a new overall record for a full-year period. We estimate that changes in currency exchange rates decreased our net sales by approximately $9 million, or 1%, as compared to 2015.

Our Chemicals Segment's net sales decreased 18% or $303.1 million in 2015 compared to 2014, primarily due to the net effect of a 14% decrease in average TiO_2 selling prices (which decreased net sales by approximately $231 million) and a 6% increase in sales volumes (which increased net sales by approximately $99 million). TiO_2 selling prices will increase or decrease generally as a result of competitive market pressures, changes in the relative level of supply and demand as well as changes in raw material and other manufacturing costs.

Our Chemicals Segment's sales volumes increased primarily due to higher sales in certain European and export markets, partially offset by lower sales in North American markets. We estimate that changes in currency exchange rates decreased our net sales by approximately $138 million, or 8%, as compared to 2014.

Cost of Sales—Our Chemicals Segment's cost of sales decreased $49.3 million or 4% in 2016 compared to 2015 due to the net impact of lower raw materials and other production costs of approximately $76 million (primarily caused by the lower third-party feedstock ore costs, as discussed above), approximately $4.6 million in savings resulting from workforce reductions implemented in 2015, a 3% increase in TiO_2 production volumes and currency fluctuations (primarily the euro). In addition, cost of sales in 2015 includes approximately $10.8 million of severance costs related to the workforce reduction plan discussed above.

Our Chemicals Segment's cost of sales as a percentage of net sales decreased to 81% in 2016 compared to 86% in 2015, as the favorable effects of lower raw materials and other production costs, efficiencies related to higher production volumes, and the impact of the $10.8 million workforce reduction charge classified in cost of sales in 2015 and associated cost savings from such workforce reduction realized in 2016 more than offset the unfavorable impact of lower average selling prices, as discussed above.

Our Chemicals Segment's cost of sales decreased $146.1 million or 11% in 2015 compared to 2014 due to the net impact of lower raw materials and other production costs of approximately $26 million (primarily caused by the lower third-party feedstock ore costs, as discussed above), a 3% increase in TiO_2 production volumes and currency fluctuations (primarily the euro). In addition, cost of sales in 2015 includes approximately $10.8 million of severance costs related to the workforce reduction plan discussed above.

Our cost of sales as a percentage of net sales increased to 86% in 2015 compared to 79% in 2014, as the unfavorable impact of lower average selling prices and the workforce reduction charge more than offset the favorable effects of lower raw material costs and efficiencies related to higher production volumes, as discussed above.

Gross Margin and Operating Income—Our Chemicals Segment's operating income as a percentage of net sales increased to 7% in 2016 from 1% in 2015. This increase was driven by the increase in gross margin, which increased to 19% in 2016 compared to 14% in 2015, as well as the impact of the $10.9 million 2015 workforce reduction charge classified in selling, general and administrative expense and the associated cost savings from such workforce reductions realized in 2016 of $5.6 million, and the income aggregating $4.3 million related to insurance settlement gains from two separate business interruption claims. As discussed and quantified above, our gross margin increased primarily due to the net effect of lower selling prices, lower raw material and other production costs (including 2015 workforce reduction charges of $10.8 million classified as cost of sales and the associated $4.6 million of cost savings from such workforce reduction realized in 2016), higher sales volumes and higher production volumes. We estimate that changes in currency exchange rates increased income from operations by approximately $14 million in 2016 as compared to 2015.

Our Chemicals Segment's operating income as a percentage of net sales decreased to 1% in 2015 from 9% in 2014. This decrease was driven by the decline in gross margin, which decreased to 14% in 2015 compared to 21% in 2014, as well as the negative impact of the workforce reduction charge classified as part of other operating expense ($10.9 million). As discussed and quantified above, our gross margin decreased primarily due to the net effect of lower selling prices, workforce reduction costs classified as part of cost of sales ($10.8 million), lower manufacturing costs (primarily raw materials), higher production volumes, and higher sales volumes. We estimate that changes in currency exchange rates increased operating income by approximately $40 million in 2015 as compared to 2014.

Our Chemicals Segment's operating income (loss) is net of amortization of purchase accounting adjustments made in conjunction with our acquisitions of interests in NL and Kronos. As a result, we recognize additional depreciation expense above the amounts Kronos reports separately, substantially all of which is included within cost of sales. We recognized additional depreciation expense of $2.6 million in 2014, $2.2 million in 2015 and $2.1 million in 2016, which reduced our reported Chemicals Segment's operating income (loss) as compared to amounts reported by Kronos.

Currency Exchange Rates—— Our Chemicals Segment has substantial operations and assets located outside the United States (primarily in Germany, Belgium, Norway and Canada). The majority of our sales from non-U.S. operations are denominated in currencies other than the U.S. dollar, principally the euro, other major European currencies and the Canadian dollar. A portion of our sales generated from our non-U.S. operations is denominated in the U.S. dollar (and consequently our non-U.S. operations will generally hold U.S. dollars from time to time). Certain raw materials used worldwide, primarily titanium-containing feedstocks, are purchased in U.S. dollars, while labor and other production and administrative costs are incurred primarily in local currencies. Consequently, the translated U.S. dollar value of our non-U.S. sales and operating results are subject to currency exchange rate fluctuations which may favorably or unfavorably impact reported earnings and may affect the comparability of period-to-period operating results. In addition to the impact of the translation of sales and expenses over time, our non-U.S. operations also generate currency transaction gains and losses which primarily relate to (i) the difference between the currency exchange rates in effect when non-local currency sales or operating costs (primarily U.S. dollar denominated) are initially accrued and when such amounts are settled with the non-local currency, (ii) changes in currency exchange rates during time periods when our non-U.S. operations are holding non-local currency (primarily U.S. dollars), and (iii) relative changes in the aggregate fair value of currency forward contracts held from time to time. As discussed in Note 19 to our Consolidated Financial Statements, we periodically use currency forward contracts to manage a portion of our currency exchange risk, and relative changes in the aggregate fair value of any currency forward contracts we hold from time to time serves in part to mitigate the currency transaction gains or losses we would otherwise recognize from the first two items described above.

Overall, we estimate that fluctuations in currency exchange rates had the following effects on the reported amounts of our sales and operating income (loss) for the periods indicated.

Impact of changes in currency exchange rates - 2016 vs. 2015

	Transaction gains recognized			Translation gain/loss- impact of rate changes	Total currency impact 2016 vs. 2015
	2015	2016	Change		
			(In millions)		
Impact on:					
Net sales	$-	$ -	$ -	$ (9)	$ (9)
Income from operations	-	6	6	8	14

The $9 million reduction in our Chemicals Segment's net sales (translation loss) was caused primarily by a strengthening of the U.S. dollar relative to the euro, as our euro-denominated sales were translated into fewer U.S. dollars in 2016 as compared to 2015. The strengthening of the U.S. dollar relative to the Canadian dollar and the Norwegian krone in 2016 did not have a significant effect on the reported amount of our Chemicals Segment's net sales, as a substantial portion of the sales generated by our Chemicals Segment's Canadian and Norwegian operations are denominated in the U.S. dollar.

The $14 million increase in income from operations was comprised of the following:

- Approximately $6 million from net currency transaction gains primarily caused by a strengthening of the U.S. dollar relative to the euro, Norwegian krone and Canadian dollar, as U.S. dollar-denominated receivables and U.S. dollar currency held by our non-U.S. operations became equivalent to a greater amount of local currency in 2016 as compared to 2015, and
- Approximately $8 million from net currency translation gains caused primarily by a strengthening of the U.S. dollar relative to the Canadian dollar and the Norwegian krone, as their local currency-denominated operating costs were translated into fewer U.S. dollars in 2016 as compared to 2015, (and such translation, as it related to the U.S. dollar relative to the euro, had a negative effect on income from operations in 2016 as compared to 2015, as the negative impact of the stronger U.S. dollar on euro-denominated sales more than offset the favorable effect of euro-denominated operating costs being translated into fewer U.S. dollars in 2016 compared to 2015).

Impact of changes in currency exchange rates - 2015 vs. 2014

	Transaction gains/(losses) recognized			Translation gain/loss- impact of rate changes	Total currency impact 2015 vs. 2014
	2014	2015	Change		
	(in millions)				
Impact on:					
Net sales	$ —	$ —	$ —	$ (138)	$ (138)

Operating income	4	—	(4)	44	40

The $138 million reduction in net sales (translation loss) was caused primarily by a strengthening of the U.S. dollar relative to the euro, as our Chemicals Segment's euro-denominated sales were translated into fewer U.S. dollars in 2015 as compared to 2014. The strengthening of the U.S. dollar relative to the Canadian dollar and the Norwegian krone in 2015 did not have a significant effect on the reported amount of our net sales, as a substantial portion of the sales generated by our Chemicals Segment's Canadian and Norwegian operations are denominated in the U.S. dollar.

The $40 million increase in operating income comprised the following net effects:

- A reduction in the amount of net currency transaction gains during the two periods of approximately $4 million. Such net currency transaction gains (losses) result primarily from U.S. dollar-denominated receivables and U.S. dollar currency held by our Chemicals Segment's non-U.S. operations, which are translated into the applicable local currency at each balance sheet date. During 2014, a relative strengthening of the U.S. dollar relative to the euro and the Norwegian krone gave rise to a net $4 million currency transaction gain, whereas we recognized a nominal currency transaction loss during 2015, and

- Approximately $44 million from net currency translation gains caused primarily by a strengthening of the U.S. dollar relative to the Canadian dollar and the Norwegian krone, as their local currency-denominated operating costs were translated into fewer U.S. dollars in 2015 as compared to 2014. Overall, the strengthening of the U.S. dollar relative to the euro in 2015 did not have a significant impact on our Chemicals Segment's operating income, as the reduction in net sales caused by such strengthening was substantially offset by the effect of our euro-denominated operating costs being translated into fewer U.S. dollars.

Outlook— During 2016 our Chemicals Segment operated its production facilities at 98% of practical capacity compared to 95% in 2015. We expect our production volumes to be slightly higher in 2017 as compared to 2016, as our Chemicals Segment production rates in 2017 will be positively impacted by the implementation of certain productivity-enhancing improvement projects at certain facilities. Assuming economic conditions do not deteriorate in the various regions of the world, we expect our 2017 sales volumes to be comparable to 2016 sales volumes. We will continue to monitor current and anticipated near-term customer demand levels and align our production and inventories accordingly.

We continued to experience moderation in the cost of TiO_2 feedstock ore procured from third parties in both 2015 and 2016. Our Chemicals Segment cost of sales per metric ton of TiO_2 sold declined throughout 2015 and 2016 due to the moderation in the cost of TiO_2 feedstock and the cost savings achieved from the 2015 implementation of a restructuring plan discussed below. Consequently, our cost of sales per metric ton of TiO_2 sold in 2016 was slightly lower than our Chemicals Segment cost of sales per metric ton of TiO_2 sold in 2015 (excluding the effect of changes in currency exchange rates). We expect our Chemicals Segment cost of sales per metric ton of TiO_2 sold in 2017 will range from being comparable to slightly higher than our per-metric ton cost in 2016.

We started 2016 with selling prices 17% lower than the beginning of 2015, and prices declined by an additional 1% in the first quarter of 2016. In the second quarter of 2016, our average selling prices began to rise due to the implementation of previously-announced price increases and average selling prices continued to rise for the remainder of 2016. Our Chemicals Segment average selling prices at the end of 2016 were 10% higher than at the end of 2015, and were also higher as compared to our overall average selling prices for the full year of 2016. Industry data indicates that overall TiO_2 inventory held by producers has declined significantly during 2016. In addition, we believe most customers hold very low inventories of TiO_2 with many operating on a just-in-time basis. With the strong sales volumes experienced in 2016, we continue to see evidence of strengthening demand for our Chemicals Segment TiO_2 products in certain of our primary markets. We and our Chemicals Segment major competitors have announced price increases, which we began implementing in the second quarter of 2016, as contracts have allowed. The extent to which we will be able to achieve any additional price increases in the near term will depend on market conditions.

We initiated a restructuring plan in 2015 designed to improve our Chemicals Segment ur long-term cost structure. As part of such plan, we implemented certain voluntary and involuntary workforce reductions during 2015 at certain of our facilities impacting approximately 160 individuals. Such workforce reductions are expected to result in approximately $19 million of annual cost savings. Since the majority of workforce reductions had been implemented by July 1, 2015, the full year 2016 did not reflect this annual cost savings, as a portion of such annual cost savings were achieved in the second half of 2015 affecting year over year comparisons. These workforce reductions are not expected to negatively impact our ability to operate our production facilities at their practical capacity rates, as evidenced by the production levels we achieved in 2016. In addition to the workforce reductions implemented in 2015, we are also in the process of implementing other cost reduction initiatives throughout the organization, including the implementation of continued process productivity improvements.

Overall, we expect our Chemicals Segment operating income in 2017 will be higher as compared to 2016, principally as a result of expected higher average selling prices in 2017 as compared to 2016 and to a lesser extent from the favorable effects of anticipated higher production volumes in 2017.

Due to the constraints of high capital costs and extended lead time associated with adding significant new TiO_2 production capacity, especially for premium grades of TiO_2 products produced from the chloride process, we believe increased and sustained profit margins will be necessary to financially justify major expansions of TiO_2 production capacity required to meet expected future growth in demand. As a result of customer decisions over the last year, some industry projects to increase TiO_2 production capacity have been cancelled or deferred indefinitely, and announcements have been made regarding the closure of certain facilities. Given the lead time required for production capacity expansions, a shortage of TiO_2 products could occur if economic conditions improve and global demand levels for TiO_2 increase sufficiently.

Our expectations for our future operating results are based upon a number of factors beyond our control, including worldwide growth of gross domestic product, competition in the marketplace, continued operation of competitors, unexpected or earlier-than-expected capacity additions or reductions and technological advances. If actual developments differ from our expectations, our results of operations could be unfavorably affected.

Component Products—

Our Component Products Segment’s product offerings consist of a significantly large number of products that have a wide variation in selling price and manufacturing cost, which results in certain practical limitations on our ability to quantify the impact of changes in individual product sales quantities and selling prices on our net sales, cost of goods sold and gross margin. In addition, small variations in period-to-period net sales, cost of goods sold and gross margin can result from changes in the relative mix of our products sold. The key performance indicator for our Component Products Segment is operating income margins.

	Years ended December 31,			% Change	
	2014	2015	2016	2014-15	2015-16
	(Dollars in millions)				
Net sales	$103.9	$109.0	$108.9	5%	— %
Cost of sales	71.6	75.6	73.8	6%	(2) %
Gross margin	$32.3	$33.4	$35.1	4%	5 %
Operating income	$13.6	$14.0	$15.6	2%	11 %
Percent of net sales:					
Cost of sales	69 %	69 %	68 %		
Gross margin	31 %	31 %	32 %		
Operating income	13 %	13 %	14 %		

Net Sales—Our Component Products Segment’s net sales for 2016 were comparable to 2015 because our security products reporting unit was able to substantially replace revenue for a government security end-user project which did not recur in 2016 with a new project with the same customer. Security product sales for 2015 included approximately $6.3 million for a government security end-user project which did not recur in 2016. During the second half of 2016, we were awarded a substantial new project for the same customer which began to ship in August and was completed in December, totaling $5.8 million in net sales. Marine Components also contributed with higher sales to the waterski/wakeboard boat market, including the continuing introduction of new product lines to that market. Relative changes in selling prices did not have a material impact on net sales comparisons.

Our Component Products Segment’s net sales increased approximately $5.1 million in 2015 principally due to higher demand within the security products reporting unit including $3.0 million related to existing government customers. Sales within the marine component reporting unit increased 8% compared to prior year due to increased demand for products sold to the ski/wakeboard boat market, including the introduction of new product lines to that market. Relative changes in selling prices did not have a material impact on net sales comparisons.

Costs of Goods Sold and Gross Margin—Our Component Products Segment’s cost of goods sold for 2016 was down from 2015 on comparable sales, resulting in an increase in gross margin. As a percentage of sales, gross margin for 2016 was favorable to 2015 due primarily to higher variable margins resulting from favorable customer and product mix for both security products and marine components.

Our Component Products Segment’s cost of sales and gross margin both increased from 2014 to 2015 primarily due to increased sales volumes. As a percentage of sales, cost of goods sold were flat primarily due to improved coverage of fixed manufacturing costs over increased production volumes to meet higher demand at each of our reporting units, partially offset by increased costs noted above.

Operating Income—Our Component Products Segment operating income improved in 2016 compared to 2015 and also in 2015 compared to 2014. Operating costs and expenses consists primarily of sales and administrative-related personnel costs, sales commissions and advertising expenses directly related to product sales and administrative costs relating to business unit and corporate management activities, as well as gains and losses on disposal of plant, property and equipment. Operating costs and expenses in 2016 was comparable to 2015 on an absolute basis and as a percentage of sales.

Our Component Products Segment operating income improved in 2015 compared to 2014 and also in 2014 compared to 2013. Operating costs and expenses consists primarily of sales and administrative-related personnel costs, sales commissions and advertising expenses directly related to product sales and administrative costs relating to business unit and corporate management activities, as well as gains and losses on disposal of plant, property and equipment. Operating costs and expenses increased in 2015 primarily due to an increase of $.5 million in 2015 compared to 2014 as a result of increased personnel costs.

General—Our Component Products Segment's profitability primarily depends on our ability to utilize our production capacity effectively, which is affected by, among other things, the demand for our products and our ability to control our manufacturing costs, primarily comprised of labor costs and materials. The materials used in our products consist of purchased components and raw materials some of which are subject to fluctuations in the commodity markets such as zinc, brass and stainless steel. Total material costs represented approximately 45% of our cost of sales in 2016, with commodity-related raw materials accounting for approximately 10% of our cost of sales. During 2015 and 2016, markets for our primary commodity-related raw materials, including zinc, brass and stainless steel, have generally been stable and relatively soft compared to historical levels. Markets for our primary commodity-related raw materials are expected to remain relatively stable into 2017 with the possible exception of zinc, which has increased in price over the final months of 2016. We occasionally enter into short-term commodity-related raw material supply arrangements to mitigate the impact of future increases in commodity related raw material costs. See Item 1 - "Business Component Products Segment – CompX International, Inc. - Raw Materials."

Outlook— Our Component Products Segment experienced robust demand for its products in 2015 and 2016 buoyed by continued high demand from certain large existing customers, including significant projects for government security applications which are not expected to recur. We continue to benefit from innovation and diversification in our product offerings to the recreational boat markets served by our Marine Components segment. We anticipate continued strong demand for our products in 2017, though we do not expect demand for government security applications to equal 2016 volumes. As in prior periods, we will continue to monitor general economic conditions and sales order rates and respond to fluctuations in customer demand through continuous evaluation of staffing levels and consistent execution of our lean manufacturing and cost improvement initiatives. Additionally, we continue to seek opportunities to gain market share in markets we currently serve, to expand into new markets and to develop new product features in order to mitigate the impact of changes in demand as well as broaden our sales base.

Waste Management—

On November 18, 2015, we entered into an agreement with Rockwell Holdco, Inc. ("Rockwell"), for the sale of WCS to Rockwell. The agreement, as amended, is for $270 million in cash plus the assumption of all of WCS' third-party indebtedness incurred prior to the date of the agreement. Additionally, Rockwell and its affiliates will assume all financial assurance obligations related to the WCS business. Rockwell is the parent company of EnergySolutions, Inc. Completion of the sale is subject to certain customary closing conditions, including the receipt of U.S. anti-trust approval. On November 16, 2016, the U.S. Department of Justice filed an anti-trust action in the U.S. federal district court for the District of Delaware styled United States of America vs. Energy Solutions, Inc., et al (Case No. 1:16-cv-01056-UNA), seeking an injunction to enjoin completion of the sale of WCS. Pursuant to our agreement with Rockwell, Rockwell and its affiliates are required, with our cooperation and assistance, to vigorously contest and resist such antitrust action. Assuming all closing conditions are satisfied, including the receipt of U.S. anti-trust approval, the sale is expected to close by sometime in the third quarter of 2017. There can be no assurance, however, that the parties will be successful in contesting and resisting such antitrust action, that receipt of U.S. anti-trust approval will be obtained, that all closing conditions will be satisfied, or that any such sale of WCS would be completed. See Note 3 to our Consolidated Financial Statements for additional information regarding the operations of the Waste Management Segment.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Net sales	$66.5	$45.0	$47.4

Cost of sales	49.7	50.5	55.5
Gross margin	$16.8	$(5.5)	$(8.1)
Operating loss	$(2.2)	$(26.5)	$(26.2)

General—We have operated our Waste Management Segment’s waste management facility on a relatively limited basis while we navigated the regulatory licensing and permitting requirements for the disposal of byproduct waste material and a broad range of LLRW and mixed LLRW. In 2008, the TCEQ issued us a license for the disposal of byproduct material. Byproduct material includes uranium or thorium mill tailings as well as equipment, pipe and other materials used to handle and process the mill tailings. We began byproduct disposal operations at our site in Andrews County, Texas in 2009. Also in 2009, the TCEQ issued a near-surface LLRW disposal license to us. Construction of the Compact and Federal LLRW sites began in January 2011. The Compact LLRW site was fully certified, operational and received its first waste for disposal in 2012. The Federal LLRW site was fully certified and operational in 2012 and received its first waste for disposal in mid-2013.

Net Sales and Operating Loss— The Waste Management Segment’s net sales increased $2.4 million in 2016 compared to 2015 but margins were negatively impacted by a change in service and disposal mix in 2016. Disposal revenue declined $4.0 million in 2016 compared to 2015 primarily due to a decline in volumes to our higher priced Compact disposal facility somewhat offset by increased disposal volumes to our lower priced RCRA facility. Such decline in disposal volumes was offset by an increase in transportation related revenue in 2016 as we seek to increase our logistical capabilities to better manage customer disposal shipments; however, increases in transportation revenue also add to our cost of sales as we generally pass through actual logistics costs plus a service fee to our customers. As a result, increases in transportation revenue of $6.4 million in 2016 compared to 2015 are offset by increases in cost of sales over the same period. As a result of the overall lower disposal revenues and the change in mix of disposal revenue, we were not able to achieve the levels of fixed charge coverage we had in 2015 resulting in increased negative gross margins in 2016 as compared to 2015. We were able to lower selling, general and administrative costs in 2016 primarily due to lower consulting and legal expenses which offset the decline in gross margin, such that the operating loss was relatively consistent between the 2015 and 2016.

The Waste Management Segment's net sales decreased $21.5 million in 2015 compared to 2014. Disposal volumes for the second, third and fourth quarters of 2015 were negatively impacted by availability of certain classifications of waste shipping containers to us beginning during the latter part of the second quarter of 2015. In July 2015 we entered into an exclusive leasing arrangement to secure dedicated access to two such containers although fully implementing these containers into our shipping schedules has been slower than we anticipated. In November 2015 we signed an agreement which allowed us to resume utilizing the shipping containers which had been unavailable to us for much of the year. In addition we benefited from a one-time disposal campaign related to the decommissioning of a nuclear power plant which contributed $11.9 million in disposal revenue in 2014 and $4.8 million in 2015. Lower disposal volumes in 2015 led to lower coverage of fixed costs as compared to 2014. As a result, our Waste Management Segment's operating loss increased significantly in 2015 as compared to 2014.

We recognized an operating loss in all prior years because we have not achieved sufficient revenues to offset the high cost structure associated with operating under our byproduct and LLRW disposal licenses relative to the waste treatment and disposal volume, in part because we have not consistently received sufficient volume of LLRW for disposal in both our Compact and Federal LLRW disposal facilities to overcome our fixed operating cost structure. We continue to seek to increase our Waste Management Segment's sales volumes from waste streams permitted under our current licenses.

Outlook— With both of the Compact LLRW disposal facility and the Federal LLRW disposal facility certified and operational, we provide "one-stop shopping" for treatment, storage and disposal of hazardous, toxic, LLRW and radioactive byproduct material. WCS has the broadest range of capabilities of any commercial enterprise in the U.S. for the storage, treatment and permanent disposal of these materials, which may give WCS a competitive advantage in the industry. We are also exploring opportunities to obtain certain types of new business (including disposal and storage of certain other types of waste) that, if obtained, could increase our Waste Management Segment's sales and decrease our Waste Management Segment's operating loss. One of these opportunities is a consolidated interim storage license for the storage of high level waste such as used nuclear fuel from nuclear power plants. WCS submitted a license application in April 2016, which was docketed for formal review by the NRC in January 2017. In addition to the license, federal legislation is needed to provide a mechanism for DOE to take title of such waste and fund such storage. We do not know if a license will be granted by NRC or if federal legislation will be enacted for such storage. If a license is granted and federal legislation is passed, WCS would endeavor to enter into a storage agreement with DOE. However, congressional appropriations, facility financing and financial assurance, DOE transportation approvals and construction of the interim storage facility must all take place prior to commencement of any operations. Subject to the forgoing, storage revenue, if any, under an interim storage license would not be expected to begin until 2021 or later. We do not know if all of the forgoing prerequisites can be achieved, or that WCS would receive any such storage revenues.

Our ability to increase our Waste Management Segment's sales volumes through these waste streams, particularly as it relates to the Compact and Federal LLRW disposal facilities, together with improved operating efficiencies through cost reductions and increased capacity utilization, are important factors in improving our Waste Management operating results and cash flows. We have obtained long-term disposal contracts with several waste generators and are actively pursuing additional contracts. We were awarded a national disposal contract for our Federal LLRW disposal facility in April 2013. The contract is for a period of five years and up to $300 million; however, tasks awarded under the contract to date have been for smaller dollar-value waste streams. We have received waste for disposal since mid-2013 for the Federal LLRW disposal facility, but it may be difficult for us to generate positive operating results until we begin routinely receiving larger Federal LLRW streams for disposal. In addition we are dependent on large commercial projects in order to receive sufficient disposal volumes to operate the Compact LLRW disposal facility at full capacity. Large projects, both federal and commercial, are infrequent and are subject to a competitive bidding and delays in the expected time line for waste disposal to be completed. While we are the only commercial facility licensed to take Class A, B and C LLRW and Mixed LLRW (LLRW mixed with hazardous waste) other facilities can accept Class A waste including facilities that in some circumstances mix waste in such a way that some Class B and Class C waste may meet the Class A disposal requirements at these facilities.

With the receipt of our recent license amendments and our dedicated shipping containers now in service, including containers we leased in July 2015, we believe we are positioned to take full advantage of our disposal facilities going forward for any federal or commercial waste which we would be successful in obtaining. We have increased our logistical handling capabilities in order to more fully serve our customers and better facilitate their disposal shipments going forward. However, because certain large commercial generators choose to store waste onsite rather than dispose of such waste, because of the competitive nature of obtaining federal or commercial waste for disposal, and because there are generally no legal or regulatory obligations requiring disposal of such wastes, we do not know if these efforts will succeed in increasing our disposal volumes. We do not know if WCS will be able to achieve sufficient recurring disposal volumes to generate positive operating results or cash flows.

We have in the past considered and evaluated various strategic alternatives with respect to our Waste Management Segment. With respect to the pending sale transaction noted above, we expect to recognize a gain if such pending transaction is successfully closed. If such pending sale transaction were not to be successfully closed, we would continue to consider and evaluate various other alternatives with respect to our Waste Management Segment, including alternatives aimed at minimizing or ultimately discontinuing any continued financial support of the Waste Management Segment, some of which could result in the recognition of a material loss as required under GAAP, such as long-lived asset impairments. At December 31, 2016 the Segment’s long-lived assets aggregated $181.4 million. See also “Results of Operations – Critical Accounting Policies and Estimates – Long-lived Assets”.

Real Estate Management and Development—

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Net sales	$40.3	$30.1	$46.2
Cost of sales	33.9	25.4	36.2
Gross margin	$6.4	$4.7	$10.0
Operating loss	$2.0	$—	$.8

General—Our Real Estate Management and Development Segment consists of BMI and LandWell. BMI, which among other things provides utility services to an industrial park located in Henderson, Nevada, and is responsible for the delivery of water to the city of Henderson and various other users through a water distribution system owned by BMI. LandWell is actively engaged in efforts to develop certain real estate in Henderson, Nevada including approximately 2,100 acres zoned for residential/planned community purposes and approximately 400 acres zoned for commercial and light industrial use.

In December 2013 and through the end 2016, LandWell has closed or entered into escrow on approximately 410 acres of the residential/planned community and approximately 50 acres zoned for commercial and light industrial use at contracted prices that support the estimated fair value assigned to the land held for development that was acquired with consideration of development costs expected to be incurred after the acquisition date. See Note 3 to our Consolidated Financial Statements. Contracts for land sales are negotiated on an individual basis and sales terms and prices will vary based on such factors as location (including location within a planned community), expected development work, and individual buyer needs. Although land may be under contract, we do not recognize revenue until we have satisfied the criteria for revenue recognition set forth in ASC Topic 976. In some instances, we will receive cash proceeds at the time the contract closes and record deferred revenue for some or all of the cash amount received, with such deferred revenue being recognized in subsequent periods. Because land held for development was initially recognized at estimated fair value at the acquisition date as required by ASC Topic 805, we do not expect to recognize significant operating income on land sales for the land currently under contract. We expect the development work to continue for 10 to 15 years on the rest of the land held for development, especially the remainder of the residential/planned community.

Net Sales and Operating Income— A substantial portion of the net sales from our Real Estate Management and Development segment in 2016 consisted of revenues from land sales. We recognized $37.8 million in revenues on land sales during 2016 compared to $21.5 million in 2015. As noted above we recognize revenue in our residential/planned community under percentage completion accounting and a large majority of the revenue we recognized in 2015 and 2016 was under this method of revenue recognition. We also have commercial property not included in the planned community for which revenue is generally recognized in full at closing, as we generally have no further obligations after the closing date of the sale for these properties. Land sale revenue for such commercial property not included in the planned community was $5.6 million in 2016 and $9.0 million in 2015. The contracts on these sales (both within the planned community and otherwise) include approximately 400 acres of the residential planned community and certain other acreage which closed in December 2014 and through the end of 2016. Cost of sales related to land sales revenues was $30.3 million in 2016 and $19.9 million in 2015.

We recognized $21.5 million in revenues on land sales during 2015 compared to $31.9 million in 2014. As noted above we recognize revenue in our residential/planned community under percentage completion accounting and a large majority of the revenue we recognized in 2014 and 2015 was under this method of revenue recognition. We also have commercial property not included in the planned community for which revenue is generally recognized in full at closing, as we generally have no further obligations after the closing date of the sale for these properties. Almost half of our land sales revenue in 2015 were for such property sales not included in the planned community. The contracts on these sales (both within the planned community and otherwise) include approximately 270 acres of the residential planned community and certain other acreage which closed in December 2013 and through the end of 2015. Cost of sales related to land sales revenues was $19.9 million in 2015 and $28.1 million in 2014.

The remainder of net sales and cost of sales related to this segment primarily relates to water delivery fees and expenses. We deliver water to several customers under long-term contracts. In this regard in January 2016 we amended our water delivery contract with the City of Henderson, Nevada. As a result we recognized a contract related intangible asset impairment of $5.1 million in the first quarter of 2016 ($2.1 million, or $.01 per diluted share, net of income tax benefit and noncontrolling interest). See Note 7 to our Consolidated Financial Statements. Based on the contract amendment as expected annual water sales were approximately $1 million lower than 2015 levels but cost of sales related to water delivery remained relatively consistent from period to period. As noted above, because land held for development was initially recognized at estimated fair value at the acquisition date as required by ASC Topic 805, we did not recognize significant operating income in either 2015 or 2016 (excluding the impact of the contract related intangible asset impairment charge in 2016).

Outlook—We are actively pursuing opportunities to maximize cash proceeds from the sale of our land held for development. In the near term, we are focused on developing and selling land we manage, primarily to residential builders, for the approximately 2,100 acres zoned for residential/planned community in Henderson, Nevada. We expect the development work for the residential/planned community to continue over the next several years, including those parcels currently under contract for which the development work is expected to be completed in 2018. We do not expect to recognize significant amounts of operating income related to these sales for the parcels currently under contract because our basis in the land value is the December 2013 acquisition date fair value; however, we do expect to generate cash proceeds from these sales in excess of our acquisition costs, which proceeds are expected to be used, in part, to fund ongoing development work for the remainder of these properties.

General Corporate Items, Interest Expense, Provision for Income Taxes (Benefit), Noncontrolling Interest and Related Party Transactions

Securities Earnings—A significant portion of our interest and dividend income in 2014, 2015 and 2016 relates to the distributions we received from The Amalgamated Sugar Company LLC. We recognized dividend income from the LLC of $25.4 million in each of 2014, 2015 and 2016.

Insurance Recoveries—Insurance recoveries relate to amounts NL received from certain of its former insurance carriers, and relate principally to the recovery of prior lead pigment and asbestos litigation defense costs incurred by NL. We have agreements with four former insurance carriers pursuant to which the carriers reimburse us for a portion of our future lead pigment litigation defense costs, and one such carrier reimburses us for a portion of our future asbestos litigation defense costs. We are not able to determine how much we will ultimately recover from these carriers for defense costs incurred by us because of certain issues that arise regarding which defense costs qualify for reimbursement. Substantially all of the $10.4 million in the insurance recoveries we recognized in 2014 and $3.7 million we recognized in 2015 relate to settlements NL reached with two of its insurance carriers in which the carriers agreed to reimburse NL for a portion of its past litigation defense costs. While we continue to seek additional insurance recoveries for lead pigment and asbestos litigation matters, we do not know the extent to which we will be successful in obtaining additional reimbursement for either defense costs or indemnity. Any additional insurance recoveries would be recognized when the receipt is probable and the amount is determinable. Substantially all of the insurance recoveries recognized in 2016 relate to reimbursement of ongoing litigation defense costs. See Note 18 to our Consolidated Financial Statements.

Other General Corporate Items— Corporate expenses were 10% higher at $43.1 million in 2016 compared to $39.6 million in 2015. Corporate expenses increased primarily due to $5.8 million in transactions costs in 2016 related to the proposed sale of our Waste Management Segment partially offset by lower administrative related expenses and lower litigation and related costs in 2016. Included in corporate expense are:

- litigation and related costs at NL of $3.5 million in 2016 compared to $4.8 million in 2015; and
- environmental remediation and related costs of $5.9 million in 2016 compared to $5.7 million in 2015.

Corporate expenses were 2% higher at $39.6 million in 2015 compared to $38.8 million in 2014. Corporate expenses increased primarily due to higher administrative related expenses in 2015, offset in part by lower environmental remediation and related costs and to a lesser extent lower litigation and related costs in 2014. Included in corporate expense are:

- litigation and related costs at NL of $4.8 million in 2015 compared to $7.0 million in 2014; and

- environmental remediation and related costs of $5.7 million in 2015 compared to $6.6 million in 2014.

Overall, we currently expect that our net general corporate expenses in 2017 will be lower than in 2016 primarily due to lower expected environmental remediation and related costs.

The level of our litigation and related expenses varies from period to period depending upon, among other things, the number of cases in which we are currently involved, the nature of such cases and the current stage of such cases (e.g. discovery, pre-trial motions, trial or appeal, if applicable). See Note 18 to our Consolidated Financial Statements. If our current expectations regarding the number of cases in which we expect to be involved during 2017, or the nature of such cases, were to change our corporate expenses could be higher than we currently estimate.

Obligations for environmental remediation and related costs are difficult to assess and estimate, and it is possible that actual costs for environmental remediation and related costs will exceed accrued amounts or that costs will be incurred in the future for sites in which we cannot currently estimate the liability. If these events occur in 2017, our corporate expense could be higher than we currently estimate. In addition, we adjust our accruals for environmental remediation and related costs as further information becomes available to us or as circumstances change. Such further information or changed circumstances could result in an increase or reduction in our accrued environmental remediation and related costs. See Note 18 to our Consolidated Financial Statements.

Interest Expense— Interest expense increased to $63.2 million in 2016 from $59.0 million in 2015 primarily due to the net effects of higher 2016 average debt levels and higher average interest rates (primarily due to the interest rate swap contract Kronos entered into in September 2015.

Interest expense increased to $59.0 million in 2015 from $56.7 million in 2014 primarily due to the net effects of higher 2015 average debt levels and mostly offset by lower average interest rates on outstanding borrowings (principally Kronos' term loan amended in May 2015).

We expect interest expense will be slightly higher in 2017 as compared to 2016 due to higher average balances of outstanding borrowings at Valhi and higher average interest rates as a result of the increase in the prime rate on variable rate debt and the Kronos interest rate swap. See Note 19 to our Consolidated Financial Statements.

Provision for Income Taxes (Benefit)— We recognized income tax expense of $6.0 million in 2016 compared to income tax expense of $97.3 million in 2015. We recognized income tax expense of $97.3 million in 2015 compared to income tax expense of $32.5 million in 2014. As discussed below, our income tax expense in 2015 includes an aggregate non-cash deferred income tax expense of $159.0 million related to the recognition of a deferred income tax asset valuation for our Chemicals Segment's German and Belgian operations (mostly recognized in the second quarter), while our income tax expense in 2016 includes an aggregate $2.2 million non-cash tax benefit as the result of a net decrease in such deferred income tax valuation allowance. Our earnings are subject to income tax in various U.S. and non-U.S. jurisdictions, and the income tax rates applicable to our pre-tax earnings (losses) of our non-U.S. operations is generally lower than the income tax rates applicable to our U.S. operations. Our income tax expense in 2016 includes a $3.4 million current income tax benefit related to the execution and finalization of an Advance Pricing Agreement between the U.S. and Canada. Excluding the effect of any increase or decrease in our deferred income tax asset valuation allowance, we would generally expect our overall effective tax rate to be lower than the U.S. federal statutory rate of 35% primarily because of our non-U.S. operations. Our effective income tax rate in 2015, excluding the impact of the deferred income tax asset valuation allowances we recognized, was higher than the U.S. federal statutory tax rate of 35%, primarily due to a current U.S. income tax benefit attributable to current year losses of one of our non-U.S. subsidiaries. Our effective income tax rate in 2016, excluding the impact of the deferred income tax asset valuation allowances we recognized and the change to prior year tax as discussed above, was higher than the U.S. federal statutory rate of 35% primarily due to a fourth quarter increase in our reserve for uncertain tax positions. Excluding the impact of the deferred income tax asset valuation allowance we recognized and the change to prior year tax, we expect our effective income tax rate to be lower than the U.S. federal statutory rate of 35% primarily because of our non-U.S. operations.

We have substantial net operating loss (NOL) carryforwards in Germany (the equivalent of $638 million for German corporate purposes and $71 million for German trade tax purposes, respectively, at December 31, 2016) and in Belgium (the equivalent of $93 million for Belgian corporate tax purposes at December 31, 2016), all of which have an indefinite carryforward period. As a result, we have net deferred income tax assets with respect to these two jurisdictions, primarily related to these NOL carryforwards. The German corporate tax is similar to the U.S. federal income tax, and the German trade tax is similar to the U.S. state income tax. Prior to June 30, 2015, and using all available evidence, we had concluded no deferred income tax asset valuation allowance was required to be recognized with respect to these net deferred income tax assets under the more-likely-than-not recognition criteria, primarily because (i) the carryforwards have an indefinite carryforward period, (ii) we utilized a portion of such carryforwards during the most recent three-year period, and (iii) we expected to utilize the remainder of the carryforwards over the long term. We had also previously indicated that facts and circumstances could change, which might in the future result in the recognition of a valuation allowance against some or all of such deferred income tax assets. However, as of June 30, 2015, and given our operating results during the second quarter of 2015 and our expectations at that time for our operating results for the remainder of 2015, which had been driven in large part by the trend in our average TiO_2 selling prices over such periods as well as the $21.1 million pre-tax charge recognized in the second quarter of 2015 in connection with the implementation of certain workforce reductions, we did not have sufficient positive evidence to overcome the significant negative evidence of having cumulative losses in the most recent twelve consecutive quarters in both our German and Belgian jurisdictions at June 30, 2015 (even considering that the carryforward period of our German and Belgian NOL carryforwards is indefinite, one piece of positive evidence). Accordingly, at June 30, 2015, we concluded that we were required to recognize a non-cash deferred income tax asset valuation allowance under the more-likely-than-not recognition criteria with respect to our German and Belgian net deferred income tax assets at such date. We recognized an additional non-cash deferred income tax asset valuation allowance during the second half of 2015 due to losses recognized by our German and Belgian operations during such period. Such valuation allowance aggregated $168.9 million at December 31, 2015. During 2016, we recognized an aggregate $2.2 million non-cash tax benefit as the result of a net decrease in such deferred income tax valuation allowance, as the impact of utilizing a portion of our German NOLs during such period more than offset the impact of additional losses recognized by our Belgian operations during such period. We continue to believe we will ultimately realize the full benefit of these German and Belgian NOL carryforwards, in part because of their indefinite carryforward period. However, our ability to reverse all or a portion of either the German or Belgian valuation allowance in the future is dependent on the presence of sufficient positive evidence, such as the existence of cumulative profits in the most recent twelve consecutive quarters, and the ability to demonstrate future profitability for a sustainable period. Until such time as we are able to reverse either valuation allowance in full, to the extent we generate additional losses in Germany or Belgium in the intervening periods, our effective income tax rate would be impacted by the existence of such valuation allowance, because such losses would effectively be recognized without any associated net income tax benefit, as such losses would result in a further increase in the deferred income tax asset valuation allowance. Alternatively, until such time as we are able to reverse either valuation allowance in full, to the extent we generate income in Germany or Belgium in the intervening periods, our effective income tax rate would also be impacted by the existence of such valuation allowance, because such income may be recognized without any associated net income tax expense, subject to certain NOL usage limitations, as we would reverse a portion of the valuation allowance to offset the income tax expense attributable to such income. In addition, any change in tax law related to the indefinite carryforward period of either of these NOLs could adversely impact our ability to reverse either valuation allowance in full. Our Belgian operations continue to have cumulative losses in the most recent twelve consecutive quarters at December 31, 2016. Although the results of our German operations improved during 2016, indicating a change in the negative trend in earnings that existed at December 31, 2015, and we utilized a portion of our German NOLs during 2016, and we have cumulative income with respect to our German operations for the most recent twelve consecutive quarters at December 31, 2016, the sustainability of such positive trend in earnings has not yet been demonstrated at December 31, 2016, and accordingly we do not currently have sufficient positive evidence under the more-likely-than-not recognition criteria to support reversal of the entire valuation allowance related to our German operations at such date. Consistent with our expectation regarding our consolidated results of operations in 2016 (as discussed above in the “Chemicals - Outlook” subsection), we currently believe it is likely our German and Belgian operations will report improved operating results in 2017 as compared to 2016. Whether the operating results of either or both of our German and Belgian operations improve to such an extent in 2017 that reversal of the respective valuation allowance in full would be supported by the presence of sufficient positive evidence is presently not ascertainable. However, if the positive trend in our German operating results continue during 2017 and continue to reflect cumulative income in the most recent twelve consecutive quarters such that the sustainability of such positive trend in earnings would then be demonstrated, it is possible our net deferred income tax asset with respect to our German operations could meet the more-likely-than-not recognition criteria sometime during 2017, at which time we would reverse the deferred income tax asset valuation allowance related to our German operations, resulting in the recognition of a material non-cash income tax benefit. Reversal of the deferred income tax asset valuation allowance with respect to our Belgian operations would not occur until such time as the expected positive trend in the operating results of our Belgian operations had generated cumulative income in a twelve consecutive quarter period, and sustainability of such positive trend in earnings could be demonstrated.

We recognize deferred income taxes with respect to the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock because the exemption under GAAP to avoid such recognition of deferred income taxes is not available to us. There is a maximum amount (or cap) of such deferred income taxes we are required to recognize with respect to our direct investment in Kronos, and we previously reached such maximum amount in the fourth quarter of 2010. Since that time and through March 31, 2015, we were not required to recognize any additional deferred income taxes with respect to our direct investment in Kronos because the deferred income taxes associated with the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock continued to be above such cap. However, at June 30, 2015, the deferred income taxes associated with the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock was, for the first time since the fourth quarter of 2010, below such cap, in large part due to the net loss reported by Kronos in the second quarter of 2015. Accordingly, our provision for income taxes in 2015 includes an aggregate non-cash income tax benefit of $29.3 million for the reduction in the deferred income taxes required to be recognized with respect to the excess of the financial reporting carrying amount over the income tax basis of our direct investment in

Kronos common stock, to the extent such reduction related to our equity in Kronos' net loss. A substantial portion of such $29.3 million was recognized in the second quarter of 2015, with the remainder recognized in the third and fourth quarters. We recognized a a similar non-cash income tax expense of $6.5 million in 2016 for the increase in the deferred income taxes required to be recognized with respect to the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock, to the extent such increase related to our equity in Kronos' net income (loss). Such amount is included in the table of our income tax rate reconciliation for incremental net benefit on earnings and losses on non-U.S. and U.S. subsidiaries in Note 14 to our Consolidated Financial Statements (in addition to the other items indicated above). A portion of such reduction also related to our equity in Kronos' other comprehensive income (loss) items, and the amounts shown in the table above for income tax expense (benefit) allocated to other comprehensive income (loss) includes amounts related to our equity in Kronos' other comprehensive income (loss) items.

Our income tax expense was favorably impacted by an aggregate non-cash income tax benefit of $3.7 million in 2014 (mostly in the second quarter) related to a net reduction in our reserve for uncertain tax positions.

See Note 14 to our Consolidated Financial Statements for a tabular reconciliation of our statutory tax expense to our actual tax expense. Some of the more significant items impacting this reconciliation are summarized below.

Noncontrolling Interest in Net Income (Loss) of Subsidiaries—Noncontrolling interest in operations of subsidiaries increased from 2016 to 2015 primarily due to increased operating income at Kronos. Noncontrolling interest in operations of subsidiaries decreased from 2015 to 2014 primarily due to decreased operating income at Kronos.

Related Party Transactions—We are a party to certain transactions with related parties. See Note 17 to our Consolidated Financial Statements.

Assumptions on Defined Benefit Pension Plans and OPEB Plans.

Defined Benefit Pension Plans—We maintain various defined benefit pension plans in the U.S., Europe and Canada. See Note 11 to our Consolidated Financial Statements.

Under defined benefit pension plan accounting, we recognize defined benefit pension plan expense and prepaid and accrued pension costs based on certain actuarial assumptions, principally the assumed discount rate, the assumed long-term rate of return on plan assets and the assumed increase in future compensation levels. We recognize the full funded status of our defined benefit pension plans as either an asset (for overfunded plans) or a liability (for underfunded plans) in our Consolidated Balance Sheet.

We recognized consolidated defined benefit pension plan expense of $22.0 million in 2014, $23.7 million in 2015, and $22.9 million in 2016. Certain non-U.S. employees are covered by plans in their respective countries, principally in Germany, Canada and Norway. Participation in the defined benefit pension plan in Germany was closed to new participants effective in 2005. German employees hired beginning in 2005 participate in a new plan in which the retirement benefit is based upon the amount of employee and employer contributions to the plan, but for which in accordance with German law the employer guarantees a minimum rate of return on invested assets and a guaranteed indexed lifetime benefit payment after retirement based on the participant's account balance at the time of retirement. In accordance with GAAP, the new pension plan is accounted for as a defined benefit plan, principally because of such guaranteed minimum rate of return and guaranteed lifetime benefit payment. Participation in the defined benefit plan in Canada with respect to hourly and salaried workers was closed to new participants in December 2013 and 2014, respectively, and existing hourly and salaried plan participants will no longer accrue additional defined pension benefits after December 2013 and 2014, respectively. Our U.S. plan for both NL and Kronos was closed to new participants in 1996, and existing participants no longer accrued any additional benefits after that date. The amount of funding requirements for these defined benefit pension plans is generally based upon applicable regulations (such as ERISA in the U.S.) and will generally differ from pension expense for financial reporting purposes. The amount of funding requirements for these defined benefit pension plans is generally based upon applicable regulations (such as ERISA in the U.S.), and will generally differ from pension expense recognized under GAAP for financial reporting purposes. We made contributions to all of our defined benefit pension plans of $21.7 million in 2014, $18.0 million in 2015, and $15.4 million in 2016.

The discount rates we use for determining defined benefit pension expense and the related pension obligations are based on current interest rates earned on long-term bonds that receive one of the two highest ratings given by recognized rating agencies in the applicable country where the defined benefit pension benefits are being paid. In addition, we receive third-party advice about appropriate discount rates and these advisors may in some cases use their own market indices. We adjust these discount rates as of each December 31 valuation date to reflect then-current interest rates on such long-term bonds. We use these discount rates to determine the actuarial present value of the pension obligations as of December 31 of that year. We also use these discount rates to determine the interest component of defined benefit pension expense for the following year.

At December 31, 2016, approximately 63%, 15%, 8% and 9% of the projected benefit obligations related to our plans in Germany, Canada, Norway and the U.S., respectively. We use several different discount rate assumptions in determining our consolidated defined benefit pension plan obligation and expense. This is because we maintain defined benefit pension plans in several different countries in Europe and North America and the interest rate environment differs from country to country.

We used the following discount rates for our defined benefit pension plans:

	Discount rates used for:		
	Obligations at December 31, 2014 and expense in 2015	Obligations at December 31, 2015 and expense in 2016	Obligations at December 31, 2016 and expense in 2017
Kronos and NL Plans:			
Germany	2.3%	2.3 %	1.8 %
Canada	3.8%	3.9 %	3.7 %
Norway	2.3%	2.8 %	2.5 %
U.S.	3.8%	4.1 %	3.9 %

The assumed long-term rate of return on plan assets represents the estimated average rate of earnings expected to be earned on the funds invested or to be invested in the plans' assets provided to fund the benefit payments inherent in the projected benefit obligations. Unlike the discount rate, which is adjusted each year based on changes in current long-term interest rates, the assumed long-term rate of return on plan assets will not necessarily change based upon the actual short-term performance of the plan assets in any given year. Defined benefit pension expense each year is based upon the assumed long-term rate of return on plan assets for each plan, the actual fair value of the plan assets as of the beginning of the year and an estimate of the amount of contributions to and distributions from the plan during the year. Differences between the expected return on plan assets for a given year and the actual return are deferred and amortized over future periods based either upon the expected average remaining service life of the active plan participants (for plans for which benefits are still being earned by active employees) or the average remaining life expectancy of the inactive participants (for plans for which benefits are not still being earned by active employees).

At December 31, 2016, the fair value of plan assets for all defined benefit plans comprised $45.6 million related to U.S. plans and $381.8 million related to foreign plans. Substantially all of plan assets attributable to foreign plans related to plans maintained by Kronos, and approximately 70% and 30% of the plan assets attributable to U.S. plans related to plans maintained by NL and Kronos, respectively. At December 31, 2016, approximately 51%, 22%, 11% and 11% of the plan assets related to our plans in Germany, Canada, Norway and the U.S, respectively. We use several different long-term rates of return on plan asset assumptions in determining our consolidated defined benefit pension plan expense. This is because the plan assets in different countries are invested in a different mix of investments and the long-term rates of return for different investments differ from country to country.

In determining the expected long-term rate of return on plan asset assumptions, we consider the long-term asset mix (e.g. equity vs. fixed income) for the assets for each of our plans and the expected long-term rates of return for such asset components. In addition, we receive third-party advice about appropriate long-term rates of return. Substantially all of the assets of our U.S. plan are invested in the Combined Master Retirement Trust ("CMRT"), a collective investment trust sponsored by Contran to permit the collective investment by certain master trusts which fund certain employee benefits sponsored by Contran and certain of its affiliates, including us. Such assumed asset mixes are discussed in Note 11 to our Consolidated Financial Statements.

Our pension plan weighted average asset allocations by asset category were as follows:

	December 31, 2016			
	Germany	Canada	Norway	CMRT
Equity securities and limited partnerships	20 %	37 %	12 %	59 %
Fixed income securities	71	63	59	36
Real estate	8	—	9	—
Other	1	—	20	5
Total	100 %	100 %	100 %	100 %

	December 31, 2015			
	Germany	Canada	Norway	CMRT
Equity securities and limited partnerships	20 %	36 %	12 %	56 %
Fixed income securities	70	56	62	38
Real estate	9	—	9	—
Other	1	8	17	6
Total	100 %	100 %	100 %	100 %

We regularly review our actual asset allocation for each non-US plan and will periodically rebalance the investments in each plan to more accurately reflect the targeted allocation when considered appropriate. The CMRT trustee and investment committee do not maintain a specific target asset allocation in order to achieve their objectives, but instead they periodically change the asset mix of the CMRT based upon, among other things, advice they receive from third-party advisors and their expectations regarding potential returns for various investment alternatives and what asset mix will generate the greatest overall return while maintaining an acceptable level of risk.

The assumed long-term rates of return on plan assets used for purposes of determining net period pension cost for 2014, 2015 and 2016 were as follows:

	2014	2015	2016
Kronos and NL plans:			
Germany	4.3 %	4.3 %	3.5 %
Canada	5.5 %	5.8 %	5.2 %
Norway	3.8 %	3.8 %	3.3 %
U.S.	7.5 %	7.5 %	7.5 %

We currently expect to use the same long-term rate of return on plan asset assumptions in 2017 as we used in 2016 for purposes of determining the 2017 defined benefit pension plan expense.

To the extent that a plan's particular pension benefit formula calculates the pension benefit in whole or in part based upon future compensation levels, the projected benefit obligations and the pension expense will be based in part upon expected increases in future compensation levels. For all of our plans for which the benefit formula is so calculated, we generally base the assumed expected increase in future compensation levels upon average long-term inflation rates for the applicable country.

In addition to the actuarial assumptions discussed above, the amount of recognized defined benefit pension expense and the amount of net pension asset and net pension liability will vary based upon relative changes in currency exchange rates.

A reduction in the assumed discount rate generally results in an actuarial loss, as the actuarially-determined present value of estimated future benefit payments will increase. Conversely, an increase in the assumed discount rate generally results in an actuarial gain. In addition, an actual return on plan assets for a given year that is greater than the assumed return on plan assets results in an actuarial gain, while an actual return on plan assets that is less than the assumed return results in an actuarial loss. Other actual outcomes that differ from previous assumptions, such as individuals living longer or shorter than assumed in mortality tables, which are also used to determine the actuarially-determined present value of estimated future benefit payments, changes in such mortality table themselves or plan amendments, will also result in actuarial losses or gains. These amounts are recognized in other comprehensive income. In addition, any actuarial gains generated in future periods would reduce the negative amortization effect of any cumulative unrecognized actuarial losses, while any actuarial losses generated in future periods would reduce the favorable amortization effect of any cumulative unrecognized actuarial gains.

During 2016, our defined benefit pension plans generated a combined net actuarial loss of $38.0 million. This actuarial loss resulted primarily from the decrease in discount rates from December 31, 2015 to December 31, 2016, and to a lesser extent from an actual return on plan assets during 2016 below the expected return.

Based on the actuarial assumptions described above and our current expectations for what actual average currency exchange rates will be during 2017, we currently expect our aggregate defined benefit pension expense will approximate $28 million in 2017. In comparison, we currently expect to be required to make approximately $15 million of aggregate contributions to such plans during 2017.

As noted above, defined benefit pension expense and the amounts recognized as prepaid and accrued pension costs are based upon the actuarial assumptions discussed above. We believe all of the actuarial assumptions used are reasonable and appropriate. If we had lowered the assumed discount rates by 25 basis points for all of our plans as of December 31, 2016, our aggregate projected benefit obligations would have increased by approximately $30 million at that date, and our aggregate defined benefit pension expense would be expected to increase by approximately $2 million during 2017. Similarly, if we lowered the assumed long-term rates of return on plan assets by 25 basis points for all of our plans, our defined benefit pension expense would be expected to increase by approximately $1 million during 2017.

OPEB Plans—We provide certain health care and life insurance benefits for certain of our eligible retired employees. See Note 11 to our Consolidated Financial Statements. At December 31, 2016, approximately 59%, 23% and 18% of our aggregate accrued OPEB costs relate to Kronos, NL and Tremont, respectively. Kronos provides such OPEB benefits to eligible retirees in the U.S. and Canada, and NL and Tremont provide such OPEB benefits to eligible retirees in the U.S. Under accounting for other postretirement employee benefits, OPEB expense and accrued OPEB costs are based on certain actuarial assumptions, principally the assumed discount rate and the assumed rate of increases in future health care costs. We recognize the full unfunded status of our OPEB plans as a liability.

Based on such actuarial assumptions and our current expectation for what actual average currency exchange rates will be during 2017, we expect our consolidated OPEB benefit will approximate $1.1 million in 2017 and because our OPEB plans have no plan assets we will be required to contribute the entire benefit payment to such plans during 2017.

We believe that all of the actuarial assumptions used are reasonable and appropriate. However, if we had lowered the assumed discount rate by 25 basis points for all plans as of December 31, 2016, our aggregate projected benefit obligations at that date and our OPEB cost during 2017 would not be materially impacted. Similarly, a one percent assumed change in health care trend rates for all plans would not materially impact our OPEB costs.

Foreign Operations

We have substantial operations located outside the United States, principally our Chemicals Segment's operations in Europe and Canada. The functional currency of these operations is the local currency. As a result, the reported amount of our assets and liabilities related to these foreign operations will fluctuate based upon changes in currency exchange rates. At December 31, 2016, we had substantial net assets denominated in the euro, Canadian dollar and Norwegian krone.

LIQUIDITY AND CAPITAL RESOURCES

Consolidated Cash Flows

Operating Activities—

Trends in cash flows from operating activities (excluding the impact of significant asset dispositions and relative changes in assets and liabilities) are generally similar to trends in our operating income.

Cash flows from operating activities increased to $79.8 million in 2016 from $22.1 million in 2015. This $57.7 million increase in cash provided by operations was primarily due to the net effects of the following items:

- consolidated operating income of $81.2 million in 2016, an improvement of $86.6 million compared to an operating loss of $5.4 million in 2015;
- higher net cash paid for income taxes in 2016 of $10.1 million resulting from our increased profitability;
- lower net distributions received from our TiO_2 joint venture in 2016 of $2.9 million, primarily due to the timing of the joint venture's working capital needs; and

- changes in receivables, inventories, payables and accrued liabilities in 2016 provided $23.3 million in net cash compared to $21.3 million in 2015, an increase in the amount of cash provided of $2.0 million compared to 2015, primarily due to the relative changes in our inventories, receivables, prepaids, land held for development, payables and accruals.

Cash flows from operating activities decreased from $67.3 million in 2014 to $22.5 million in 2015. This $44.8 million decrease in cash provided by operations was primarily due to the net effects of the following items:

- consolidated operating loss of $5.4 million in 2015, a decline of $175.6 million compared to operating income of $170.2 million in 2014;
- lower net cash paid for income taxes in 2015 of $23.2 million resulting from our decreased profitability;
- lower net distributions received from our TiO_2 joint venture in 2015 of $4.1 million, primarily due to the timing of the joint venture's working capital needs;
- lower cash funding of pension plans in 2015 of $3.7 million; and
- changes in receivables, inventories, payables and accrued liabilities in 2015 provided $21.3 million in net cash compared to net cash used of $116.9 million in 2014, an increase in the amount of cash provided of $139.2 million compared to 2014, primarily due to the relative changes in our inventories, receivables, prepaids, land held for development, payables and accruals.

Changes in working capital were affected by accounts receivable and inventory changes. As shown below:

- Kronos' average days sales outstanding ("DSO") was slightly lower from December 31, 2015 to December 31, 2016 primarily as a result of relative changes in the timing of collections.
- Kronos' average days sales in inventory ("DSI") decreased from December 31, 2015 to December 31, 2016 due to lower inventory volumes and lower inventory raw material costs
- CompX's average DSO increased from December 31, 2015 to December 31, 2016 as a result of the timing of sales and collections in the last month of 2016 as compared to 2015.
- CompX's average DSI increased from December 31, 2015 to December 31, 2016 after assuming more normalized levels following an intentional inventory build at the end of 2014.

For comparative purposes, we have also provided comparable prior year numbers below.

	December 31, 2014	December 31, 2015	December 31, 2016
Kronos:			
Days sales outstanding	61 days	66 days	65 days
Days sales in inventory	76 days	80 days	71 days
CompX:			
Days sales outstanding	32 days	31 days	36 days
Days sales in inventory	90 days	76 days	79 days

We do not have complete access to the cash flows of our majority-owned subsidiaries, due in part to limitations contained in certain credit agreements of our subsidiaries and because we do not own 100% of these subsidiaries. A detail of our consolidated cash flows from operating activities is presented in the table below. Intercompany dividends have been eliminated.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Cash provided by (used in) operating activities:			
Kronos	$87.6	$52.0	$89.6
Valhi exclusive of subsidiaries	15.5	12.3	10.7
CompX	12.2	13.5	13.9
NL exclusive of subsidiaries	12.0	15.6	14.8
Waste Control Specialists	7.9	(12.2)	(10.7)
Tremont	3.7	(.6)	9.2
BMI	5.9	(1.7)	2.8
LandWell	(1.3)	4.8	30.9
Other	(.6)	—	—
Eliminations	(75.6)	(61.2)	(81.4)
Total	$67.3	$22.5	$79.8

Investing Activities—

We disclose capital expenditures by our business segments in Note 2 to our Consolidated Financial Statements. All of our capitalized permit costs relate to our Waste Management Segment.

During 2016 we had net purchases of $.7 million of marketable securities.

During 2015 we had net proceeds of $1.4 million from the disposal of marketable securities.

During 2014 we had net purchases of $1.2 million of marketable securities.

Financing Activities –

During 2016, we:

- borrowed a net $15.1 million on Valhi's credit facility with Contran;
- repaid $3.5 million under Kronos' term loan; and
- repaid $2.6 million under Tremont's promissory note payable.

During 2015, we:

- borrowed a net $40.1 million on Valhi's credit facility with Contran;
- repaid $3.5 million under Kronos' term loan; and
- repaid $.3 million under Tremont's promissory note payable.

During 2014, we:

- borrowed $348.3 million under Kronos' term loan and subsequently repaid $2.6 million;
- repaid $170.0 million under Kronos' note payable to Contran;
- borrowed $81.0 million under Kronos' North American credit facility and subsequently repaid $92.1 million;

- borrowed a net $17.2 million on Valhi's credit facility with Contran;
- repaid $1.7 million under Tremont's promissory note payable;
- borrowed $1.1 million from a Canadian economic development agency and
- repaid $.9 million under BMI's bank note payable.

We paid aggregate cash dividends on our common stock of $37.3 million in 2014 and $27.1 million in each of 2015 and 2016 ($.05 per share in the first quarter of 2014, and $.02 per share for the second, third and fourth quarters of 2014 and each quarter of 2015 and 2016). Distributions to noncontrolling interest in 2014, 2015 and 2016 are primarily comprised of; CompX dividends paid to shareholders other than NL; Kronos cash dividends paid to shareholders other than us and NL, and BMI and LandWell dividends paid to shareholders other than us.

Other cash flows from financing activities in 2014, 2015 and 2016 relate principally to shares of common stock issued by us and our subsidiaries upon the exercise of stock options or the issuance of shares to directors.

Outstanding Debt Obligations

At December 31, 2016, our consolidated indebtedness was comprised of:

- Valhi's $250 million loan from Snake River Sugar Company due in 2027;
- Valhi's $278.9 million outstanding on its $325 million credit facility with Contran which is due no earlier than December 31, 2018;
- $340.4 million aggregate borrowing under Kronos' term loan ($335.9 million carrying amount, net of unamortized original issue discount and debt issuance costs) due through February 2020;
- WCS' financing capital lease with Andrews County, Texas ($64.0 million carrying amount) which has an effective interest rate of 7.0% and is due in monthly installments through August 2035;
- Tremont's promissory note payable ($14.5 million outstanding) due in December 2023;
- $8.5 million on BMI's bank note payable ($8.4 million carrying amount, net of debt issuance costs), due through January 2025;
- $2.9 million on LandWell's note payable to the City of Henderson due in October 2020; and
- approximately $10.4 million of other indebtedness, primarily capital lease obligations.

Certain of our credit facilities require the respective borrowers to maintain a number of covenants and restrictions which, among other things, restrict our ability to incur additional debt, incur liens, pay dividends or merge or consolidate with, or sell or transfer substantially all of our assets to, another entity, and contain other provisions and restrictive covenants customary in lending transactions of this type. Certain of our credit agreements contain provisions which could result in the acceleration of indebtedness prior to their stated maturity for reasons other than defaults for failure to comply with typical financial or payment covenants. For example, certain credit agreements allow the lender to accelerate the maturity of the indebtedness upon a change of control (as defined in the agreement) of the borrower. In addition, certain credit agreements could result in the acceleration of all or a portion of the indebtedness following a sale of assets outside the ordinary course of business. Kronos' North American and European revolvers contain a number of covenants and restrictions which, among other things, restrict its ability to incur additional debt, incur liens, pay dividends or merge or consolidate with, or sell or transfer substantially all of its assets to, another entity, and contains other provisions and restrictive covenants customary in lending transactions of this type. Kronos' European revolving credit facility also requires the maintenance of certain financial ratios, and one of such requirements is based on the ratio of net debt to the last twelve months EBITDA of the borrowers. The terms of all of our debt instruments (including revolving lines of credit for which we have no outstanding borrowings at December 31, 2016) are discussed in Note 9 to our Consolidated Financial Statements. We are in compliance with all of our debt covenants at December 31, 2016. We believe that we will be able to continue to comply with the financial covenants contained in our credit facilities through their maturity; however, if future operating results differ materially from our expectations we may be unable to maintain compliance.

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Future Cash Requirements

Liquidity—

Our primary source of liquidity on an ongoing basis is our cash flows from operating activities and borrowings under various lines of credit and notes. We generally use these amounts to (i) fund capital expenditures, (ii) repay short-term indebtedness incurred primarily for working capital purposes and (iii) provide for the payment of dividends (including dividends paid to us by our subsidiaries) or treasury stock purchases. From time-to-time we will incur indebtedness, generally to (i) fund short-term working capital needs, (ii) refinance existing indebtedness, (iii) make investments in marketable and other securities (including the acquisition of securities issued by our subsidiaries and affiliates) or (iv) fund major capital expenditures or the acquisition of other assets outside the ordinary course of business. Occasionally we sell assets outside the ordinary course of business, and we generally use the proceeds to (i) repay existing indebtedness (including indebtedness which may have been collateralized by the assets sold), (ii) make investments in marketable and other securities, (iii) fund major capital expenditures or the acquisition of other assets outside the ordinary course of business or (iv) pay dividends.

We routinely compare our liquidity requirements and alternative uses of capital against the estimated future cash flows we expect to receive from our subsidiaries, and the estimated sales value of those units. As a result of this process, we have in the past sought, and may in the future seek, to raise additional capital, refinance or restructure indebtedness, repurchase indebtedness in the market or otherwise, modify our dividend policies, consider the sale of our interests in our subsidiaries, affiliates, business units, marketable securities or other assets, or take a combination of these and other steps, to increase liquidity, reduce indebtedness and fund future activities. Such activities have in the past and may in the future involve related companies. From time to time we and our subsidiaries may enter into intercompany loans as a cash management tool. Such notes are structured as revolving demand notes and pay and receive interest on terms we believe are more favorable than current debt and investment market rates. The companies that borrow under these notes have sufficient borrowing capacity to repay the notes at any time upon demand. All of these notes and related interest expense and income are eliminated in our Consolidated Financial Statements.

We periodically evaluate acquisitions of interests in or combinations with companies (including our affiliates) that may or may not be engaged in businesses related to our current businesses. We intend to consider such acquisition activities in the future and, in connection with this activity, may consider issuing additional equity securities and increasing indebtedness. From time to time, we also evaluate the restructuring of ownership interests among our respective subsidiaries and related companies.

We believe we will be able to comply with the financial covenants contained in our credit facilities through their maturities; however, if future operating results differ materially from our expectations we may be unable to maintain compliance. Based upon our expectations of our operating performance, and the anticipated demands on our cash resources, we expect to have sufficient liquidity to meet our short-term (defined as the twelve-month period ending December 31, 2016) and long-term obligations (defined as the five-year period ending December 31, 2020). In this regard, see the discussion above in “Outstanding Debt Obligations.” If actual developments differ from our expectations, our liquidity could be adversely affected.

At December 31, 2016, we had credit available under existing facilities of $179.4 million, which was comprised of:

- $58.5 [1] million under Kronos’ European revolving credit facility;
- $74.8 million under Kronos’ North American revolving credit facility; and
- $46.1 [2] million under Valhi’s Contran credit facility.

(1) Based on the terms of Kronos’ European credit facility (including the net debt to EBITDA financial test discussed above), and the borrowers’ EBITDA over the last twelve months ending December 31, 2016, Kronos’ borrowing

availability at December 31, 2016 under this facility is approximately 47% of the credit facility, or €55.8 million.

(2) Amounts available under this facility are at the sole discretion of Contran.

At December 31, 2016, we had an aggregate of $204.5 million of restricted and unrestricted cash, cash equivalents and marketable securities. A detail by entity is presented in the table below.

	Total amount	Held outside U.S.
	(In millions)	
Kronos	$52.4	$ 40.9
CompX	33.2	—
NL exclusive of its subsidiaries	65.1	.2
WCS	21.7	—
BMI	7.8	—
Tremont exclusive of its subsidiaries	9.1	—
LandWell	14.9	—
Valhi exclusive of its subsidiaries	.3	—
Total cash and cash equivalents, restricted cash and marketable securities	$204.5	$ 41.1

Capital Expenditures and other investments—

We currently expect our aggregate capital expenditures for 2017 will be approximately $86 million as follows:

- $65 million by our Chemicals Segment, including approximately $14 million in the area of environmental compliance, protection and improvement;
- $3 million by our Component Products Segment;
- $7 million by our Waste Management Segment; and
- $11 million by our Real Estate Management and Development Segment.

The WCS amount includes approximately $.8 million in capitalized operating permit costs. In addition LandWell expects to spend approximately $22 million on land development costs during 2017 (which are included in the determination of cash provided by operating activities).

Capital spending for 2017 is expected to be funded primarily through cash generated from operations and borrowing under existing credit facilities. Planned capital expenditures in 2016 at Kronos and CompX will primarily be to maintain and improve the cost-effectiveness of our facilities. A significant portion (approximately $13 million) of Kronos' planned capital expenditures in 2016 relates to the implementation of a new accounting and manufacturing system. In addition, Kronos' capital expenditures in the area of environmental compliance, protection and improvement include expenditures which are primarily focused on increased operating efficiency but also result in improved environmental protection, such as lower emissions from our manufacturing plants.

Repurchases of our Common Stock and Common Stock of Our Subsidiaries—

We have in the past, and may in the future, make repurchases of our common stock in market or privately-negotiated transactions. At December 31, 2016 we had approximately 4.0 million shares available for repurchase of our common stock under the authorizations described in Note 16 to our Consolidated Financial Statements.

Prior to 2014, Kronos' board of directors authorized the repurchase of up to 2.0 million shares of its common stock in open market transactions, including block purchases, or in privately-negotiated transactions at unspecified prices and over an unspecified period of time. Kronos may repurchase its common stock from time to time as market conditions permit. The stock repurchase program does not include specific price targets or timetables and may be suspended at any time. Depending on market conditions, Kronos may terminate the program prior to its completion. Kronos will use cash on hand to acquire the shares. Repurchased shares will be added to Kronos' treasury and cancelled. Kronos did not make any repurchases under the plan during 2014, 2015 and 2016, and at December 31, 2016 approximately 1.95 million shares are available for repurchase.

Prior to 2014, CompX's board of directors authorized various repurchases of its Class A common stock in open market transactions, including block purchases, or in privately-negotiated transactions at unspecified prices and over an unspecified period of time. CompX may repurchase its common stock from time to time as market conditions permit. The stock repurchase program does not include specific price targets or timetables and may be suspended at any time. Depending on market conditions, CompX may terminate the program prior to its completion. CompX will generally use cash on hand to acquire the shares. Repurchased shares will be added to CompX's treasury and cancelled. CompX did not make any repurchases under the plan during 2014, 2015 and 2016, and at December 31, 2016 approximately 678,000 shares were available for purchase under these authorizations.

Dividends—

Because our operations are conducted primarily through subsidiaries and affiliates, our long-term ability to meet parent company level corporate obligations is largely dependent on the receipt of dividends or other distributions from our subsidiaries and affiliates. If Kronos pays its regular dividend of $.15 per share in each quarter of 2017, based on the 58.0 million shares we held of Kronos common stock at December 31, 2016, we would receive aggregate annual regular dividends from Kronos of $34.8 million. NL has not paid a dividend since prior to 2014 and we do not know if we will receive any cash dividends from NL during 2017. We did not receive any distributions from WCS during 2016, and we do not expect to receive any distributions from WCS during 2017. BMI and LandWell do pay cash dividends from time to time, but the timing and amount of such dividends are uncertain. In this regard, we received aggregate dividends from BMI and LandWell of $7.0 million in 2014, $1.4 million in 2015 and $12.4 million in 2016. We do not know if we will receive additional distributions from BMI and LandWell during 2017. All of our ownership interest in CompX is held through our ownership in NL, as such we do not receive any dividends from CompX. Instead any dividend paid by CompX is paid to NL.

Our subsidiaries have various credit agreements with unrelated third-party lenders which contain customary limitations on the payment of dividends, typically a percentage of net income or cash flow; however, these restrictions in the past have not significantly impacted their ability to pay dividends.

Investment in our Subsidiaries and Affiliates and Other Acquisitions—

We have in the past, and may in the future, purchase the securities of our subsidiaries and affiliates or third parties in market or privately-negotiated transactions. We base our purchase decision on a variety of factors, including an analysis of the optimal use of our capital, taking into account the market value of the securities and the relative value of expected returns on alternative investments. In connection with these activities, we may consider issuing additional equity securities or increasing our indebtedness. We may also evaluate the restructuring of ownership interests of our businesses among our subsidiaries and related companies.

We generally do not guarantee any indebtedness or other obligations of our subsidiaries or affiliates. For information on our guarantee of certain financial assurances related to WCS see Note 17 to our Consolidated Financial Statements. Our subsidiaries are not required to pay us dividends. If one or more of our subsidiaries were unable to maintain its current level of dividends, either due to restrictions contained in a credit agreement or to satisfy its liabilities or otherwise, our ability to service our liabilities or to pay dividends on our common stock could be adversely impacted. If this were to occur, we might consider reducing or eliminating our dividends or selling interests in subsidiaries or other assets. If we were required to liquidate assets to generate funds to satisfy our liabilities, we might be required to sell at what we believe would be less than what we believe is the long-term value of such assets.

WCS' primary source of liquidity currently consists of intercompany borrowings from one of our wholly-owned subsidiaries under the terms of a revolving credit facility. We eliminate these intercompany borrowings in our Consolidated Financial Statements. WCS has borrowed substantial amounts from us over the years. Prior to 2015, we contributed these amounts to WCS' capital. WCS did not borrow any amounts from us during 2014. WCS borrowed an aggregate $19.0 million in 2015 and $22.7 million in 2016 from our subsidiary, and WCS could borrow an additional $43.3 million under its current intercompany facility with such subsidiary at December 31, 2016. It is probable WCS will borrow additional amounts from our subsidiary during 2017 under the terms of the revolving credit facility.

On November 14, 2016 we entered into a $50 million revolving credit facility with a subsidiary of NL secured with approximately 35.2 million shares of the common stock of Kronos Worldwide, Inc. held by NL's subsidiary as collateral. Outstanding borrowings under the credit facility bear interest at the prime rate plus 1.875% per annum, payable quarterly, with all amounts due on December 31, 2023. The maximum principal amount which may be outstanding from time-to-time under the credit facility is limited to 50% of the amount of the most recent closing price of the Kronos stock. The credit facility contains a number of covenants and restrictions which, among other things, restrict NL's subsidiary's ability to incur additional debt, incur liens, and merge or consolidated with, or sell or transfer substantially all of NL's subsidiary's assets to, another entity, and require NL's subsidiary to maintain a minimum specified level of consolidated net worth. Upon an event of default (as defined in the credit facility), Valhi will be entitled to terminate its commitment to make further loans to NL's subsidiary, declare the outstanding loans (with interest) immediately due and payable, and exercise its rights with respect to the collateral under the Loan Documents. Such collateral rights include, upon certain insolvency events with respect to NL's subsidiary or NL, the right to purchase all of the Kronos common stock at a purchase price equal to the aggregate market value, less amounts owing to Valhi under the Loan Documents, and up to 50% of such purchase price may be paid by Valhi in the form of an unsecured promissory note bearing interest at the prime rate plus 2.75% per annum, payable quarterly, with all amounts due no later than five years from the date of purchase, with the remainder of such purchase price payable in cash at the date of purchase. We also eliminate any such intercompany borrowings in our Consolidated Financial Statements. During 2016 NL's subsidiary borrowed $.5 million under this facility.

We have an unsecured revolving demand promissory note with Kronos which as amended in August 2016, provides for borrowings from Kronos of up to $60 million. We also eliminate any such intercompany borrowings in our Consolidated Financial Statements. We had no borrowings from Kronos during 2016 under this facility, which as amended is due on demand, but in any event no earlier than December 31, 2018. Kronos' obligation to loan us money under this note is at Kronos' discretion.

On August 3, 2016 we entered into an unsecured revolving demand promissory note with CompX which, as amended, provides for borrowings from CompX of up to $40 million. We eliminate these intercompany borrowings in our Condensed Consolidated Financial Statements. The facility, as amended, is due on demand, but in any event no earlier than December 31, 2018. We had gross borrowings of $36.6 million and gross repayments of $9.2 million from CompX for a total outstanding balance of $27.4 million at December 31, 2016. We could borrow an additional $12.6 million under our current intercompany facility with CompX at December 31, 2016. CompX's obligation to loan us money under this note is at CompX's discretion.

Investment in The Amalgamated Sugar Company LLC—

The terms of The Amalgamated Sugar Company LLC Company Agreement provide for an annual "base level" of cash dividend distributions (sometimes referred to as distributable cash) by the LLC of $26.7 million, from which we are entitled to a 95% preferential share. Distributions from the LLC are dependent, in part, upon the operations of the LLC. We record dividend distributions from the LLC as income when they are declared by the LLC, which is generally the same month in which we receive the distributions, although distributions may in certain cases be paid on the first business day of the following month. To the extent the LLC's distributable cash is below this base level in any given year, we are entitled to an additional 95% preferential share of any future annual LLC distributable cash in excess of the base level until such shortfall is recovered. Based on the LLC's current projections for 2017, we expect distributions received from the LLC in 2017 will exceed our debt service requirements under our $250 million loans from Snake River Sugar Company by approximately $1.8 million.

We may, at our option, require the LLC to redeem our interest in the LLC, and the LLC has the right to redeem our interest in the LLC beginning in 2027. The redemption price is generally $250 million plus the amount of certain undistributed income allocable to us, if any. In the event we require the LLC to redeem our interest in the LLC, Snake River has the right to accelerate the maturity of and call our $250 aggregate million loans from Snake River. Redemption of our interest in the LLC would result in us reporting income related to the disposition of our LLC interest for income tax purposes, although we would not be expected to report a gain in earnings for financial reporting purposes at the time our LLC interest is redeemed. However, because of Snake River's ability to call our $250 million loans from Snake River upon redemption of our interest in the LLC, the net cash proceeds (after repayment of the debt) generated by the redemption of our interest in the LLC could be less than the income taxes that we would be required to pay as a result of the disposition.

Off-balance Sheet Financing

We do not have any off-balance sheet financing agreements other than the operating leases discussed in Note 18 to our Consolidated Financial Statements.

Commitments and Contingencies

We are subject to certain commitments and contingencies, as more fully described in the Notes to our Consolidated Financial Statements and in this Management's Discussion and Analysis of Financial Condition and Results of Operations, including:

- certain income tax examinations which are underway in various U.S. and non-U.S. jurisdictions;
- certain environmental remediation matters involving NL, Tremont, BMI and Valhi;
- certain litigation related to NL's former involvement in the manufacture of lead pigment and lead-based paint; and
- certain other litigation to which we are a party.

In addition to those legal proceedings described in Note 18 to our Consolidated Financial Statements, various legislation and administrative regulations have, from time to time, been proposed that seek to (i) impose various obligations on present and former manufacturers of lead pigment and lead-based paint (including NL) with respect to asserted health concerns associated with the use of such products and (ii) effectively overturn court decisions in which NL and other pigment manufacturers have been successful. Examples of such proposed legislation include bills which would permit civil liability for damages on the basis of market share, rather than requiring plaintiffs to prove that the defendant's product caused the alleged damage, and bills which would revive actions barred by the statute of limitations. While no legislation or regulations have been enacted to date that are expected to have a material adverse effect on our consolidated financial position, results of operations or liquidity, enactment of such legislation could have such an effect.

As more fully described in the Notes 9 and 18 to our Consolidated Financial Statements, we are a party to various debt, lease and other agreements which contractually and unconditionally commit us to pay certain amounts in the future. Our obligations related to the long-term supply contracts for the purchase of TiO_2 feedstock are more fully described in Note 18 to our Consolidated Financial Statements and above in "Business—Chemicals Segment—Kronos Worldwide, Inc. —Manufacturing, Operations and Properties." The following table summarizes our contractual commitments as of December 31, 2016 by the type and date of payment.

Contractual commitment	Payment due date 2017	2018/ 2019	2020/ 2021	2022and after	Total
	(In millions)				
Indebtedness (1):					
Principal	$7.8	$294.7	$342.9	$ 324.4	$969.8
Interest payments	59.5	104.9	58.9	149.4	372.7
Operating leases (2)	11.3	11.9	8.1	23.9	55.2
Kronos' long-term supply contracts for the purchase of TiO_2 feedstock (3)	326.5	278.9	—	—	605.4
Kronos' long-term service and other supply contracts (4)	49.9	73.0	22.9	12.2	158.0
CompX's raw material and other purchase commitments (5)	9.7	.4	—	—	10.1
WCS collateral trust (6)	6.9	13.9	8.5	—	29.3
Fixed asset acquisitions (2)	18.9	—	—	—	18.9
BMI and LandWell purchase commitments (7)	3.2	—	—	—	3.2
Deferred payment obligation (8)	—	—	—	11.1	11.1
Estimated income tax obligations (9)	13.8	—	—	—	13.8
Total	$507.5	$777.7	$441.3	$ 521.0	$2,247.5

(1) The amount shown for indebtedness involving revolving credit facilities is based upon the actual amount outstanding at December 31, 2016, and the amount shown for interest for any outstanding variable-rate indebtedness is based upon the December 31, 2016 interest rate, reflects the net impact of the associated interest rate swap and assumes that such variable-rate indebtedness remains outstanding until the maturity of the facility. The timing and amount shown for principal payments on term loan indebtedness is based on the mandatory contractual principal repayment schedule of such indebtedness, and assumes no voluntary principal prepayments. See Item 7A— "Quantitative and Qualitative Disclosures About Market Risk" and Note 9 to our Consolidated Financial Statements.

(2) The timing and amount shown for our operating leases and fixed asset acquisitions are based upon the contractual payment amount and the contractual payment date for such commitments.

(3)

Our contracts for the purchase of TiO_2 feedstock contain fixed quantities that we are required to purchase, or specify a range of quantities within which we are required to purchase based on our feedstock requirements. The pricing under these agreements is generally negotiated quarterly or semi-annually. The timing and amount shown for our commitments related to the supply contracts for TiO_2 feedstock are based upon our current estimate of the quantity of material that will be purchased in each time period shown, the payment that would be due based upon such estimated purchased quantity and an estimate of the prices for the various suppliers which is primarily based on first half 2017 pricing. The actual amount of material purchased and the actual amount that would be payable by us, may vary from such estimated amounts. Our obligation for the purchase of TiO_2 feedstock is more fully described in Note 18 to our Consolidated Financial Statements and above in "Business – Chemicals Segment – Kronos Worldwide, Inc. raw materials." The amounts shown in the table above include the feedstock ore requirements from contracts we entered into through February 2017.

(4) The amounts shown for the long-term service and other supply contracts primarily pertain to agreements we have entered into with various providers of products or services which help to run our plant facilities (electricity, natural gas, etc.), utilizing December 31, 2016 exchange rates. See Note 18 to our Consolidated Financial Statements.

(5) CompX's purchase obligations consist of all open purchase orders and contractual obligations (primarily commitments to purchase raw materials) and are based on the contractual payment amount and the contractual payment date for those commitments.
(6) The funding requirements for WCS collateral trust agreements are described in Note 18 to our Consolidated Financial Statements.
(7) BMI and LandWell's purchase obligations consist of contractual obligations (primarily commitments for land development and improvement costs) and are based on the contractual payment amount and the contractual payment date for those commitments.
(8) The deferred payment obligation is described in Note 10 to our Consolidated Financial Statements.
(9) The amount shown for income taxes is the amount of our consolidated income taxes currently payable at December 31, 2016 (including our reserve for uncertain tax positions classified as a current liability at such date), which are assumed to be paid during 2017 and includes taxes payable, if any, to Contran as a result of our being a member of the Contran Tax Group. See Notes 1 and 14 to our Consolidated Financial Statements.

The table above does not include:

- Our obligations under the Louisiana Pigment Company, L.P. joint venture, as the timing and amount of such purchases are unknown and dependent on, among other things, the amount of TiO_2 produced by the joint venture in the future, and the joint venture's future cost of producing such TiO_2. However, the table of contractual commitments does include amounts related to our share of the joint venture's ore requirements necessary for it to produce TiO_2 for us. See Notes 7 and 17 to our Consolidated Financial Statements and "Business—Chemicals—Kronos Worldwide, Inc."
- Amounts we might pay to fund our defined benefit pension plans and OPEB plans, as the timing and amount of any such future fundings are unknown and dependent on, among other things, the future performance of defined benefit pension plan assets, interest rate assumptions and actual future retiree medical costs. Our defined benefit pension plans and OPEB plans are discussed in greater detail in Note 11 to our Consolidated Financial Statements. We currently expect we will be required to contribute an aggregate of $16.2 million to our defined benefit pension and OPEB plans during 2017.
- Any amounts that we might pay to settle any of our uncertain tax positions classified as a noncurrent liability, as the timing and amount of any such future settlements are unknown and dependent on, among other things, the timing of tax audits. See Note 14 to our Consolidated Financial Statements.

We occasionally enter into raw material supply arrangements to mitigate the short-term impact of future increases in raw material costs. While these arrangements do not necessarily commit us to a minimum volume of purchase, they generally provide for stated unit prices based upon achievement of specified volume purchase levels. This allows us to stabilize raw material purchase prices to a certain extent, provided the specified minimum monthly purchase quantities are met.

Recent Accounting Pronouncements

See Note 20 to our Consolidated Financial Statements.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

General—We are exposed to market risk from changes in interest rates, currency exchange rates, raw materials and equity security prices.

Interest Rates—We are exposed to market risk from changes in interest rates, primarily related to our indebtedness.

At December 31, 2016 our aggregate indebtedness was split between 35% of fixed-rate instruments and 65% of variable-rate borrowings (in 2015 the percentages were 36% of fixed-rate instruments and 64% of variable rate borrowings). The fixed-rate debt instruments minimizes earnings volatility that would result from changes in interest rates. The following table presents principal amounts and weighted average interest rates for our aggregate outstanding indebtedness at December 31, 2016.

The table below shows the fair value of our financial liabilities at December 31, 2016.

	Indebtedness* Amount				
	Carrying value	Fair value	Year end interest rate		Maturity date
	(In millions)				
Fixed-rate indebtedness:					
Valhi loans from Snake River	$250.0	$250.0	9.4	%	2027
Tremont promissory note payable	14.5	14.5	3.0		2023
WCS financing capital lease	64.0	64.0	7.0		2035
Note payable to the City of Henderson	2.9	2.9	3.0		2020
Total fixed-rate indebtedness	331.4	331.4	8.6	%	
Variable-rate indebtedness:					
Kronos term loan	$335.9	$334.6	4.0	%	2020
Valhi Contran credit facility	278.9	278.9	4.75		2018
BMI bank note payable	8.4	8.5	3.75		2025
Total variable-rate indebtedness	623.2	622.0	4.3	%	
Total	$954.6	$953.4	5.8	%	

*Excludes capital lease obligations.

As part of our interest rate risk management strategy, in 2015 we entered into a pay-fixed/receive-variable interest rate swap contract to minimize our exposure to volatility in the benchmark LIBOR interest rate as it relates to our forecasted outstanding variable-rate indebtedness. As a result of this swap the amount of interest expense we will incur is fixed at the swap rate, consequently a change in LIBOR rate will not impact the amount of interest expense recognized. Considering the effects of the interest rate swap approximately 70% of our debt would be considered fixed-rate and our weighted average borrowing rate for such indebtedness would be 6.2%. See Note 19 to our Consolidated Financial Statements for a discussion of this interest rate swap.

Currency Exchange Rates — We are exposed to market risk arising from changes in currency exchange rates as a result of manufacturing and selling our products worldwide. Earnings are primarily affected by fluctuations in the value of the U.S. dollar relative to the euro, the Canadian dollar, and the Norwegian krone and the U.K. pound sterling.

Certain of our sales generated by our non-U.S. operations are denominated in U.S. dollars. We periodically use currency forward contracts to manage a very nominal portion of currency exchange rate risk associated with trade receivables denominated in a currency other than the holder's functional currency or similar exchange rate risk associated with future sales. We have not entered into these contracts for trading or speculative purposes in the past, nor do we currently anticipate entering into such contracts for trading or speculative purposes in the future.

See Notes 1 and 19 to our Consolidated Financial Statements for a discussion of the assumptions we used to estimate the fair value of the financial instruments to which we are a party at December 31, 2015 and 2016.

Raw Materials — Our Chemicals Segment generally enters into long-term supply agreements for certain critical raw materials. Many of these raw material contracts contain fixed quantities we are required to purchase or specify a range of quantities within which we are required to purchase. Raw material pricing under these agreements is generally negotiated quarterly or semi-annually depending on the suppliers.

Our Component Products Segment will occasionally enter into short-term commodity related raw material supply arrangements to mitigate the impact of future increases in commodity related raw material costs. We do not have long-term supply agreements for our raw material requirements because either we believe the risk of unavailability of those raw materials is low and we believe the downside risk of price volatility to be too great or because long-term supply agreements for those materials are generally not available. We do not engage in commodity hedging programs.

Marketable Equity and Debt Security Prices — We are exposed to market risk due to changes in prices of the marketable securities we own. The fair value of such debt and equity securities (determined using Level 1, Level 2 and Level 3 inputs) at December 31, 2015 and 2016 was $256.9 million and $257.9 million, respectively. The potential change in the aggregate fair value of these investments, assuming a hypothetical 10% change in prices, would be approximately $25.7 and $25.8 million at December 31, 2015 and 2016, respectively.

Other — We believe there may be a certain amount of incompleteness in the sensitivity analyses presented above. For example, the hypothetical effect of changes in interest rates discussed above ignores the potential effect on other variables that affect our results of operations and cash flows, such as demand for our products, sales volumes and selling prices and operating expenses. Contrary to the above assumptions, changes in interest rates rarely result in simultaneous comparable shifts along the yield curve. Also, our investment in The Amalgamated Sugar Company LLC represents a significant portion of our total portfolio of marketable securities. That investment serves as collateral for our loans from Snake River Sugar Company, and a decrease in the fair value of that investment would likely be mitigated by a decrease in the fair value of the related indebtedness. Accordingly, the amounts we present above are not necessarily an accurate reflection of the potential losses we would incur assuming the hypothetical changes in market prices were actually to occur.

The above discussion and estimated sensitivity analysis amounts include forward-looking statements of market risk which assume hypothetical changes in market prices. Actual future market conditions will likely differ materially from such assumptions. Accordingly, such forward-looking statements should not be considered to be projections by us of future events, gains or losses.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The information called for by this Item is contained in a separate section of this Annual Report. See “Index of Financial Statements” (page F-1).

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 disclosure controls and procedures which, as defined in Exchange Act Rule 13a-15(e), means controls and other procedures that are designed to ensure that information required to be disclosed in the reports we file or submit to the SEC under the Securities Exchange Act of 1934, as amended (the “Act”), is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information we are required to disclose in the reports we file or submit to the SEC under the Act is accumulated and communicated to our management, including our principal executive officer and our principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions to be made regarding required disclosure. Each of and Robert D. Graham, our Chairman of the Board, President and Chief Executive Officer, and Gregory M. Swalwell, our Executive Vice President, Chief Financial Officer and Chief Accounting Officer, have evaluated the design and effectiveness of our disclosure controls and procedures as of December 31, 2016. Based upon their evaluation, these executive officers have concluded that our disclosure controls and procedures were effective as of the date of such evaluation.

Management's report on internal control over financial reporting —

Our management is responsible for establishing and maintaining adequate internal control over financial reporting which, as defined by Exchange Act Rule 13a-15(f) means a process designed by, or under the supervision of, our principal executive and principal financial officers, or persons performing similar functions, and effected by the board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles, and 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,
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that receipts and expenditures are being made only in accordance with authorizations of management and directors and
- Provide reasonable assurance regarding prevention or timely detection of an unauthorized acquisition, use or disposition of assets that could have a material effect on our Consolidated Financial Statements.

Our evaluation of the effectiveness of internal control over financial reporting is based upon the criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission in 2013 (commonly referred to as the "2013 COSO" framework). Based on our evaluation under that framework, we have concluded that our internal control over financial reporting was effective as of December 31, 2016.

This annual report does not include an attestation report of our registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our registered public accounting firm pursuant to rules of the SEC that permit us to provide only management's report in this annual report.

As permitted by the SEC, our assessment of internal control over financial reporting excludes (i) internal control over financial reporting of equity method investees and (ii) internal control over the preparation of any financial statement schedules which would be required by Article 12 of Regulation S-X. However, our assessment of internal control over financial reporting with respect to equity method investees did include controls over the recording of amounts related to our investment that are recorded in the consolidated financial statements, including controls over the selection of accounting methods for our investments, the recognition of equity method earnings and losses and the determination, valuation and recording of our investment account balances.

Changes in internal control over financial reporting —

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

Certifications —

Our chief executive officer is required to annually file a certification with the New York Stock Exchange, or NYSE, certifying our compliance with the corporate governance listing standards of the NYSE. During 2016, our chief executive officer filed such annual certification with the NYSE. The 2016 certification was unqualified.

Our chief executive officer and chief financial officer are also required to, among other things, file quarterly certifications with the SEC regarding the quality of our public disclosures, as required by Section 302 of the

Sarbanes-Oxley Act of 2002. The certifications for the quarter ended December 31, 2016 have been filed as Exhibits 31.1 and 31.2 to this Annual Report on Form 10-K.

ITEM 9B. OTHER INFORMATION

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this Item is incorporated by reference to our 2017 definitive proxy statement we will file with the SEC pursuant to Regulation 14A within 120 days after the end of the fiscal year covered by this report (the "Valhi Proxy Statement").

ITEM 11. EXECUTIVE COMPENSATION

The information required by this Item is incorporated by reference to our 2017 proxy statement.

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

The information required by this Item is incorporated by reference to our 2017 proxy statement.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTORS INDEPENDENCE

The information required by this Item is incorporated by reference to our 2017 proxy statement. See also Note 17 to our Consolidated Financial Statements.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information required by this Item is incorporated by reference to our 2017 proxy statement.

PART IV

ITEM 15. EXHIBITS

(a) and (c) Financial Statements

The Registrant

Our Consolidated Financial Statements listed on the accompanying Index of Financial Statements (see page F-1) are filed as part of this Annual Report.

50%-or-less owned persons

We are not required to provide any consolidated financial statements pursuant to Rule 3-09 of Regulation S-X.

(b) Exhibits

Included as exhibits are the items listed in the Exhibit Index. We have retained a signed original of any of these exhibits that contain signatures, and we will provide such exhibit to the Commission or its staff upon request. We will furnish a copy of any of the exhibits listed below upon request and payment of $4.00 per exhibit to cover our costs of furnishing the exhibits. Such requests should be directed to the attention of our Corporate Secretary at our corporate offices located at 5430 LBJ Freeway, Suite 1700, Dallas, Texas 75240. Pursuant to Item 601(b)(4)(iii) of Regulation S-K, we will furnish to the Commission upon request any instrument defining the rights of holders of long-term debt issues and other agreements related to indebtedness which do not exceed 10% of our consolidated total assets as of December 31, 2016.

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Item No.	Exhibit Index
3.1+	Restated Certificate of Incorporation of Valhi, Inc.—incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K (File No. 1-5467) dated May 10, 2012 and filed on May 10, 2012.
3.2	Consent Agreement dated as of March 29, 2007 between Valhi, Inc. and Contran Corporation regarding the Amended and Restated Certificate of Designations, Rights and Preferences of 6% Series A Preferred Stock of Valhi, Inc.—incorporated by reference to Exhibit 10.2 to our Current Report on Form 8-K/A (File No. 1-5467) dated March 26, 2007 and filed by us on March 30, 2007.
3.3	By-Laws of Valhi, Inc. as amended—incorporated by reference to Exhibit 3.1 of our Current Report on Form 8-K (File No. 1-5467) dated November 6, 2007.
10.1	Intercorporate Services Agreement between Valhi, Inc. and Contran Corporation effective as of January 1, 2004—incorporated by reference to Exhibit 10.1 to our Quarterly Report on Form 10-Q for the quarter ended March 31, 2004.
10.2	Intercorporate Services Agreement between Contran Corporation and NL Industries, Inc. effective as of January 1, 2004—incorporated by reference to Exhibit 10.1 to NL's Quarterly Report on Form 10-Q (File No. 1-640) for the quarter ended March 31, 2004.
10.3	Intercorporate Services Agreement between Contran Corporation and CompX International Inc. effective January 1, 2004—incorporated by reference to Exhibit 10.2 to CompX's Annual Report on Form 10-K (File No. 1-13905) for the year ended December 31, 2003.
10.4	Intercorporate Services Agreement between Contran Corporation and Kronos Worldwide, Inc. effective January 1, 2004—incorporated by reference to Exhibit No. 10.1 to Kronos' Quarterly Report on Form 10-Q (File No. 1-31763) for the quarter ended March 31, 2004.
10.5	Tax Agreement between Valhi, Inc. and Contran Corporation dated June 3, 2015 —incorporated by reference to Exhibit 10.5 to our Annual Report on Form 10-K (File No. 1-5467) for the year ended December 31, 2015.
10.6*	Valhi, Inc. 2012 Director Stock Plan—incorporated by reference to Exhibit 4.5 of the Registration statement on Form S-8 of the Registrant (File No. 333-48391). Filed on May 31, 2012.
10.7*	Kronos Worldwide, Inc. 2012 Director Stock Plan—incorporated by reference to Exhibit 4.4 of the Registration statement on Form S-8 of the Registrant (File No. 333-113425). Filed on May 31, 2012.

10.8*	CompX International Inc. 2012 Director Stock Plan—incorporated by reference to Exhibit 4.4 of the Registration statement on Form S-8 of the Registrant (File No. 333-47539). Filed on May 31, 2012.
10.9*	NL Industries, Inc. 2012 Director Stock Plan—incorporated by reference to Exhibit 4.4 of the Registrant's statement on Form S-8 (File No. 001-00640) Filed on May 31, 2012.
10.10	First Amended and Restated Agreement Regarding Shared Insurance among CompX International Inc., Contran Corporation, Keystone Consolidated Industries, Inc., Kronos Worldwide, Inc., NL Industries, Inc. and Valhi, Inc. dated October 15, 2015 incorporated by reference to Exhibit 10.24 to the Annual Report on Form 10-K of Kronos Worldwide, Inc. (File No. 001-31763) for the year ended December 31, 2015.
10.11	Formation Agreement of The Amalgamated Sugar Company LLC dated January 3, 1997 (to be effective December 31, 1996) between Snake River Sugar Company and The Amalgamated Sugar Company—incorporated by reference to Exhibit 10.19 to Valhi, Inc.'s Annual Report on Form 10-K (File No. 1-5467) for the year ended December 31, 1996.
10.12	Master Agreement Regarding Amendments to The Amalgamated Sugar Company Documents dated October 19, 2000—incorporated by reference to Exhibit 10.1 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended September 30, 2000.
10.13	Prepayment and Termination Agreement dated October 14, 2005 among Valhi, Inc., Snake River Sugar Company and Wells Fargo Bank Northwest, N.A.—incorporated by reference to Exhibit No. 10.1 to Valhi, Inc.'s Amendment No. 1 to its Current Report on Form 8-K (File No. 1-5467) dated October 18, 2005.
10.14	Company Agreement of The Amalgamated Sugar Company LLC dated January 3, 1997 (to be effective December 31, 1996)—incorporated by reference to Exhibit 10.20 to Valhi, Inc.'s Annual Report on Form 10-K (File No. 1-5467) for the year ended December 31, 1996.
10.15	First Amendment to the Company Agreement of The Amalgamated Sugar Company LLC dated May 14, 1997—incorporated by reference to Exhibit 10.1 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended June 30, 1997.

Item No.	Exhibit Index
10.16	Second Amendment to the Company Agreement of The Amalgamated Sugar Company LLC dated November 30, 1998—incorporated by reference to Exhibit 10.24 to Valhi, Inc.'s Annual Report on Form 10-K (File No. 1-5467) for the year ended December 31, 1998.
10.17	Third Amendment to the Company Agreement of The Amalgamated Sugar Company LLC dated October 19, 2000—incorporated by reference to Exhibit 10.2 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended September 30, 2000.
10.18	Amended and Restated Company Agreement of The Amalgamated Sugar Company LLC dated October 14, 2005 among The Amalgamated Sugar Company LLC, Snake River Sugar Company and The Amalgamated Collateral Trust—incorporated by reference to Exhibit No. 10.7 to Valhi, Inc.'s Amendment No. 1 to its Current Report on Form 8-K (File No. 1-5467) dated October 18, 2005.
10.19	Subordinated Promissory Note in the principal amount of $37.5 million between Valhi, Inc. and Snake River Sugar Company, and the related Pledge Agreement, both dated January 3, 1997— incorporated by reference to Exhibit 10.21 to Valhi, Inc.'s Annual Report on Form 10-K (File No. 1-5467) for the year ended December 31, 1996.
10.20	Limited Recourse Promissory Note in the principal amount of $212.5 million between Valhi, Inc. and Snake River Sugar Company, and the related Limited Recourse Pledge Agreement, both dated January 3, 1997—incorporated by reference to Exhibit 10.22 to Valhi, Inc.'s Annual Report on Form 10-K (File No. 1-5467) for the year ended December 31, 1996.
10.21	Subordinated Loan Agreement between Snake River Sugar Company and Valhi, Inc., as amended and restated effective May 14, 1997—incorporated by reference to Exhibit 10.9 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended June 30, 1997.
10.22	Second Amendment to the Subordinated Loan Agreement between Snake River Sugar Company and Valhi, Inc. dated November 30, 1998—incorporated by reference to Exhibit 10.28 to Valhi, Inc.'s Annual Report on Form 10-K (File No. 1-5467) for the year ended December 31, 1998.
10.23	Third Amendment to the Subordinated Loan Agreement between Snake River Sugar Company and Valhi, Inc. dated October 19, 2000—incorporated by reference to Exhibit 10.3 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended September 30, 2000.
10.24	Fourth Amendment to the Subordinated Loan Agreement between Snake River Sugar Company and Valhi, Inc. dated March 31, 2003—incorporated by reference to Exhibit No. 10.1 to Valhi, Inc.'s Quarterly Report on Form 10-Q (file No. 1-5467) for the quarter ended March 31, 2003.

10.25 Contingent Subordinate Pledge Agreement between Snake River Sugar Company and Valhi, Inc., as acknowledged by First Security Bank National Association as Collateral Agent, dated October 19, 2000—incorporated by reference to Exhibit 10.4 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended September 30, 2000.

10.26 Contingent Subordinate Security Agreement between Snake River Sugar Company and Valhi, Inc., as acknowledged by First Security Bank National Association as Collateral Agent, dated October 19, 2000—incorporated by reference to Exhibit 10.5 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended September 30, 2000.

10.27 Contingent Subordinate Collateral Agency and Paying Agency Agreement among Valhi, Inc., Snake River Sugar Company and First Security Bank National Association dated October 19, 2000— incorporated by reference to Exhibit 10.6 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended September 30, 2000.

10.28 Deposit Trust Agreement related to the Amalgamated Collateral Trust among ASC Holdings, Inc. and Wilmington Trust Company dated May 14, 1997—incorporated by reference to Exhibit 10.2 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended June 30, 1997.

10.29 First Amendment to Deposit Trust Agreement dated October 14, 2005 among ASC Holdings, Inc. and Wilmington Trust Company—incorporated by reference to Exhibit No. 10.2 to Valhi, Inc.'s Amendment No. 1 to its Current Report on Form 8-K (File No. 1-5467) dated October 18, 2005.

10.30 Pledge Agreement between The Amalgamated Collateral Trust and Snake River Sugar Company dated May 14, 1997—incorporated by reference to Exhibit 10.3 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended June 30, 1997.

Item No.	Exhibit Index
10.31	Second Pledge Amendment (SPT) dated October 14, 2005 among The Amalgamated Collateral Trust and Snake River Sugar Company—incorporated by reference to Exhibit No. 10.4 to Valhi, Inc.'s Amendment No. 1 to its Current Report on Form 8-K (File No. 1-5467) dated October 18, 2005.
10.32	Guarantee by The Amalgamated Collateral Trust in favor of Snake River Sugar Company dated May 14, 1997—incorporated by reference to Exhibit 10.4 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended June 30, 1997.
10.33	Second SPT Guaranty Amendment dated October 14, 2005 among The Amalgamated Collateral Trust and Snake River Sugar Company—incorporated by reference to Exhibit No. 10.5 to Valhi, Inc.'s Amendment No. 1 to its Current Report on Form 8-K (File No. 1-5467) dated October 18, 2005.
10.34	Voting Rights and Collateral Deposit Agreement among Snake River Sugar Company, Valhi, Inc., and First Security Bank, National Association dated May 14, 1997—incorporated by reference to Exhibit 10.8 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended June 30, 1997.
10.35	Subordination Agreement between Valhi, Inc. and Snake River Sugar Company dated May 14, 1997—incorporated by reference to Exhibit 10.10 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended June 30, 1997.
10.36	First Amendment to the Subordination Agreement between Valhi, Inc. and Snake River Sugar Company dated October 19, 2000—incorporated by reference to Exhibit 10.7 to Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended September 30, 2000.
10.37	Form of Option Agreement among Snake River Sugar Company, Valhi, Inc. and the holders of Snake River Sugar Company's 10.9% Senior Notes Due 2009 dated May 14, 1997—incorporated by reference to Exhibit 10.11 to the Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended June 30, 1997.
10.38	Option Agreement dated October 14, 2005 among Valhi, Inc., Snake River Sugar Company, Northwest Farm Credit Services, FLCA and U.S. Bank National Association—incorporated by reference to Exhibit No. 10.6 to Valhi, Inc.'s Amendment No. 1 to its Current Report on Form 8-K (File No. 1-5467) dated October 18, 2005.
10.39	First Amendment to Option Agreements among Snake River Sugar Company, Valhi Inc., and the holders of Snake River's 10.9% Senior Notes Due 2009 dated October 19, 2000—incorporated by reference to Exhibit 10.8 to the Valhi, Inc.'s Quarterly Report on Form 10-Q (File No. 1-5467) for the quarter ended September 30, 2000.

10.40 Formation Agreement dated as of October 18, 1993 among Tioxide Americas Inc., Kronos Louisiana, Inc. and Louisiana Pigment Company, L.P.—incorporated by reference to Exhibit 10.2 of NL's Quarterly Report on Form 10-Q (File No. 1-640) for the quarter ended September 30, 1993.

10.41 Joint Venture Agreement dated as of October 18, 1993 between Tioxide Americas Inc. and Kronos Louisiana, Inc.—incorporated by reference to Exhibit 10.3 of NL's Quarterly Report on Form 10-Q (File No. 1-640) for the quarter ended September 30, 1993.

10.42 Kronos Offtake Agreement dated as of October 18, 1993 by and between Kronos Louisiana, Inc. and Louisiana Pigment Company, L.P.—incorporated by reference to Exhibit 10.4 of NL's Quarterly Report on Form 10-Q (File No. 1-640) for the quarter ended September 30, 1993.

10.43 Amendment No. 1 to Kronos Offtake Agreement dated as of December 20, 1995 between Kronos Louisiana, Inc. and Louisiana Pigment Company, L.P.—incorporated by reference to Exhibit 10.22 of NL's Annual Report on Form 10-K (File No. 1-640) for the year ended December 31 1995.

10.44 Allocation Agreement dated as of October 18, 1993 between Tioxide Americas Inc., ICI American Holdings, Inc., Kronos Worldwide, Inc. (f/k/a Kronos, Inc.) and Kronos Louisiana, Inc.—incorporated by reference to Exhibit 10.10 to NL's Quarterly Report on Form 10-Q (File No. 1-640) for the quarter ended September 30, 1993.

10.45 Lease Contract dated June 21, 1952, between Farbenfabrieken Bayer Aktiengesellschaft and Titangesellschaft mit beschrankter Haftung (German language version and English translation thereof)—incorporated by reference to Exhibit 10.14 of NL's Annual Report on Form 10-K (File No. 1-640) for the year ended December 31, 1985.

10.46 Administrative Settlement for Interim Remedial Measures, Site Investigation and Feasibility Study dated July 7, 2000 between the Arkansas Department of Environmental Quality, Halliburton Energy Services, Inc., M I, LLC and TRE Management Company—incorporated by reference to Exhibit 10.1 to Tremont Corporation's Quarterly Report on Form 10-Q (File No. 1-10126) for the quarter ended June 30, 2002.

Item No.	Exhibit Index
10.47	Restated and Amended Agreement by and between Richards Bay Titanium (Proprietary) Limited (acting through its sales agent Rio Tinto Iron & Titanium Limited) and Kronos (US), Inc. effective January 1, 2016 – incorporated by reference to Exhibit 10.26 to the Annual Report on Form 10-K of Kronos Worldwide, Inc. (File No. 001-31763) for the year ended December 31, 2015.
10.48	Credit Agreement, dated February 18, 2014, by and among Kronos Worldwide, Inc. and Deutsche Bank AG New York Branch - incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K and filed by Kronos Worldwide, Inc. (File No. 001-31763) dated February 18, 2014 and filed by the registrant on February 18, 2014.
10.49	First Amendment to Credit Agreement dated May 21, 2015 among Kronos Worldwide, Inc., Deutsche Bank AG New York Branch, as Administrative Agent, and the lenders a party thereto - incorporated by reference to Exhibit 10.1 to the current report on Form 8-K and filed by Kronos Worldwide, Inc. (File No. 001-31763) dated May 21, 2015 and filed by the registrant on May 21, 2015.
10.50	Guaranty and Security Agreement, dated February 18, 2014, among Kronos Worldwide, Inc., Kronos Louisiana, Inc., Kronos (US), Inc., Kronos International, Inc. and Deutsche Bank AG New York Branch - incorporated by reference to Exhibit 10.2 to the Current Report on Form 8-K (File No. 001-31763) dated February 18, 2014 and filed by and filed by Kronos Worldwide, Inc. on February 18, 2014.
10.51	Intercreditor Agreement dated as of February 18, 2014, by and between Wells Fargo Capital Finance and Deutsche Bank AG New York Branch, and acknowledged by Kronos Worldwide, Inc., Kronos Louisiana, Inc. and Kronos (US), Inc. - incorporated by reference to Exhibit 10.3 to the Current Report on Form 8-K (File No. 001-31763) dated February 18, 2014 and filed by and filed by Kronos Worldwide, Inc. on February 18, 2014.
10.52	Purchase Agreement by and between Rockwell Holdco, Inc. and Andrews County Holding, Inc.—incorporated by reference to Exhibit No. 2.1 to Valhi, Inc.'s Current Report on Form 8-K (File No. 333-48391) dated November 19, 2015.
10.53	First amendment to Purchase Agreement by and between Rockwell Holdco, Inc., as Purchaser, and Andrews County Holdings, Inc., as Seller, dated as of August 29, 2016 - —incorporated by reference to Exhibit No. 2.1 to Valhi, Inc.'s Current Report on Form 8-K (File No. 333-48391) dated August 29, 2016.
10.54	Second amendment to Purchase Agreement by and between Rockwell Holdco, Inc., as Purchaser, and Andrews County Holdings, Inc., as Seller, dated as of September 23, 2016 - —incorporated by reference to Exhibit No. 2.1 to Valhi, Inc.'s Current Report on Form 8-K (File No. 333-48391) dated September 23, 2016.
10.55	Third amendment to Purchase Agreement by and between Rockwell Holdco, Inc., as Purchaser, and Andrews County Holdings, Inc., as Seller, dated as of October 19, 2016 - —incorporated by reference to Exhibit No. 2.1 to Valhi, Inc.'s Current Report on Form 8-K (File No. 333-48391) dated October 19, 2016.

10.56	Fourth amendment to Purchase Agreement by and between Rockwell Holdco, Inc., as Purchaser, and Andrews County Holdings, Inc., as Seller, dated as of November 14, 2016 - —incorporated by reference to Exhibit No. 2.1 to Valhi, Inc.'s Current Report on Form 8-K (File No. 333-48391) dated November 14, 2016.
21.1**	Subsidiaries of Valhi, Inc.
23.1**	Consent of PricewaterhouseCoopers LLP with respect to Valhi's Consolidated Financial Statements
31.1**	Certification
31.2**	Certification
32.1**	Certification
101.INS **	XBRL Instance Document
101.SCH **	XBRL Taxonomy Extension Schema
101.CAL **	XBRL Taxonomy Extension Calculation Linkbase
101.DEF **	XBRL Taxonomy Extension Definition Linkbase
101.LAB **	XBRL Taxonomy Extension Label Linkbase
101.PRE **	XBRL Taxonomy Extension Presentation Linkbase

* Management contract, compensatory plan or agreement.
** Filed herewith.

+Exhibit 3.1 is restated for the purposes of the disclosure requirements of Item 601 of Regulation S-K promulgated by the U.S. Securities and Exchange Commission and does not represent a restated certificate of incorporation that has been filed with the Delaware Secretary of State.

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.

VALHI, INC.

(Registrant)

By: /s/ Robert D. Graham
Robert D. Graham, March 10, 2017
(Chairman of the Board, President and Chief Executive Officer)

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

/s/ Thomas E. Barry Thomas E. Barry, March 10, 2017 (Director)	/s/ Robert D. Graham Robert D. Graham, March 10, 2017 (Chairman of the Board, President and Chief Executive Officer)
/s/ Loretta J. Feehan Loretta J. Feehan, March 10, 2017 (Director)	/s/ Gregory M. Swalwell Gregory M. Swalwell, March 10, 2017 (Executive Vice President, Chief Financial Officer and Chief Accounting Officer)
/s/ Elisabeth C. Fisher Elisabeth C. Fisher, March 10, 2017 (Director)	/s/ Amy Allbach Samford Amy Allbach Samford, March 10, 2017 (Vice President and Controller)
/s/ W. Hayden McIlroy W. Hayden McIlroy, March 10, 2017 (Director)	
/s/ Mary A.Tidlund Mary A. Tidlund, March 10, 2017 (Director)	

Annual Report on Form 10-K

Items 8, 15(a) and 15(c)

Index of Financial Statements

We have omitted all financial statement schedules because they are not applicable or the required amounts are either not material or are presented in the Notes to the Consolidated Financial Statements.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and Board of Directors of Valhi, Inc.:

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of operations, of comprehensive income (loss), of stockholders' equity and of cash flows present fairly, in all material respects, the financial position of Valhi, Inc. and its subsidiaries as of December 31, 2015 and 2016, 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. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these financial statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

As discussed in Note 20 to the consolidated financial statements, the Company changed the manner in which it presents restricted cash and restricted cash equivalents in the statement of cash flows in 2016.

/s/ PricewaterhouseCoopers LLP

Dallas, Texas

March 10, 2017

VALHI, INC. AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

(In millions)

	December 31, 2015	2016
ASSETS		
Current assets:		
Cash and cash equivalents	$202.3	$159.8
Restricted cash equivalents	7.2	12.5
Marketable securities	2.0	4.4
Accounts and other receivables, net	228.9	268.0
Refundable income taxes	7.4	1.0
Receivable from affiliates	10.3	3.2
Land held for development	9.9	10.9
Inventories, net	405.2	360.6
Other current assets	23.0	17.0
Total current assets	896.2	837.4
Other assets:		
Marketable securities	254.9	253.5
Investment in TiO_2 manufacturing joint venture	82.9	78.9
Goodwill	379.7	379.7
Deferred income taxes	1.3	1.2
Pension asset	1.7	1.6
Other assets	255.0	236.4
Total other assets	975.5	951.3
Property and equipment:		
Land	45.4	45.4
Buildings	239.7	237.5
Equipment	1,061.6	1,070.6
Treatment, storage and disposal facilities	159.5	159.6
Mining properties	35.5	35.1
Construction in progress	33.1	41.8
	1,574.8	1,590.0
Less accumulated depreciation	909.1	935.5
Net property and equipment	665.7	654.5
Total assets	$2,537.4	$2,443.2

VALHI, INC. AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS (CONTINUED)

(In millions, except share data)

	December 31, 2015	December 31, 2016
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Current maturities of long-term debt	$9.5	$7.8
Accounts payable	104.8	94.4
Accrued liabilities	121.1	135.2
Payable to affiliates	45.5	51.6
Income taxes	5.7	5.1
Total current liabilities	286.6	294.1
Noncurrent liabilities:		
Long-term debt	951.0	957.2
Deferred income taxes	321.0	275.0
Accrued pension costs	216.8	240.2
Accrued environmental remediation and related costs	108.7	107.3
Accrued postretirement benefits costs	11.8	11.1
Other liabilities	114.6	113.9
Total noncurrent liabilities	1,723.9	1,704.7
Equity:		
Valhi stockholders' equity:		
Preferred stock, $.01 par value; 5,000 shares authorized; 5,000 shares issued	667.3	667.3
Common stock, $.01 par value; 500.0 million shares authorized; 355.2 million shares issued and outstanding	3.6	3.6
Additional paid-in capital	—	—
Retained earnings (deficit)	(155.6)	(198.5)
Accumulated other comprehensive loss	(197.0)	(221.9)
Treasury stock, at cost—13.2 million shares	(49.6)	(49.6)
Total Valhi stockholders' equity	268.7	200.9
Noncontrolling interest in subsidiaries	258.2	243.5
Total equity	526.9	444.4
Total liabilities and equity	$2,537.4	$2,443.2
Commitments and contingencies (Notes 9, 14, 17 and 18)		

See accompanying Notes to Consolidated Financial Statements.

VALHI, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS

(In millions, except per share data)

	Years ended December 31,		
	2014	2015	2016
Revenues and other income:			
Net sales	$1,862.6	$1,532.9	$1,566.8
Other income, net	42.0	32.0	39.4
Total revenues and other income	1,904.6	1,564.9	1,606.2
Costs and expenses:			
Cost of sales	1,459.8	1,310.0	1,274.7
Selling, general and administrative	276.1	269.7	260.2
Contract related intangible asset impairment	—	—	5.1
Interest	56.7	59.0	63.2
Total costs and expenses	1,792.6	1,638.7	1603.2
Income (loss) before income taxes	112.0	(73.8)	3.0
Income tax expense	32.5	97.3	6.0
Net income (loss)	79.5	(171.1)	(3.0)
Noncontrolling interest in net income (loss) of subsidiaries	25.7	(37.5)	12.9
Net income (loss) attributable to Valhi stockholders	$53.8	$(133.6)	$(15.9)
Basic and diluted net income (loss) per share	$.16	$(.39)	$(.05)
Cash dividends per share	$.11	$.08	$.08
Basic and diluted weighted average shares outstanding	342.0	342.0	342.0

See accompanying Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

(In millions)

	Years ended December 31,		
	2014	2015	2016
Net income (loss)	$79.5	$(`171.1)	$(3.0)
Other comprehensive income (loss), net of tax:			
Currency translation	(105.8)	(77.0)	(14.5)
Interest rate swap	—	(1.8)	.2
Marketable securities	(22.1)	(7.5)	4.0
Defined benefit pension plans	(71.6)	12.6	(19.7)
Other postretirement benefit plans	(2.5)	(.7)	(.9)
Total other comprehensive loss, net	(202.0)	(74.4)	(30.9)
Comprehensive loss	(122.5)	(245.5)	(33.9)
Comprehensive income (loss) attributable to noncontrolling interest	(35.7)	(63.5)	6.9
Comprehensive loss attributable to Valhi stockholders	$(86.8)	$(182.0)	$(40.8)

See accompanying Notes to Consolidated Financial Statements.

VALHI, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

Years ended December 31, 2014, 2015 and 2016

(In millions)

	Valhi Stockholders' Equity							
	Preferred stock	Common stock	Additional paid-in capital	Retained earnings (deficit)	Accumulated other comprehensive income (loss)	Treasury stock	Non-controlling interest	Total equity
Balance at December 31, 2013	$667.3	$ 3.6	$ 27.6	$(39.6)	$ (8.0)	$(49.6)	$ 391.5	$992.8
Net income	—	—	—	53.8	—	—	25.7	79.5
Cash dividends	—	—	(28.0)	(9.3)	—	—	(19.3)	(56.6)
Other comprehensive loss, net	—	—	—	—	(140.6)	—	(61.4)	(202.0)
Equity transactions with noncontrolling interest, net	—	—	.4	—	—	—	(.2)	.2
Balance at December 31, 2014	667.3	3.6	—	4.9	(148.6)	(49.6)	336.3	813.9
Net income	—	—	—	(133.6)	—	—	(37.5)	(171.1)
Cash dividends	—	—	(.2)	(26.9)	—	—	(14.6)	(41.7)
Other comprehensive loss, net	—	—	—	—	(48.4)	—	(26.0)	(74.4)
Equity transactions with noncontrolling interest, net	—	—	.2	—	—	—	—	.2
Balance at December 31, 2015	667.3	3.6	—	(155.6)	(197.0)	(49.6)	258.2	526.9
Net income (loss)	—	—	—	(15.9)	—	—	12.9	(3.0)
Cash dividends	—	—	(.2)	(26.9)	—	—	(21.6)	(48.7)
Other comprehensive loss, net	—	—	—	—	(24.9)	—	(6.0)	(30.9)
Equity transactions with noncontrolling interest, net	—	—	.2	(.1)	—	—	—	.1
Balance at December 31, 2016	$667.3	$ 3.6	$ —	$(198.5)	$ (221.9)	$(49.6)	$ 243.5	$444.4

See accompanying Notes to Consolidated Financial Statements.

VALHI, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In millions)

	Years ended December 31,		
	2014	2015	2016
Cash flows from operating activities:			
Net income (loss)	$79.5	$(171.1)	$(3.0)
Depreciation and amortization	78.4	69.9	67.5
Net (gain) loss from:			
Securities transactions, net	(.3)	—	(.5)
Disposal of property and equipment, net	.9	.8	.3
Noncash interest expense	2.3	2.5	2.6
Benefit plan expense greater (less) than cash funding	(3.1)	2.9	4.6
Deferred income taxes	10.0	85.7	(39.1)
Distributions from TiO_2 manufacturing joint venture, net	10.6	6.5	3.6
Contract related intangible asset impairment	—	—	5.1
Other, net	8.0	7.8	1.9
Change in assets and liabilities:			
Accounts and other receivables, net	(27.2)	22.2	(47.4)
Land held for development, net	(6.8)	7.1	18.3
Inventories, net	(55.1)	(8.4)	39.6
Accounts payable and accrued liabilities	(26.4)	(14.3)	(.3)
Income taxes	5.4	(.9)	3.7
Accounts with affiliates	(13.2)	17.1	13.8
Other noncurrent assets	2.8	(2.5)	.1
Other noncurrent liabilities	4.8	2.7	(3.8)
Other, net	(3.3)	(5.9)	12.8
Net cash provided by operating activities	67.3	22.1	79.8

VALHI, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS (CONTINUED)

(In millions)

	Years ended December 31,		
	2014	2015	2016
Cash flows from investing activities:			
Capital expenditures	$(72.7)	$(54.6)	$(58.9)
Capitalized permit costs	(.3)	(1.3)	(1.5)
Purchases of marketable securities	(16.3)	(13.6)	(11.4)
Proceeds from disposal of marketable securities	15.1	15.0	10.7
Other, net	.5	.4	(.5)
Net cash used in investing activities	(73.7)	(54.1)	(61.6)
Cash flows from financing activities:			
Indebtedness:			
Borrowings	515.6	84.9	312.2
Principal payments	(343.1)	(53.4)	(309.0)
Deferred financing costs paid	(6.1)	—	—
Valhi cash dividends paid	(37.3)	(27.1)	(27.1)
Distributions to noncontrolling interest in subsidiaries	(18.9)	(15.0)	(21.6)
Net cash provided by (used in) financing activities	110.2	(10.6)	(45.5)
Net increase (decrease)	$103.8	$(42.6)	$(27.3)

VALHI, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS (CONTINUED)

(In millions)

	Years ended December 31,		
	2014	2015	2016
Cash, cash equivalents and restricted cash and cash equivalents – net change from			
Operating, investing and financing activities	$103.8	$(42.6)	$(27.3)
Effect of exchange rates on cash	(10.1)	(8.5)	(5.3)
Net change for the year	93.7	(51.1)	(32.6)
Balance at beginning of year	186.5	280.2	229.1
Balance at end of year	$280.2	$229.1	$196.5
Supplemental disclosures:			
Cash paid for:			
Interest, net of amounts capitalized	$53.9	$56.6	$60.8
Income taxes, net	33.4	10.2	20.3
Noncash investing activities:			
Change in accruals for capital expenditures	6.5	6.7	8.0
Accruals for capital lease additions	8.9	—	—

See accompanying Notes to Consolidated Financial Statements.

VALHI, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

December 31, 2016

Note 1—Summary of significant accounting policies:

Nature of our business. Valhi, Inc. (NYSE: VHI) is primarily a holding company. We operate through our wholly-owned and majority-owned subsidiaries, including NL Industries, Inc., Kronos Worldwide, Inc., CompX International Inc., Waste Control Specialists LLC ("WCS"), Tremont LLC, Basic Management, Inc. ("BMI") and The LandWell Company ("LandWell"). Kronos (NYSE: KRO), NL (NYSE: NL), and CompX (NYSE MKT: CIX) each file periodic reports with the Securities and Exchange Commission ("SEC").

Organization. We are majority owned by a wholly-owned subsidiary of Contran Corporation ("Contran"), which owns approximately 93% of our outstanding common stock at December 31, 2016. All of Contran's outstanding voting stock is held by a family trust established for the benefit of Lisa K. Simmons and Serena Simmons Connelly and their children, for which Ms. Simmons and Ms. Connelly are co-trustees, or is held directly by Ms. Simmons and Ms. Connelly or entities related to them. Consequently, Ms. Simmons and Ms. Connelly may be deemed to control Contran and us.

Unless otherwise indicated, references in this report to "we," "us" or "our" refer to Valhi, Inc. and its subsidiaries, taken as a whole.

Management's estimates. The preparation of our Consolidated Financial Statements in conformity with accounting principles generally accepted in the United States of America ("GAAP"), requires us to make estimates and assumptions that affect the reported amounts of our assets and liabilities and disclosures of contingent assets and liabilities at each balance sheet date and the reported amounts of our revenues and expenses during each reporting period. Actual results may differ significantly from previously-estimated amounts under different assumptions or conditions.

Principles of consolidation. Our consolidated financial statements include the financial position, results of operations and cash flows of Valhi and our majority-owned and wholly-owned subsidiaries. We eliminate all material intercompany accounts and balances. Changes in ownership are accounted for as equity transactions with no gain or loss recognized on the transaction unless there is a change in control. See Note 3.

Foreign currency translation. The financial statements of our foreign subsidiaries are translated to U.S. dollars. The functional currency of our foreign subsidiaries is generally the local currency of the country. Accordingly, we translate the assets and liabilities at year-end rates of exchange, while we translate their revenues and expenses at average exchange rates prevailing during the year. We accumulate the resulting translation adjustments in stockholders' equity as part of accumulated other comprehensive income (loss), net of related deferred income taxes and noncontrolling interest. We recognize currency transaction gains and losses in income.

Derivatives and hedging activities. We recognize derivatives as either an asset or liability measured at fair value in accordance with Accounting Standards Codification ("ASC") Topic 815, Derivatives and Hedging. We recognize the effect of changes in the fair value of derivatives either in net income or other comprehensive income (loss), depending on the intended use of the derivative. See Note 19.

Cash and cash equivalents. We classify bank time deposits and government and commercial notes and bills with original maturities of three months or less as cash equivalents.

Restricted cash and cash equivalents. We classify cash and cash equivalents that have been segregated or are otherwise limited in use as restricted. Such restrictions principally include amounts pledged as collateral with respect to performance obligations or letters of credit required by regulatory agencies for certain closure and post-closure obligations of our Waste Management Segment and various environmental remediation sites, cash held in escrow under various hold-back agreements with third-party homebuilders associated with our Real Estate Management and Development Segment, cash pledged under debt agreement covenants and cash held in trust by our insurance brokerage subsidiary pending transfer to the applicable insurance or reinsurance carrier. To the extent the restricted amount relates to a recognized liability, we classify the restricted amount as current or noncurrent according to the corresponding liability. To the extent the restricted amount does not relate to a recognized liability, we classify restricted cash as a current asset. Restricted cash and cash equivalents classified as a current asset are presented separately on our Consolidated Balance Sheets, and restricted cash and cash equivalents classified as a noncurrent asset are presented as a component of other assets on our Consolidated Balance Sheets, as disclosed in Note 7.

Marketable securities and securities transactions. We carry marketable debt and equity securities at fair value. ASC Topic 820, Fair Value Measurements and Disclosures, establishes a consistent framework for measuring fair value and (with certain exceptions) this framework is generally applied to all financial statements items required to be measured at fair value. The standard requires fair value measurements to be classified and disclosed in one of the following three categories:

- Level 1—Unadjusted quoted prices in active markets that are accessible at the measurement date for identical, unrestricted assets or liabilities;
- Level 2—Quoted prices in markets that are not active, or inputs which are observable, either directly or indirectly, for substantially the full term of the assets or liability; and
- Level 3—Prices or valuation techniques that require inputs that are both significant to the fair value measurement and unobservable.

We recognize unrealized and realized gains and losses on trading securities in income. We accumulate unrealized gains and losses on available-for-sale securities as part of accumulated other comprehensive income (loss), net of related deferred income taxes and noncontrolling interest. Realized gains and losses are based on specific identification of the securities sold.

Accounts receivable. We provide an allowance for doubtful accounts for known and estimated potential losses arising from our sales to customers based on a periodic review of these accounts.

Inventories and cost of sales. We state inventories at the lower of cost or market, net of allowance for obsolete and slow-moving inventories. We generally base inventory costs for all inventory categories on average cost that approximates the first-in, first-out method. Inventories include the costs for raw materials, the cost to manufacture the raw materials into finished goods and overhead. Depending on the inventory's stage of completion, our manufacturing costs can include the costs of packing and finishing, utilities, maintenance, depreciation, shipping and handling, and salaries and benefits associated with our manufacturing process. We allocate fixed manufacturing overhead costs based on normal production capacity. Unallocated overhead costs resulting from periods with abnormally low production levels are charged to expense as incurred. As inventory is sold to third parties, we recognize the cost of sales in the same period the sale occurs. We periodically review our inventory for estimated obsolescence or instances when inventory is no longer marketable for its intended use, and we record any write-down equal to the difference between the cost of inventory and its estimated net realizable value based on assumptions about alternative uses, market conditions and other factors.

Land held for development. Land held for development relates to BMI and LandWell, for which we gained a controlling interest prior to 2014. The primary asset of LandWell is certain real property in Henderson, Nevada some of which we are developing for residential lots in a master planned community. Land held for development was recorded at the estimated acquisition date fair value based on a value per developable acre at the time of purchase. Development costs, including infrastructure improvements, real estate taxes, capitalized interest and other costs, some of which may be allocated, are capitalized during the period incurred. We allocate costs to each parcel sold on a pro-rata basis associated with the relevant development activity, and the costs allocated to parcels expected to be sold within one year are presented separately in current assets on our Consolidated Balance Sheets. As land parcels are sold, costs of land sales, including land and development costs, are allocated based on specific identification, relative sales value, square footage or a combination of these methods. All sales and marketing activities and general overhead are charged to selling, general and administrative expense as incurred.

Investment in TiO_2 manufacturing joint venture. We account for our investment in a 50%-owned manufacturing joint venture by the equity method. Distributions received from such investee are classified for statement of cash flow purposes using the "nature of distribution" approach under ASC Topic 230. See Note 7.

Goodwill and other intangible assets; amortization expense. Goodwill represents the excess of cost over fair value of individual net assets acquired in business combinations. Goodwill is not subject to periodic amortization. We amortize other intangible assets by the straight-line method over their estimated lives and state them net of accumulated amortization. We evaluate goodwill for impairment, annually, or when circumstances indicate the carrying value may not be recoverable. We evaluate other intangible assets for impairment when events or changes in circumstances indicate the carrying value may not be recoverable. See Note 8.

Capitalized operating permits. Our Waste Management Segment capitalizes direct costs related to the acquisition or renewal of operating permits and amortizes such costs by the straight-line method over the term of the applicable permit. Our net capitalized operating permit costs include (i) costs to renew certain permits for which the renewal application is pending with the applicable regulatory agency and (ii) costs to apply for certain new permits which have not yet been issued by the applicable regulatory authority. We currently expect renewal of the permits for which application is still pending will occur in the ordinary course of business, and we are amortizing costs related to such renewals from the date the prior permit expired. All operating permits are generally subject to renewal at the option of the issuing governmental agency. See Note 7.

Property and equipment; depreciation expense. We state property and equipment at acquisition cost, including capitalized interest on borrowings during the actual construction period of major capital projects. In 2014, 2015 and 2016 we capitalized $2.9 million, $1.1 million and $1.0 million, respectively, of interest costs. We compute depreciation of property and equipment for financial reporting purposes (including mining equipment) principally by the straight-line method over the estimated useful lives of the assets as follows:

Asset	Useful lives
Buildings and improvements	10 to 40 years
Machinery and equipment	3 to 20 years
Mine development costs	Units-of-production
Landfill disposal costs	Units-of-consumption

We use accelerated depreciation methods for income tax purposes, as permitted. Upon the sale or retirement of an asset, we remove the related cost and accumulated depreciation from the accounts and recognize any gain or loss in income currently.

We expense expenditures for maintenance, repairs and minor renewals as incurred that do not improve or extend the life of the assets, including planned major maintenance.

We have a governmental concession with an unlimited term to operate our ilmenite mines in Norway. Mining properties consist of buildings and equipment used in our Norwegian ilmenite mining operations. While we own the land and ilmenite reserves associated with the mining operations, such land and reserves were acquired for nominal value and we have no material asset recognized for the land and reserves related to our mining operations.

We operate waste disposal facilities. We capitalize preparation costs for landfill disposal cells, including costs relating to excavation and grading and the design and construction of liner and leachate collection system. We recognize closure and post closure costs as part of the carrying value of our disposal facilities.

We perform impairment tests when events or changes in circumstances indicate the carrying value may not be recoverable. We consider all relevant factors. We perform the impairment test by comparing the estimated future undiscounted cash flows (exclusive of interest expense) associated with the asset or asset group to the asset's net carrying value to determine if a write-down to fair value is required.

Closure and post closure costs. The closure and post closure obligations related to our Waste Management Segment's waste disposal sites are covered by the scope of ASC Topic 410, Asset Retirement and Environmental Obligations. We recognize the fair value of a liability for an asset retirement obligation in accordance with ASC Topic 410 in the period in which the liability is incurred, with an offsetting increase in the carrying amount of the related long-lived asset. Over time, we accrete the liability to its future value, and we depreciate the capitalized cost over the useful life of the related asset. The accretion and depreciation expenses are reported as a component of cost of sales in the accompanying statement of operations. We account for future revisions in the estimated fair value of the asset retirement obligation due to changes in the amount and/or timing of the expected future cash flows to settle the retirement obligation, prospectively as an adjustment to the previously-recognized asset retirement cost. Upon settlement of the liability, we will either settle the obligation for its recorded amount or incur a gain or loss upon settlement. See Note 10.

Long-term debt. We state long-term debt net of any unamortized original issue premium, discount or deferred financing costs (other than deferred financing costs associated with revolving credit facilities, which are recognized as an asset). We classify amortization of deferred financing costs and any premium or discount associated with the issuance of indebtedness as interest expense, and compute amortization by either the interest method or the straight-line method over the term of the applicable issue.

Employee benefit plans. Accounting and funding policies for our retirement plans are described in Note 11.

Income taxes. We and our qualifying subsidiaries are members of Contran's consolidated U.S federal income tax group (the "Contran Tax Group"). We and certain of our qualifying subsidiaries also file consolidated income tax returns with Contran in various U.S. state jurisdictions. As a member of the Contran Tax Group, we are jointly and severally liable for the federal income tax liability of Contran and the other companies included in the Contran Tax Group for all periods in which we are included in the Contran Tax Group. See Note 17. As a member of the Contran Tax Group, we are a party to a tax sharing agreement which provides that we compute our tax provision for U.S. income taxes on a separate-company basis using the tax elections made by Contran. Pursuant to the tax sharing agreement, we make payments to or receive payments from Contran in amounts we would have paid to or received from the U.S. Internal Revenue Service or the applicable state tax authority had we not been a member of the Contran Tax Group. We made net cash payments for income taxes to Contran of $19.3 million in 2014, $2.5 million in 2015 and $10.7 million in 2016.

We recognize deferred income tax assets and liabilities for the expected future tax consequences of temporary differences between amounts recorded in our Consolidated Financial Statements and the tax basis of our assets and liabilities, including investments in our subsidiaries and affiliate who are not members of the Contran Tax Group and undistributed earnings of foreign subsidiaries which are not deemed to be permanently reinvested. Deferred income tax assets and liabilities for each tax-paying jurisdiction in which we operate are netted and presented as either a noncurrent deferred income tax asset or liability as applicable. In addition, we recognize deferred income taxes with respect to the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock because the exemption under GAAP to avoid recognition of such deferred income taxes is not available to us. The earnings of our foreign subsidiaries subject to permanent reinvestment plans aggregated $660 million at December 31, 2016. It is not practical for us to determine the amount of the unrecognized deferred income tax liability related to these earnings due to the complexities associated with the U.S. taxation on earnings of foreign subsidiaries repatriated to the U.S. We periodically evaluate our deferred tax assets in the various taxing jurisdictions in which we operate and adjust any related valuation allowance based on the estimate of the amount of such deferred tax assets we believe does not meet the more-likely-than-not recognition criteria.

We record a reserve for uncertain tax positions where we believe it is more-likely-than-not our position will not prevail with the applicable tax authorities. The amount of the benefit associated with our uncertain tax positions that we recognize is limited to the largest amount for which we believe the likelihood of realization is greater than 50%. We accrue penalties and interest on the difference between tax positions taken on our tax returns and the amount of benefit recognized for financial reporting purposes. We classify our reserves for uncertain tax positions in a separate current or noncurrent liability, depending on the nature of the tax position. See Note 14.

Environmental remediation and related costs. We record liabilities related to environmental remediation and related costs when estimated future expenditures are probable and reasonably estimable. We adjust these accruals as further information becomes available to us or as circumstances change. We generally do not discount estimated future expenditures to its present value due to the uncertainty of the timing of the ultimate payout. We recognize any recoveries of remediation costs from other parties when we deem their receipt to be probable. We expense any environmental remediation related legal costs as incurred. At December 31, 2015 and 2016, we had not recognized any material receivables for recoveries. See Note 18.

Net sales. We record sales when products are shipped and title and other risks and rewards of ownership have passed to the customer, or when we perform services. We include amounts charged to customers for shipping and handling costs in net sales. We state sales net of price, early payment and distributor discounts and volume rebates. We report taxes assessed by a governmental authority such as sales, use, value added, excise taxes and fees from the State of Texas and Andrews County, Texas on a net basis (meaning we do not recognize these taxes in either our revenues or in our costs and expenses).

Certain retail land sales of our Real Estate Management and Development Segment are recognized under the under the percentage-of-completion method when we are required to complete property development and improvements after title passes to the buyer and when all of the criteria of ASC 970-605-30 are met. Under such method, revenues and profits are recognized in the same proportion of our progress towards completion of our contractual obligations, with our progress measured by costs incurred as a percentage of total costs estimated to be incurred. Such costs incurred and total estimated costs include amounts specifically identifiable with the parcels sold as well as certain development costs for the entire residential/planned community which are allocated to the parcels sold under applicable GAAP. Other retail land sales are generally recognized by the full accrual method of accounting at closing, in which title passes to the customer and we have no remaining contractual obligations to the buyer.

Selling, general and administrative expenses; shipping and handling costs; advertising costs; research and development costs. Selling, general and administrative expenses include costs related to marketing, sales, distribution, shipping and handling, research and development, legal, environmental remediation and administrative functions such as accounting, treasury and finance, and includes costs for salaries and benefits not associated with our manufacturing process, travel and entertainment, promotional materials and professional fees. Shipping and handling costs of our Chemicals Segment were approximately $95 million in 2014, $87 million in 2015 and $90 million in 2016. Shipping and handling costs of our Component Products and Waste Management Segments are not material. We expense advertising and research, development and sales technical support costs as incurred. Advertising costs were approximately $1 million in each of 2014, 2015 and 2016. Research, development and certain sales technical support costs were approximately $19 million in 2014, $16 million in 2015 and $13 million in 2016.

Note 2—Business and geographic segments:

Business segment	Entity	% controlled at December 31, 2016	
Chemicals	Kronos	80	%
Component products	CompX	87	%
Waste management	WCS	100	%
Real estate management and development	BMI and LandWell	63% - 77	%

Our control of Kronos includes 50% we hold directly and 30% held directly by NL. We own 83% of NL. Our control of CompX is through NL. We own 63% of BMI. Our control of LandWell includes the 27% we hold directly and 50% held by BMI. See Note 3.

We are organized based upon our operating subsidiaries. Our operating segments are defined as components of our consolidated operations about which separate financial information is available that is regularly evaluated by our chief operating decision maker in determining how to allocate resources and in assessing performance. Each operating segment is separately managed, and each operating segment represents a strategic business unit offering different products.

We have the following four consolidated reportable operating segments.

- Chemicals—Our chemicals segment is operated through our majority control of Kronos. Kronos is a leading global producer and marketer of value-added titanium dioxide pigments (“TiO_2”). TiO_2 is used to impart whiteness, brightness, opacity and durability to a wide variety of products, including paints, plastics, paper, fibers and ceramics. Additionally, TiO_2 is a critical component of everyday applications, such as coatings, plastics and paper, as well as many specialty products such as inks, foods and cosmetics. See Note 7.
- Component Products—We operate in the component products industry through our majority control of CompX. CompX is a leading manufacturer of security products used in the recreational transportation, postal, office and institutional furniture, cabinetry, tool storage, healthcare and a variety of other industries. CompX is also a leading manufacturer of stainless steel exhaust systems, gauges, throttle controls and trim tabs for the recreational marine industry. All of CompX production facilities are in the United States.
- Waste Management—WCS is our subsidiary which operates a West Texas facility for the processing, treatment, storage and disposal of a broad range of low-level radioactive, hazardous, toxic and other wastes. WCS obtained a byproduct disposal license in 2008 and began disposal operations at this facility in 2009. WCS received a low-level radioactive waste (“LLRW”) disposal license in 2009. The Compact LLRW disposal facility commenced operations in 2012, and the Federal LLRW site commenced operations in 2013. We reached an agreement for the sale of our Waste Management Segment in November 2015, and which sale is subject to certain customary closing conditions, including the receipt of U.S. antitrust approval. See Note 3.
- Real Estate Management and Development—We operate in real estate management and development through our majority control of BMI and LandWell. BMI provides utility services to certain industrial and municipal customers and owns real property in Henderson, Nevada. LandWell is engaged in efforts to develop certain land holdings for commercial, industrial and residential purposes in Henderson, Nevada.

We evaluate segment performance based on segment operating income, which we define as income before income taxes and interest expense, exclusive of certain non-recurring items (such as gains or losses on disposition of business units and other long-lived assets outside the ordinary course of business and certain legal settlements) and certain general corporate income and expense items (including securities transactions gains and losses and interest and dividend income), which are not attributable to the operations of the reportable operating segments. The accounting policies of our reportable operating segments are the same as those described in Note 1. Segment results we report may differ from amounts separately reported by our various subsidiaries and affiliates due to purchase accounting adjustments and related amortization or differences in how we define operating income. Intersegment sales are not material.

Interest income included in the calculation of segment operating income is not material in 2014, 2015 or 2016. Capital expenditures include additions to property and equipment but exclude amounts we paid for business units acquired in business combinations. Depreciation and amortization related to each reportable operating segment includes amortization of any intangible assets attributable to the segment. Amortization of deferred financing costs and any premium or discount associated with the issuance of indebtedness is included in interest expense.

Segment assets are comprised of all assets attributable to each reportable operating segment, including goodwill and other intangible assets. Our investment in the TiO_2 manufacturing joint venture (see Note 7) is included in the Chemicals Segment's assets. Corporate assets are not attributable to any operating segment and consist principally of cash and cash equivalents, restricted cash equivalents and marketable securities. Our Real Estate Management and Development Segment's operating loss in 2016 includes a first quarter $5.1 million contract related intangible asset impairment which is included in the determination of its operating income, see Note 7. Our Chemicals Segment's operating income in 2016 includes $4.3 million in business interruption insurance proceeds which is included in the determination of its operating income, see Note 12.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Net sales:			
Chemicals	$1,651.9	$1,348.8	$1,364.3
Component products	103.9	109.0	108.9
Waste management	66.5	45.0	47.4
Real estate management and development	40.3	30.1	46.2
Total net sales	$1,862.6	$1,532.9	$1,566.8
Cost of sales:			
Chemicals	$1,304.6	$1,158.5	$1,109.2
Component products	71.6	75.6	73.8
Waste management	49.7	50.5	55.5
Real estate management and development	33.9	25.4	36.2
Total cost of sales	$1,459.8	$1,310.0	$1,274.7
Gross margin:			
Chemicals	$347.3	$190.3	$255.1
Component products	32.3	33.4	35.1
Waste management	16.8	(5.5)	(8.1)
Real estate management and development	6.4	4.7	10.0
Total gross margin	$402.8	$222.9	$292.1
Operating income (loss):			
Chemicals	$156.8	$7.1	$91.0
Component products	13.6	14.0	15.6
Waste management	(2.2)	(26.5)	(26.2)
Real estate management and development	2.0	—	.8
Total operating income (loss)	170.2	(5.4)	81.2
Equity in earnings of investee	—	—	—
General corporate items:			
Securities earnings	26.9	26.5	27.7
Insurance recoveries	10.4	3.7	.4
General expenses, net	(38.8)	(39.6)	(43.1)
Interest expense	(56.7)	(59.0)	(63.2)
Income (loss) before income taxes	$112.0	$(73.8)	$3.0

	Years ended December 31, 2014	2015	2016
	(In millions)		
Depreciation and amortization:			
Chemicals	$ 51.9	$ 44.3	$ 42.6
Component products	3.5	3.5	3.7
Waste management	20.3	19.3	18.3
Real estate management and development	2.7	2.8	2.9
Total	$ 78.4	$ 69.9	$ 67.5
Capital expenditures:			
Chemicals	$ 61.3	$ 47.5	$ 53.0
Component products	2.8	4.2	3.2
Waste management	4.5	1.7	.7
Real estate management and development	4.0	1.2	2.0
Corporate	.1	—	—
Total	$ 72.7	$ 54.6	$ 58.9

	December 31, 2014	2015	2016
	(In millions)		
Total assets:			
Operating segments:			
Chemicals	$ 2,001.2	$ 1,617.6	$ 1,548.9
Component products	83.1	88.7	97.9
Waste management	257.7	231.9	228.6
Real estate management and development	246.1	232.9	200.9
Corporate and eliminations	357.1	366.3	366.9
Total	$ 2,945.2	$ 2,537.4	$ 2,443.2

Geographic information. We attribute net sales to the place of manufacture (point-of-origin) and the location of the customer (point-of-destination); we attribute property and equipment to their physical location. At December 31, 2016 the net assets of our non-U.S. subsidiaries included in consolidated net assets approximated $621 million (in 2015 the total was $422 million).

	Years ended December 31, 2014	2015	2016
	(In millions)		
Net sales—point of origin:			
United States	$ 993.7	$ 841.9	$ 866.7
Germany	844.1	690.0	699.8
Canada	252.3	216.9	257.7
Belgium	249.3	198.8	187.4

Norway	256.8	183.5	164.8
Eliminations	(733.6)	(598.2)	(609.6)
Total	$1,862.6	$1,532.9	$1,566.8
Net sales—point of destination:			
North America	$753.2	$604.0	$614.2
Europe	883.6	700.9	698.2
Asia and other	225.8	228.0	254.4
Total	$1,862.6	$1,532.9	$1,566.8

	December 31, 2014	2015	2016
	(In millions)		
Net property and equipment:			
United States	$234.4	$227.1	$214.7
Germany	259.5	229.9	223.7
Canada	63.4	55.0	60.5
Norway	85.5	71.9	75.5
Belgium	90.8	81.8	80.1
Total	$733.6	$665.7	$654.5

Note 3—Business combinations, dispositions and related transactions:

Kronos Worldwide, Inc.

Prior to 2014, Kronos' board of directors authorized the repurchase of up to 2.0 million shares of its common stock in open market transactions, including block purchases, or in privately-negotiated transactions at unspecified prices and over an unspecified period of time. Kronos may repurchase its common stock from time to time as market conditions permit. The stock repurchase program does not include specific price targets or timetables and may be suspended at any time. Depending on market conditions, Kronos may terminate the program prior to its completion. Kronos would use cash on hand to acquire the shares. Repurchased shares will be added to Kronos' treasury and cancelled. Kronos did not make any repurchases under the plan during 2014, 2015 or 2016, and at December 31, 2016 approximately 1.95 million shares are available for repurchase.

CompX International Inc.

Prior to 2014, CompX's board of directors authorized various repurchases of its Class A common stock in open market transactions, including block purchases, or in privately-negotiated transactions at unspecified prices and over an unspecified period of time. CompX may repurchase its common stock from time to time as market conditions permit. The stock repurchase program does not include specific price targets or timetables and may be suspended at any time. Depending on market conditions, CompX may terminate the program prior to its completion. CompX would generally use cash on hand to acquire the shares. Repurchased shares will be added to CompX's treasury and cancelled. CompX did not make any repurchases under the plan during 2014, 2015 or 2016, and at December 31, 2016 approximately 678,000 shares were available for purchase under these authorizations.

Waste Control Specialists LLC

On November 18, 2015, we entered into an agreement with Rockwell Holdco, Inc. ("Rockwell"), for the sale of WCS to Rockwell. The agreement, as amended, is for $270 million in cash plus the assumption of all of WCS' third-party indebtedness incurred prior to the date of the agreement. Additionally, Rockwell and its affiliates will assume all financial assurance obligations related to the WCS business. Rockwell is the parent company of EnergySolutions, Inc. Completion of the sale is subject to certain customary closing conditions, including the receipt of U.S. anti-trust approval. On November 16, 2016, the U.S. Department of Justice filed an anti-trust action in the U.S. federal district court for the District of Delaware styled United States of America vs. Energy Solutions, Inc., et al (Case No. 1:16-cv-01056-UNA), seeking an injunction to enjoin completion of the sale of WCS. Pursuant to our agreement with Rockwell, Rockwell and its affiliates are required, with our cooperation and assistance, to vigorously contest and resist such antitrust action. Assuming all closing conditions are satisfied, including the receipt of U.S. anti-trust approval, the sale is expected to close by sometime in the third quarter of 2017. There can be no assurance, however, that the parties will be successful in contesting and resisting such antitrust action, that receipt of U.S. anti-trust approval will be obtained, that all closing conditions will be satisfied, or that any such sale of WCS would be completed. Due to, among other things, the size of our WCS business relative to our other businesses in terms of both net sales and asset size, the disposal of WCS would not constitute a strategic shift that would have a major effect on our consolidated operations and financial results under the guidance in ACS 205-20. Accordingly, assuming the sale of WCS is completed, WCS would not be presented as discontinued operations in our Condensed Consolidated Financial Statements. See Note 2 for additional information regarding the operations of the Waste Management Segment. Significant items included in our Consolidated Balance Sheets related to WCS at December 31, 2015 and 2016 included:

	December 31,	
	2015	2016
	(In millions)	
ASSETS		
Current assets	$10.1	$17.2
Operating permits	48.1	42.9
Restricted cash	16.2	21.6
Property and equipment, net	150.0	138.5
LIABILITIES		
Current portion of long-term debt	$4.9	$3.3
Payable to Contran	26.1	31.4
Long-term debt	71.4	68.0
Accrued noncurrent closure and post closure costs	27.4	29.4

Note 4—Accounts and other receivables, net:

	December 31,	
	2015	2016
	(In millions)	
Trade accounts receivable:		
Kronos	$194.8	$224.8

CompX	8.8	10.4
WCS	5.2	14.0
BMI/LandWell	1.2	1.3
VAT and other receivables	20.1	18.6
Allowance for doubtful accounts	(1.2)	(1.1)
Total	$228.9	$268.0

Note 5—Inventories, net:

	December 31, 2015	December 31, 2016
	(In millions)	
Raw materials:		
Chemicals	$75.9	$68.7
Component products	2.8	2.7
Total raw materials	78.7	71.4
Work in process:		
Chemicals	21.1	22.3
Component products	9.3	9.0
Total in-process products	30.4	31.3
Finished products:		
Chemicals	233.1	196.4
Component products	3.0	3.2
Total finished products	236.1	199.6
Supplies (primarily chemicals)	60.0	58.3
Total	$405.2	$360.6

Note 6—Marketable securities:

	Market value	Cost basis	Unrealized losses, net
	(In millions)		
December 31, 2015:			
Current assets	$2.0	$2.0	$ —
Noncurrent assets:			
The Amalgamated Sugar Company LLC	$250.0	$250.0	$ —
Other	4.9	5.1	(.2)
Total	$254.9	$255.1	$ (.2)
December 31, 2016:			
Current assets	$4.4	$4.4	$ —
Noncurrent assets:			
The Amalgamated Sugar Company LLC	$250.0	$250.0	$ —
Other	3.5	3.7	(.2)
Total	$253.5	$253.7	$ (.2)

	Fair Value Measurements			
	Total	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(In millions)			
December 31, 2015:				
Current assets	$2.0	$ —	$ 2.0	$ —
Noncurrent assets:				
The Amalgamated Sugar Company LLC	$250.0	$ —	$ —	$ 250.0
Fixed income securities	1.4	—	1.4	—
Mutual funds and common stocks	3.5	3.5	—	—
Total	$254.9	$ 3.5	$ 1.4	$ 250.0
December 31, 2016:				
Current assets	$4.4	$ —	$ 4.4	$ —
Noncurrent assets:				
The Amalgamated Sugar Company LLC	$250.0	$ —	$ —	$ 250.0
Fixed income securities	2.9	—	2.9	—
Mutual funds and common stocks	.6	.6	—	—
Total	$253.5	$ .6	$ 2.9	$ 250.0

Amalgamated Sugar. Prior to 2014, we transferred control of the refined sugar operations previously conducted by our wholly-owned subsidiary, The Amalgamated Sugar Company, to Snake River Sugar Company, an Oregon agricultural cooperative formed by certain sugar beet growers in Amalgamated's areas of operations. Pursuant to the transaction, we contributed substantially all of the net assets of our refined sugar operations to The Amalgamated Sugar Company LLC, a limited liability company controlled by Snake River, on a tax-deferred basis in exchange for a non-voting ownership interest in the LLC. The cost basis of the net assets we transferred to the LLC was approximately $34 million. When we transferred control of our operations to Snake River in return for our interest in the LLC, we recognized a gain in earnings equal to the difference between $250 million (the fair value of our investment in the LLC as evidenced by its $250 million redemption price, as discussed below) and the $34 million cost basis of the net assets we contributed to the LLC, net of applicable deferred income taxes. Therefore, the cost basis of our investment in the LLC is $250 million. As part of this transaction, Snake River made certain loans to us aggregating $250 million. These loans are collateralized by our interest in the LLC. See Notes 9 and 12.

We and Snake River share in distributions from the LLC up to an aggregate of $26.7 million per year (the "base" level), with a preferential 95% share going to us. To the extent the LLC's distributions are below this base level in any given year, we are entitled to an additional 95% preferential share of any future annual LLC distributions in excess of the base level until the shortfall is recovered. Under certain conditions, we are entitled to receive additional cash distributions from the LLC. At our option, we may require the LLC to redeem our interest in the LLC, and the LLC has the right to redeem, at their option, our interest in the LLC beginning in 2027. The redemption price is generally $250 million plus the amount of certain undistributed income allocable to us. If we require the LLC to redeem our interest in the LLC, Snake River has the right to accelerate the maturity of and call our $250 million loans from Snake River.

The LLC Company Agreement contains certain restrictive covenants intended to protect our interest in the LLC, including limitations on capital expenditures and additional indebtedness of the LLC. We also have the ability to temporarily take control of the LLC if our cumulative distributions from the LLC fall below specified levels, subject to satisfaction of certain conditions imposed by Snake River’s current third-party senior lenders.

Prior to 2014, Snake River agreed that the annual amount of distributions we receive from the LLC would exceed the annual amount of interest payments we owe to Snake River on our $250 million in loans from Snake River by at least $1.8 million. If we receive less than the required minimum amount, certain agreements we previously made with Snake River and the LLC, including a reduction in the amount of cumulative distributions that we must receive from the LLC in order to prevent us from becoming able to temporarily take control of the LLC, would retroactively become null and void and we would be able to temporarily take control of the LLC if we so desired. Through December 31, 2016, Snake River and the LLC maintained the applicable minimum required levels of cash flows to us.

We report the cash distributions received from the LLC as dividend income. We recognize distributions when they are declared by the LLC, which is generally the same month we receive them, although in certain cases distributions may be paid on the first business day of the following month. See Note 12. The amount of such future distributions we will receive from the LLC is dependent upon, among other things, the future performance of the LLC's operations. Because we receive preferential distributions from the LLC and we have the right to require the LLC to redeem our interest for a fixed and determinable amount beginning at a fixed and determinable date, we account for our investment in the LLC as a marketable security carried at its cost basis of $250 million. The cost basis is also the fair value of our investment determined using Level 3 inputs as the $250 million redemption price of our investment in the LLC as well as the amount of our debt owed to Snake River Company that is collateralized by our investment in the LLC. There has been no change to the fair value of our Amalgamated Sugar investment during 2014, 2015 or 2016. We do not expect to report a gain on the redemption at the time our LLC interest is redeemed, as the redemption price of $250 million is expected to equal the carrying value of our investment in the LLC at the time of redemption.

Other. The fair value of our other marketable securities are either determined using Level 1 inputs (because the securities are actively traded) or determined using Level 2 inputs (because although these securities are traded, in many cases the market is not active and the year-end valuation is generally based on the last trade of the year, which may be several days prior to December 31).

Note 7—Investment in TiO_2 manufacturing joint venture and other assets:

	December 31,	
	2015	2016
	(In millions)	
Other assets:		
Land held for development	$157.2	$138.1
Waste disposal site operating permits, net	48.1	42.9
Restricted cash equivalents	19.6	24.2
IBNR receivables	7.0	7.1
Capital lease deposit	6.2	6.2
Intangible assets	5.1	—
Other	11.8	17.9
Total	$255.0	$236.4

Investment in TiO_2 manufacturing joint venture. Our Chemicals Segment and another $Ti0_2$ producer, Tioxide Americas LLC ("Tioxide"), are equal owners of a manufacturing joint venture (Louisiana Pigment Company, L.P., or "LPC") that owns and operates a TiO_2 plant in Lake Charles, Louisiana. Tioxide is a wholly-owned subsidiary of Huntsman Corporation.

We and Tioxide are both required to purchase one-half of the TiO_2 produced by LPC, unless we and Tioxide agree otherwise (such as in 2015, when we purchased approximately 52% of the production from the plant). LPC operates on a break-even basis and, accordingly, we report no equity in earnings of LPC. Each owner's acquisition transfer price for its share of the TiO_2 produced is equal to its share of the joint venture's production costs and interest expense, if any. Our share of net cost is reported as cost of sales as the related TiO_2 acquired from LPC is sold. We report distributions we receive from LPC, which generally relate to excess cash generated by LPC from its non-cash production costs, and contributions we make to LPC, which generally relate to cash required by LPC when it builds working capital, as part of our cash flows from operating activities in our Consolidated Statements of Cash Flows. The components of our net distributions (contributions) from LPC are shown in the table below.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Distributions from LPC	$48.0	$48.2	$35.0
Contributions to LPC	(37.4)	(41.7)	(31.4)
Net distributions	$10.6	$6.5	$3.6

Summary balance sheets of LPC are shown below:

	December 31,	
	2015	2016
	(In millions)	
ASSETS		
Current assets	$96.2	$94.5
Property and equipment, net	110.1	111.6
Total assets	$206.3	$206.1
LIABILITIES AND PARTNERS' EQUITY		
Other liabilities, primarily current	$37.8	$45.2
Partners' equity	168.5	160.9
Total liabilities and partners' equity	$206.3	$206.1

Summary income statements of LPC are shown below:

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Revenues and other income:			
Kronos	$193.1	$176.5	$157.9
Tioxide	193.8	162.5	157.5
Total	386.9	339.0	315.4
Cost and expenses:			
Cost of sales	386.4	338.5	314.9
General and administrative	.5	.5	.5
Total	386.9	339.0	315.4
Net income	$—	$—	$—

Land held for development. The land held for development relates to BMI and LandWell and is discussed in Note 1.

Capitalized permit costs. We obtained our byproducts disposal license in 2008 and began amortizing such license when the byproduct disposal facility began operations in 2009. We obtained our LLRW license in 2009. Our LLRW facilities commenced operations in 2012, at which time we began amortizing such license. Amortization of capitalized operating permit costs was $6.6 million in 2014, $6.3 million in 2015 and $6.2 million in 2016. Our estimated aggregate amortization expense for all our of capitalized permit costs as of December 31, 2016 is approximately $6.2 million in 2017, $5.6 million in 2018 and $5.1 million in each of 2019, 2020 and 2021. Capitalized permit costs are stated net of accumulated amortization of $31.6 million at December 31, 2015 and $37.9 million at December 31, 2016. The components of net capitalized permit costs are presented in the table below.

	December 31,	
	2015	2016
	(In millions)	
Net permit costs for issued permits which are being amortized:		
LLRW license (expires in 2024)	$44.7	$ 39.1

Byproduct license (expires in 2018)	2.5	1.5
Other (expires 2016—2024)	.1	.1
Total amortized permits	47.3	40.7
Permits not being amortized	.8	2.2
Total	$ 48.1	$ 42.9

Other. We have certain related party transactions with LPC, as more fully described in Note 17.

The IBNR receivables relate to certain insurance liabilities, the risk of which we have reinsured with certain third party insurance carriers. We report the insurance liabilities related to these IBNR receivables which have been reinsured as part of noncurrent accrued insurance claims and expenses. Certain of our insurance liabilities are classified as current liabilities and the related IBNR receivables are classified with other current assets. See Notes 10 and 17.

Restricted cash relates primarily relates to our Waste Management Segment. In April 2014, $18.0 million of such restricted cash was released to WCS. See Note 18.

The capital lease deposit relates to certain indebtedness of our Waste Management Segment and is discussed in Note 9.

Upon acquiring a controlling interest in our Real Estate Management and Development Segment in December 2013, we recognized an indefinite-lived customer relationship intangible asset of $5.1 million for long-term contracts related to water delivery services to the City of Henderson, Nevada and various other users through a water system owned by BMI. Aggregate revenues associated with water delivered under the City of Henderson contract have historically represented approximately 70% of the Segment's aggregate water delivery revenues. These contracts generally span many years and feature automatic renewing provisions. The initial City of Henderson water delivery contract extended for a period of 25 years, and contained an automatic renewal provision. In January 2016, the water delivery contract with the City of Henderson was amended. As part of such amendment, required minimum volumes were reduced, pricing was lowered, the automatic renewal provision of the contract was eliminated, and the contract term now runs through June 2040. The amendment to the City of Henderson water delivery contract represents an event or circumstance which triggered the need to perform a quantitative impairment analysis with respect to the intangible asset in the first quarter of 2016, in accordance with the guidance in ASC 350-30-35. Accordingly, as a result of a quantitative impairment analysis performed in the first quarter of 2016 we have concluded that the $5.1 million contract related intangible asset primarily related to the City of Henderson water delivery contract has been fully impaired as a result of the amended contract (with its reduced minimum volumes and lower pricing), and we recognized an aggregate $5.1 million contract related intangible impairment loss in 2016.

Note 8—Goodwill:

We have assigned goodwill to each of our reporting units (as that term is defined in ASC Topic 350-20-20, Goodwill) which corresponds to our operating segments. All of our goodwill related to our Chemicals Segment is from our various step acquisitions of NL and Kronos which occurred prior to 2014, as goodwill was determined prior to the adoption of the equity transaction framework provisions of ASC Topic 810. Substantially all of the net goodwill related to the Component Products Segment was generated from CompX's acquisitions of certain business units and the step acquisitions of CompX. The Component Products Segment goodwill is assigned to the security products reporting unit within that operating segment.

	Operating segment		
	Chemicals	Component Products	Total
	(In millions)		
Balance at December 31, 2014, 2015 and 2016	$352.6	$ 27.1	$379.7

We test for goodwill impairment at the reporting unit level. In determining the estimated fair value of the reporting units, we use appropriate valuation techniques, such as discounted cash flows and, with respect to our Chemicals

Segment, we consider quoted market prices, a Level 1 input, while discounted cash flows are a Level 3 input. We also consider control premiums when assessing fair value using quoted market prices. If the carrying amount of goodwill exceeds its implied fair value, an impairment charge is recorded. We review goodwill for each of our reporting units for impairment during the third quarter of each year. Goodwill is also evaluated for impairment at other times whenever an event occurs or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying value. If the fair value of an evaluated asset is less than its book value, the asset is written down to fair value.

In 2014, 2015 and 2016, no goodwill impairment was indicated as part of our annual impairment review of goodwill. As permitted by GAAP, during 2014 and 2015 we used the qualitative assessment of ASC 350-20-35 for our Component Products security products reporting unit's annual impairment test and determined it was not necessary to perform the two-step quantitative goodwill impairment test. During 2016, we used the quantitative assessment of ASC 350-20-35 for security products reporting unit's 2016 annual impairment test using discounted cash flows to determine the estimated fair value of our Security Products reporting unit. Such discounted cash flows are a Level 3 input as defined by ASC 820-10-35.

Prior to 2014, we recorded an aggregate $16.5 million goodwill impairment, mostly with respect to our Component Products Segment. Our consolidated gross goodwill at December 31, 2016 is $396.2 million.

Note 9—Long-term debt:

	December 31,	
	2015	2016
	(In millions)	
Valhi:		
Snake River Sugar Company	$250.0	$250.0
Contran credit facility	263.8	278.9
Total Valhi debt	513.8	528.9
Subsidiary debt:		
Kronos —		
Term loan	338.0	335.9
WCS —		
Financing capital lease	65.6	64.0
Tremont —		
Promissory note payable	17.1	14.5
BMI —		
Bank note payable	9.3	8.4
LandWell —		
Note payable to the City of Henderson	3.1	2.9
Other	13.6	10.4
Total subsidiary debt	446.7	436.1
Total debt	960.5	965.0
Less current maturities	9.5	7.8
Total long-term debt	$951.0	$957.2

Valhi—Snake River Sugar Company—Our $250 million in loans from Snake River Sugar Company are collateralized by our interest in The Amalgamated Sugar Company LLC. The loans bear interest at a weighted average fixed interest rate of 9.4% and are due in January 2027. At December 31, 2016, $37.5 million of the loans are recourse to us and the remaining $212.5 million is nonrecourse to us. Under certain conditions, Snake River has the ability to accelerate the maturity of these loans. See Note 6.

Contran credit facility—We also have an unsecured revolving credit facility with Contran which, as amended, provides for borrowings from Contran of up to $325 million. The facility, as amended, bears interest at prime plus 1% (4.75% at December 31, 2016), and is due on demand, but in any event no earlier than December 31, 2018. The facility contains no financial covenants or other financial restrictions. Valhi pays an unused commitment fee quarterly to Contran on the available balance (except during periods during which Contran would be a net borrower from Valhi). The average interest rate on the term loan borrowings for the year ended December 31, 2016 was 4.5%. During 2016 we borrowed an additional net $15.1 million and at December 31, 2016 an additional $46.1 million was available for borrowings under the amended facility.

Kronos—Term loans— In February 2014, Kronos entered into a new $350 million term loan. The term loan was issued at 99.5% of the principal amount, or an aggregate of $348.3 million. Kronos used $170 million of the net proceeds of the new term loan to prepay the outstanding principal balance of its note payable to Contran (along with accrued and unpaid interest through the prepayment date), and such note payable was cancelled. The remaining net proceeds of the term loan are available for Kronos' general corporate purposes. The term loan, as amended in May 2015:

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bears interest, at our option, at LIBOR (with LIBOR no less than 1.0%) plus 3.00%, or the base rate, as defined in the agreement, plus 2.00%;

- requires quarterly principal repayments of $875,000 which commenced in June 2014, other mandatory principal repayments of formula-determined amounts under specified conditions with all remaining principal balance due in February 2020. Voluntary principal prepayments are permitted at any time;
- is collateralized by, among other things, a first priority lien on (i) 100% of the common stock of certain of our U.S. wholly-owned subsidiaries, (ii) 65% of the common stock or other ownership interest of our Canadian subsidiary (Kronos Canada, Inc.) and certain first-tier European subsidiaries (Kronos Titan GmbH and Kronos Denmark ApS) and (iii) a $395.7 million unsecured promissory note issued by our wholly-owned subsidiary, Kronos International, Inc. (KII) to us;

- is also collateralized by a second priority lien on all of the U.S. assets which collateralize our North American revolving facility, as discussed below;
- contains a number of covenants and restrictions which, among other things, restrict our ability to incur additional debt, incur liens, pay dividends or merge or consolidate with, or sell or transfer substantially all of our assets to, another entity and contains other provisions and restrictive covenants customary in lending transactions of this type (however, there are no ongoing financial maintenance covenants); and
- contains customary default provisions, including a default under any of our other indebtedness in excess of $50 million.

Prior to the May 2015 amendment to the term loan, the applicable margin on outstanding LIBOR-based borrowings was 3.75%, and the applicable margin on outstanding base rate borrowings was 2.75%. All other terms of the term loan, including principal repayments, maturity and collateral remain unchanged. We accounted for such amendment to our term loan as a modification of the terms of the term loan. We paid a $750,000 refinancing fee in connection with this amendment, which along with the existing unamortized deferred financing costs associated with the term loan are being amortized over the remaining term of the loan.

The average interest rate on the term loan borrowings as of and for the year ended December 31, 2016 was 4.0%. The carrying value of the term loan at December 31, 2016 is stated net of unamortized original issue discount of $.9 million and debt issuance costs of $3.6 million (at December 31, 2015 the amounts were $1.2 million and $4.7 million).

See Note 19 for a discussion of the interest rate swap we entered into in the third quarter of 2015 pursuant to our interest rate risk management strategy.

Revolving North American credit facility—In June 2012, Kronos entered into a $125 million revolving bank credit facility. As amended in January 2017, the facility matures the earlier of (i) January 30, 2022 or (ii) 90 days prior to the maturity date of our term loan (or the maturity date of any new term loan constituting a permitted refinancing of the existing term loan). Based on February 2020 maturity date of our existing term loan, the maturity date of the North American credit facility is currently November 2019. Borrowings under the revolving credit facility are available for Kronos' general corporate purposes. Available borrowings on this facility are based on formula-determined amounts of eligible trade receivables and inventories, as defined in the agreement, of certain of Kronos' North American subsidiaries less any outstanding letters of credit up to $15 million issued under the facility (with revolving borrowings by Kronos' Canadian subsidiary limited to $25 million). Any amounts outstanding under the revolving credit facility bear interest, at Kronos' option, at LIBOR plus a margin ranging from 1.5% to 2.0% or at the applicable base rate, as defined in the agreement, plus a margin ranging from .5% to 1.0%. The credit facility is collateralized by, among other things, a first priority lien on the borrowers' trade receivables and inventories. The facility contains a number of covenants and restrictions which, among other things, restricts the borrowers' ability to incur additional debt, incur liens, pay dividends or merge or consolidate with, or sell or transfer all or substantially all of their assets to, another entity, contains other provisions and restrictive covenants customary in lending transactions of this type and under certain conditions requires the maintenance of a specified financial covenant (fixed charge coverage ratio, as defined) to be at least 1.1 to 1.0. Kronos had no borrowings or repayments under this facility during 2015. During 2016, Kronos borrowed $266.2 million and repaid $266.2 million under this facility, and at December 31, 2016 Kronos had approximately $74.8 million available for borrowing under this revolving facility.

Revolving European credit facility—Kronos' operating subsidiaries in Germany, Belgium, Norway and Denmark have a €120 million secured revolving bank credit facility that, matures in September 2017. We expect to extend the maturity date of this facility on or prior to its maturity date. Kronos may denominate borrowings in Euros, Norwegian kroner or U.S. dollars. Outstanding borrowings bear interest at LIBOR plus 1.90%. The facility is collateralized by the accounts receivable and inventories of the borrowers, plus a limited pledge of all of the other assets of the Belgian borrower. The facility contains certain restrictive covenants that, among other things, restrict the ability of the borrowers to incur debt, incur liens, pay dividends or merge or consolidate with, or sell or transfer all or substantially all of the assets to, another entity, and requires the maintenance of certain financial ratios. In addition, the credit facility contains customary cross-default provisions with respect to other debt and obligations of the borrowers, KII and its other subsidiaries.

Kronos had no borrowing or repayments under this facility during 2016 and at December 31, 2016, there were no outstanding borrowings under this facility. Kronos' European credit facility requires the maintenance of certain financial ratios. Kronos' European revolving credit facility requires the maintenance of certain financial ratios, and one of such requirements is based on the ratio of net debt to last twelve months earnings before income tax, interest, depreciation and amortization expense (EBITDA) of the borrowers.   Based upon the borrowers' last twelve months EBITDA as of December 31, 2016 and the net debt to EBITDA financial test, Kronos' borrowing availability at December 31, 2016 is approximately 47% of the credit facility, or €55.8 million ($58.5 million).

WCS—Financing capital lease—Prior to 2014, WCS closed under a Sale and Purchase Agreement with the County of Andrews, Texas whereby WCS sold certain real and personal property constituting a substantial portion of its property and equipment (“Transferred Assets”) to the County for gross proceeds of $75 million. WCS used the net proceeds received under the Agreement to finance the construction of its Federal and Texas Compact LLRW disposal facilities. As a condition under the Agreement, WCS also concurrently entered into a Lease Agreement (“Lease”) with the County pursuant to which WCS agreed to lease the Transferred Assets back from the County for a period of 25 years. The Lease requires monthly rental payments payable through August 2035, and during the Lease term WCS is responsible for all costs associated with the use, occupancy, possession and operation of the Transferred Assets. Under the terms of the Agreement, WCS was also required to pay all of the County’s costs associated with the transactions, and the proceeds WCS received from the County upon closing under the Sale and Purchase Agreement were net of the County’s cost, which aggregated approximately $2.6 million At the end of the Lease term, title to the Transferred Assets automatically reverts back to WCS without further payment obligation. Prior to the end of the Lease term, WCS may, at its option, terminate the Lease early upon payment of specified amounts to the County, at which time the Transferred Assets would also revert back to WCS. For financial reporting purposes, we have accounted for these transactions in tandem as a financing capital lease, in which we continue to recognize the Transferred Assets on our Consolidated Balance Sheet and our rental payments due under the Lease are accounted for as debt. The capital lease has an effective interest rate of approximately 7.0%. At the inception of the Lease, WCS was required to prepay to the County an amount ($6.2 million) equal to its aggregate lease rentals due to the County in the final year of the Lease; the County will hold the funds as a prepaid deposit. The deposit serves as collateral for WCS’ performance under the Lease and is included in our other noncurrent assets. See Notes 7 and 17.

Other. Prior to 2014, and in conjunction with the acquisition of a controlling interest of our Real Estate Management and Development Segment, Tremont issued a $19.1 million promissory note with the seller, Nevada Environmental Response Trust (“NERT”). The note bears interest at 3% per annum, with interest payable annually and all principal due in December 2023. The promissory note is collateralized by the BMI and LandWell interests acquired as well as the real property acquired from NERT as part of the transaction. The note may be prepaid at any time, without penalty. We must make mandatory prepayments on the note in specified amounts whenever we receive distributions from BMI or LandWell, or in the event we sell any of the real property acquired. We made principal prepayments of $.3 million during 2015 and $2.6 million during 2016, under the terms of the note.

Prior to 2014, BMI entered into an $11.9 million bank note payable to Meadows Bank. The proceeds of the note were used to refinance previously outstanding debt obligations. The note requires monthly installments of $.1 million through the maturity date in January 2025. The note bears interest at a variable rate equal to the prime rate with a floor of 3.25% and a ceiling of 9.0%. The note is secured by certain real property. In addition we are required to maintain cash collateral of $750,000 with the lender, which collateral is classified as noncurrent restricted cash in our Consolidated Balance Sheets. At December 31, 2016 the note had an outstanding balance of $8.5 million and is stated net of debt issuance costs of $.1 million. The interest rate as of and for the year ended December 31, 2016 was 3.75% and 3.5%, respectively.

In February 2017, a wholly-owned subsidiary of BMI entered into a $20.5 million loan agreement with Western Alliance Bank. The proceeds were used to refinance the $8.5 million outstanding bank note payable to Meadows Bank and to finance improvements to BMI’s water delivery system. The agreement requires semi-annual payments of principal and interest on June 1 and December 1 aggregating $1.9 million annually beginning on June 1, 2017 through the maturity date in June 2032 (except during 2017 which calls for prorated aggregate principal and interest payments of $1.6 million). The agreement bears interest at 5.34% and is secured by certain real property, including the water delivery system, and revenue streams under the City of Henderson water contract. Debt issuance costs are expected to be approximately $1 million.

Prior to 2014, LandWell entered into a $3.9 million promissory note payable to the City of Henderson, Nevada. The note requires semi-annual principal payments of $250,000 payable solely from cash received from certain specified revenue sources with any remaining unpaid balance due in October 2020, see Note 18. The loan bears interest at a 3% fixed rate. Due to the uncertainty in timing of the cash to be received from the specified revenue sources, the outstanding balance of $2.9 million is deemed to be maturing in 2020.

Aggregate maturities of long-term debt at December 31, 2016

Aggregate maturities of debt at December 31, 2016 are presented in the table below.

Years ending December 31,	Amount (In millions)
Gross amounts due each year:	
2017	$ 12.6
2018	291.6

Years ending December 31,	Amount
	(In millions)
2019	12.3
2020	338.8
2021	11.8
2022 and thereafter	354.6
Subtotal	1,021.7
Less amounts representing interest on capital leases, original issue discount and debt issuance costs	56.7
Total long-term debt	$ 965.0

We are in compliance with all of our debt covenants at December 31, 2016.

Note 10—Accounts payable and accrued liabilities:

	December 31,	
	2015	2016
	(In millions)	
Accounts payable:		
Kronos	$96.1	$84.9
CompX	2.7	2.6
WCS	1.3	1.6
BMI/LandWell	2.1	2.2
NL	1.9	2.4
Other	.7	.7
Total	$104.8	$94.4
Current accrued liabilities:		
Employee benefits	$24.7	$29.2
Accrued sales discounts and rebates	23.9	22.6
Deferred income	21.8	32.0
Environmental remediation and related costs	11.7	15.3
Reserve for uncertain tax positions	—	3.3
Accrued workforce reduction costs	5.3	1.2
Interest rate swap contract	3.3	2.8
Other	30.4	28.8
Total	$121.1	$135.2
Noncurrent accrued liabilities:		
Reserve for uncertain tax positions	$32.9	$35.7
Asset retirement obligations	28.8	30.7
Deferred income	20.2	12.6
Employee benefits	7.1	7.6
Insurance claims and expenses	9.6	9.5
Deferred payment obligation	8.8	9.0
Other	7.2	8.8

Total	$114.6	$113.9

The risks associated with certain of our accrued insurance claims and expenses have been reinsured, and the related IBNR receivables are recognized as noncurrent assets to the extent the related liability is classified as a noncurrent liability. See Note 7. Our reserve for uncertain tax positions is discussed in Note 14.

Our asset retirement obligations include amounts related to the closure and post-closure obligations associated with our Waste Management Segment's facility in West Texas. We recognized accretion expense of $1.8 million in 2014 and $2.0 million in each of 2015 and 2016 on the closure and post-closure obligations. We are required to provide certain financial assurance to Texas government agencies with respect to the decommissioning obligations related to such facility, as more fully described in Note 18. Certain of our affiliates have provided or assisted us in providing such financial assurance, as discussed in Note 17.

Estimates of the ultimate cost to be incurred to settle our closure and post closure obligation require a number of assumptions, are inherently difficult to develop and the ultimate outcome may differ materially from current estimates. However, we believe our experience in the environmental services business provides a reasonable basis for estimating such costs. As additional information becomes available, cost estimates will be adjusted as necessary. It is possible that technological, regulatory or enforcement developments, the results of studies or other factors could necessitate the recording of additional liabilities which could be material.

Prior to 2014, and in conjunction with the acquisition of a controlling interest of our Real Estate Management and Development Segment, we issued a face value $11.1 million deferred payment obligation owed to NERT that bears interest at 3% per annum, commencing in December 2023, and is collateralized by the BMI and LandWell interests acquired. The deferred payment obligation has no specified maturity date. We are required to make repayments on the deferred payment obligation, in specified amounts, whenever we receive distributions from BMI and LandWell, and we may make voluntary repayments on the deferred payment obligation at any time, in each case without any penalty, but in any case only after our promissory note payable to NERT (discussed in Note 9) has been repaid in full. For financial reporting purposes, the obligation was recorded at its acquisition date present value using a 3% discount rate from December 2023 (when it becomes interest bearing at 3%).

Note 11—Employee benefit plans:

Defined contribution plans. Certain of our subsidiaries maintain various defined contribution pension plans for our employees worldwide. Defined contribution plan expense approximated $5.7 million in 2014, $5.8 million in 2015 and $5.9 million in 2016.

Defined benefit plans. Kronos and NL sponsor various defined benefit pension plans worldwide. The benefits under our defined benefit plans are based upon years of service and employee compensation. Our funding policy is to contribute annually the minimum amount required under ERISA (or equivalent foreign) regulations plus additional amounts as we deem appropriate.

We expect to contribute the equivalent of $15.1 million to all of our defined benefit pension plans during 2017. Benefit payments to plan participants out of plan assets are expected to be the equivalent of:

2017	$ 23.9 million
2018	24.1 million
2019	24.7 million
2020	25.9 million
2021	26.4 million
Next 5 years	142.9 million

The funded status of our U.S. defined benefit pension plans is presented in the table below.

	Years ended December 31,	
	2015	2016
	(In millions)	
Change in projected benefit obligations ("PBO"):		
Balance at beginning of the year	$ 70.2	$ 66.6
Interest cost	2.7	2.7
Actuarial gain	(2.2)	(2.3)
Benefits paid	(4.1)	(4.2)
Balance at end of the year	$ 66.6	$ 62.8
Change in plan assets:		
Fair value at beginning of the year	$ 53.6	$ 47.6
Actual return on plan assets	(2.3)	2.1
Employer contributions	.4	.1
Benefits paid	(4.1)	(4.2)
Fair value at end of year	$ 47.6	$ 45.6
Funded status	$ (19.0)	$ (17.2)
Amounts recognized in the Consolidated Balance Sheets:		
Accrued pension costs:		
Current	$ (.3)	$ (.2)
Noncurrent	(18.7)	(17.0)
Total	(19.0)	(17.2)
Accumulated other comprehensive loss—		
Actuarial loss	42.0	39.3
Total	$ 23.0	$ 22.1
Accumulated benefit obligations ("ABO")	$ 66.6	$ 62.8

The components of our net periodic defined benefit pension benefit cost (credit) for U.S. plans are presented in the table below. The amounts shown below for the amortization of unrecognized actuarial losses for 2014, 2015 and 2016 were recognized as components of our accumulated other comprehensive income (loss) at December 31, 2013, 2014 and 2015, respectively, net of deferred income taxes and noncontrolling interest.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Net periodic pension benefit cost (credit) for U.S. plans:			
Interest cost	$2.9	$2.7	$2.7
Expected return on plan assets	(4.0)	(3.9)	(3.4)
Amortization of unrecognized net actuarial loss	1.2	1.7	1.9
Total	$.1	$.5	$1.2

Information concerning certain of our U.S. defined benefit pension plans (for which the ABO exceeds the fair value of plan assets as of the indicated date) is presented in the table below.

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	December 31,	
	2015	2016
	(In millions)	
Plans for which the ABO exceeds plan assets:		
Projected benefit obligations	$66.6	$62.8
Accumulated benefit obligations	66.6	62.8
Fair value of plan assets	47.6	45.6

The discount rate assumptions used in determining the actuarial present value of the benefit obligation for our U.S. defined benefit pension plans as of December 31, 2015 and 2016 are 4.1% and 3.9%, respectively. The impact of assumed increases in future compensation levels does not have an effect on the benefit obligation as the plans are frozen with regards to compensation.

The weighted-average rate assumptions used in determining the net periodic pension cost for our U.S. defined benefit pension plans for 2014, 2015 and 2016 are presented in the table below. The impact of assumed increases in future compensation levels does not have an effect on the periodic pension cost as the plans are frozen with regards to compensation.

	Years ended December 31,		
Rate	2014	2015	2016
Discount rate	4.5 %	3.8 %	4.1 %
Long-term return on plan assets	7.5 %	7.5 %	7.5 %

Variances from actuarially assumed rates will result in increases or decreases in accumulated pension obligations, pension expense and funding requirements in future periods.

The funded status of our foreign defined benefit pension plans is presented in the table below.

	Years ended December 31,	
	2015	2016
	(In millions)	
Change in PBO:		
Balance at beginning of the year	$ 659.2	$ 578.9
Service cost	11.2	9.9
Interest cost	15.1	15.1
Participants' contributions	1.6	1.5
Actuarial loss (gain)	(10.0)	35.6
Change in currency exchange rates	(76.9)	(16.8)
Benefits paid	(21.3)	(20.8)
Balance at end of the year	$ 578.9	$ 603.4
Change in plan assets:		
Fair value at beginning of the year	$ 425.5	$ 382.5
Actual return on plan assets	10.8	12.2
Employer contributions	17.6	15.3
Participants' contributions	1.6	1.5
Change in currency exchange rates	(51.7)	(8.9)
Benefits paid	(21.3)	(20.8)
Fair value at end of year	$ 382.5	$ 381.8
Funded status	$ (196.4)	$ (221.6)
Amounts recognized in the Consolidated Balance Sheets:		
Pension asset	$ 1.7	$ 1.6
Accrued pension costs:		
Current	—	—
Noncurrent	(198.1)	(223.2)

Total	(196.4)	(221.6)
Accumulated other comprehensive loss:		
Actuarial loss	234.1	261.2
Prior service cost	1.9	1.7
Total	236.0	262.9
Total	$ 39.6	$ 41.3
ABO	$ 554.4	$ 578.8

The components of our net periodic defined benefit pension benefit cost for our foreign plans are presented in the table below. The amounts shown below for the amortization of unrecognized prior service cost, net transition obligations and actuarial losses for 2014, 2015 and 2016 were recognized as components of our accumulated other comprehensive income (loss) at December 31, 2013, 2014 and 2015, respectively, net of deferred income taxes and noncontrolling interest.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Net periodic pension cost for foreign plans:			
Service cost	$9.9	$11.2	$9.9
Interest cost	22.2	15.1	15.1
Settlement gain	(.3)	—	—
Curtailment loss	.1	—	—
Expected return on plan assets	(20.6)	(17.3)	(14.9)
Amortization of unrecognized:			
Prior service cost	.5	.4	.2
Net actuarial loss	10.1	13.8	11.4
Total	$21.9	$23.2	$21.7

Information concerning certain of our non-U.S. defined benefit pension plans (for which the ABO exceeds the fair value of plan assets as of the indicated date) is presented in the table below.

	December 31,	
	2015	2016
	(In millions)	
Plans for which the ABO exceeds plan assets:		
Projected benefit obligations	$518.1	$541.5
Accumulated benefit obligations	498.7	521.8
Fair value of plan assets	321.6	319.5

A summary of our key actuarial assumptions used to determine foreign benefit obligations as of December 31, 2015 and 2016 was:

	December 31,	
Rate	2015	2016
Discount rate	2.6 %	2.1 %
Increase in future compensation levels	2.9 %	2.6 %

A summary of our key actuarial assumptions used to determine foreign net periodic benefit cost for 2014, 2015 and 2016 are as follows:

	Years ended December 31,		
Rate	2014	2015	2016

Discount rate	3.8 %	2.5 %	2.6 %
Increase in future compensation levels	2.7 %	2.6 %	2.9 %
Long-term return on plan assets	5.0 %	4.6 %	3.9 %

Variances from actuarially assumed rates will result in increases or decreases in accumulated pension obligations, pension expense and funding requirements in future periods.

The amounts shown for all of our defined benefit plans for unrecognized actuarial losses and prior service cost at December 31, 2015 and 2016 have not been recognized as components of our periodic defined benefit pension cost as of those dates. These amounts will be recognized as components of our periodic defined benefit cost in future years. These amounts, net of deferred income taxes and noncontrolling interest, are recognized in our accumulated other comprehensive income (loss) at December 31, 2015 and 2016. We expect approximately $14.4 million and $.2 million of the unrecognized actuarial losses and prior service cost, respectively, will be recognized as components of our periodic defined benefit pension cost in 2017. The table below details the changes in other comprehensive income (loss) during 2014, 2015 and 2016.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Changes in plan assets and benefit obligations recognized in other comprehensive income (loss):			
Net actuarial gain (loss)	$(113.0)	$.3	$(38.0)
Plan settlement	(.2)	—	—
Amortization of unrecognized:			
Prior service cost	.5	.4	.3
Net actuarial losses	11.3	15.4	13.3
Total	$(101.4)	$16.1	$(24.4)

At December 31, 2015 and 2016, substantially all of the assets attributable to our U.S. plan were invested in the Combined Master Retirement Trust (CMRT), a collective investment trust sponsored by Contran to permit the collective investment by certain master trusts that fund certain employee benefits plans sponsored by Contran and certain of its affiliates. For 2014, 2015 and 2016, the long-term rate of return assumption for plan assets invested in the CMRT was 7.5%, based on the long-term asset mix of the assets of the CMRT and the expected long-term rates of return for such asset components as well as advice from Contran's actuaries.

The CMRT unit value is determined semi-monthly, and the plans have the ability to redeem all or any portion of their investment in the CMRT at any time based on the most recent semi-monthly valuation. However, the plans do not have the right to individual assets held by the CMRT and the CMRT has the sole discretion in determining how to meet any redemption request. For purposes of our plan asset disclosure, we consider the investment in the CMRT as a Level 2 input because (i) the CMRT value is established semi-monthly and the plans have the right to redeem their investment in the CMRT, in part or in whole, at any time based on the most recent value and (ii) observable inputs from Level 1 or Level 2 (or assets not subject to classification in the fair value hierarchy) were used to value approximately 91% and 92% of the assets of the CMRT at December 31, 2015 and 2016, respectively, as noted below. CMRT assets not subject to classification in the fair value hierarchy consist principally of certain investments measured at net asset value per share in accordance with ASC 820-10. The aggregate fair value of all of the CMRT assets, including funds of Contran and its other affiliates that also invest in the CMRT, and supplemental asset mix details of the CMRT are as follows:

	December 31, 2015		December 31, 2016	
	(In millions)			
CMRT asset value	$648.8		$637.8	
CMRT assets comprised of:				
Assets not subject to fair value hierarchy	30	%	30	%
Assets subject to fair value hierarchy:				
Level 1	54		54	
Level 2	7		8	
Level 3	9		8	
	100	%	100	%
CMRT asset mix:				
Domestic equities, principally publicly traded	29	%	31	%
International equities, principally publicly traded	22		22	
Fixed income securities, principally publicly traded	38		36	
Privately managed limited partnerships	5		5	
Hedge funds	5		5	
Other, primarily cash	1		1	
	100	%	100	%

In determining the expected long-term rate of return on non-U.S. plan asset assumptions, we consider the long-term asset mix (e.g. equity vs. fixed income) for the assets for each of our plans and the expected long-term rates of return for such asset components. In addition, we receive third-party advice about appropriate long-term rates of return. Such assumed asset mixes are summarized below:

- In Germany, the composition of our plan assets is established to satisfy the requirements of the German insurance commissioner. Our German pension plan assets represent an investment in a large collective investment fund established and maintained by Bayer AG in which several pension plans, including our German pension plan and Bayer's pension plans, have invested. Our plan assets represent a very nominal portion of the total collective investment fund maintained by Bayer. These plan assets are a Level 3 input because there is not an active market that approximates the value of our investment in the Bayer investment fund. We determine the fair value of the Bayer plan assets based on periodic reports we receive from the managers of the Bayer plan. These periodic reports are subject to audit by the German pension regulator.

In Canada, we currently have a plan asset target allocation of 35% to equity securities and 65% to fixed income securities. We expect the long-term rate of return for such investments to average approximately 125 basis points above the applicable equity or fixed income index. The Canadian assets are Level 1 inputs because they are traded in active markets.

- In Norway, we currently have a plan asset target allocation of 11% to equity securities, 79% to fixed income securities, 7% to real estate and the remainder primarily to other investments and liquid investments such as money markets. The expected long-term rate of return for such investments is approximately 7%, 3%, 5% and 7%, respectively. The majority of Norwegian plan assets are Level 1 inputs because they are traded in active markets; however approximately 11% of our Norwegian plan assets are invested in real estate and other investments not actively traded and are therefore a Level 3 input.
- We also have plan assets in Belgium and the United Kingdom. The Belgian plan assets are invested in certain individualized fixed income insurance contracts for the benefit of each plan participant as required by the local regulators and are therefore a Level 3 input. The United Kingdom plan assets consist of marketable securities which are Level 1 inputs because they trade in active markets.

We regularly review our actual asset allocation for each plan, and will periodically rebalance the investments in each plan to more accurately reflect the targeted allocation and/or maximize the overall long-term return when considered appropriate.

The composition of our December 31, 2015 and 2016 pension plan assets by asset category and fair value level is shown in the table below. The amounts shown for plan assets invested in the CMRT include a nominal amount of cash held by our U.S. pension plan which is not part of the plan's investment in the CMRT.

	Fair Value Measurements at December 31, 2015			
	Total	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(In millions)			
Germany	$223.1	$ —	$ —	$ 223.1
Canada:				
Local currency equities	9.6	9.6	—	—
Foreign currency equities	23.3	23.3	—	—
Local currency fixed income	50.6	50.6	—	—
Global mutual fund	6.8	6.8	—	—
Cash and other	.5	.5	—	—
Norway:				
Local currency equities	2.0	2.0	—	—
Foreign currency equities	3.6	3.6	—	—
Local currency fixed income	24.5	24.5	—	—
Foreign currency fixed income	4.7	4.7	—	—
Real estate	4.2	—	—	4.2
Cash and other	7.9	6.7	—	1.2
US — CMRT	47.6	—	47.6	—
Other	21.7	14.0	—	7.7
Total	$430.1	$ 146.3	$ 47.6	$ 236.2

	Fair Value Measurements at December 31, 2016			
	Total	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(In millions)			
Germany	$217.0	$ —	$ —	$ 217.0
Canada:				
Local currency equities	14.8	14.8	—	—
Foreign currency equities	19.7	19.7	—	—
Local currency fixed income	59.5	59.5	—	—
Cash and other	.4	.4	—	—
Norway:				
Local currency equities	1.6	1.6	—	—
Foreign currency equities	4.1	4.1	—	—
Local currency fixed income	23.2	23.2	—	—
Foreign currency fixed income	5.4	5.4	—	—
Real estate	4.2	—	—	4.2
Cash and other	9.9	8.8	—	1.1
US — CMRT	45.6	—	45.6	—
Other	22.0	13.8	—	8.2
Total	$427.4	$ 151.3	$ 45.6	$ 230.5

A rollforward of the change in fair value of Level 3 assets follows.

	Years ended December 31,	
	2015	2016
	(In millions)	
Fair value at beginning of year	$ 254.1	$ 236.2
Gain on assets held at end of year	6.5	4.1
Gain on assets sold during the year	.3	—
Assets purchased	13.7	13.1
Assets sold	(12.4)	(13.4)
Currency exchange rate fluctuations	(26.0)	(9.5)
Fair value at end of year	$ 236.2	$ 230.5

Postretirement benefits other than pensions ("OPEB"). NL, Kronos and Tremont provide certain health care and life insurance benefits for their eligible Canadian and U.S. retired employees. Certain of our Canadian employees may become eligible for such postretirement health care and life insurance benefits if they reach retirement age while working for us. In the U.S., employees who retired after 1998 are not entitled to any such benefits. The majority of all retirees are required to contribute a portion of the cost of their benefits and certain current and future retirees are eligible for reduced health care benefits at age 65. We have no OPEB plan assets, rather, we fund medical claims as they are paid. At December 31, 2016, we expect to contribute the equivalent of approximately $1.1 million to all of our OPEB plans during 2017. Benefit payments to OPEB plan participants are expected to be the equivalent of:

2017	$1.1 million
2018	1.0 million
2019	1.0 million
2020	.9 million
2021	.9 million
Next 5 years	3.7 million

The funded status of our OPEB plans is presented in the table below.

	Years ended December 31, 2015	2016
	(In millions)	
Actuarial present value of accumulated OPEB obligations:		
Obligations at beginning of the year	$ 15.4	$ 12.9
Service cost	.1	.1
Interest cost	.5	.5
Actuarial gain	(.8)	(.5)
Change in currency exchange rates	(1.2)	.2
Benefits paid from employer contributions	(1.1)	(1.0)
Obligations at end of the year	12.9	$ 12.2
Fair value of plan assets	—	—
Funded status	$ (12.9)	$ (12.2)
Accrued OPEB costs recognized in the Consolidated Balance Sheets:		
Current	$ (1.1)	$ (1.1)
Noncurrent	(11.8)	(11.1)
Total	(12.9)	(12.2)
Accumulated other comprehensive income (loss):		
Net actuarial losses	2.4	1.9
Prior service credit	(8.6)	(6.8)
Total	(6.2)	(4.9)
Total	$ (19.1)	$ (17.1)

The amounts shown in the table above for net actuarial losses and prior service credit at December 31, 2015 and 2016 have not yet been recognized as components of our periodic OPEB cost as of those dates. These amounts will be recognized as components of our periodic OPEB cost in future years and are recognized, net of deferred income taxes, in our accumulated other comprehensive income (loss). We expect to recognize approximately $.2 million of unrecognized actuarial gains and $1.1 million of prior service credit as components of our periodic OPEB cost in 2017.

The components of our periodic OPEB costs are presented in the table below. The amounts shown below for amortization of prior service credit and recognized actuarial losses for 2014, 2015 and 2016 were recognized as components of our accumulated other comprehensive income (loss) at December 31, 2013, 2014 and 2015, respectively, net of deferred income taxes and noncontrolling interest.

	Years ended December 31, 2014	2015	2016
	(In millions)		
Net periodic OPEB cost (credit):			
Service cost	$ .1	$ .1	$ .1
Interest cost	.6	.5	.5
Amortization of prior service credit	(2.0)	(1.9)	(1.8)

Recognized net actuarial loss	(.2)	—	(.1)
Total	$ (1.5)	$ (1.3)	$ (1.3)

The table below details the changes in other comprehensive income (loss) during 2014, 2015 and 2016.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Changes in benefit obligations recognized in other comprehensive income (loss):			
Net actuarial loss arising during the year	$ (1.4)	$ .8	$ .5
Plan amendments/curtailment	(.2)	—	(.1)
Amortization of unrecognized prior service credit	(2.0)	(1.9)	(1.8)
Total	$ (3.6)	$ (1.1)	$ (1.4)

A summary of our key actuarial assumptions used to determine the net benefit obligations as of December 31, 2015 and 2016 follows:

	December 31,	
	2015	2016
Healthcare inflation:		
Initial rate	7.0 %	7.0 %
Ultimate rate	5.0 %	5.0 %
Year of ultimate rate achievement	2021	2021
Discount rate	3.6 %	3.4 %

Assumed health care cost trend rates affect the amounts we report for health care plans. A one percent change in assumed health care trend rates would not have a material effect on the net periodic OPEB cost for 2016 or on the accumulated OPEB obligations at December 31, 2016.

The weighted average discount rate used in determining the net periodic OPEB cost for 2016 was 3.6% (the rate was 3.4% in 2015 and 4.0% in 2014). The weighted average rate was determined using the projected benefit obligations as of the beginning of each year. The impact of assumed increases in future compensation levels does not have a material effect on the net periodic OPEB cost as substantially all of such benefits relate solely to eligible retirees, for which compensation is not applicable. The impact of the assumed rate of return on plan assets also does not have a material effect on the net periodic OPEB cost as there were no plan assets as of December 31, 2015 or 2016.

Variances from actuarially-assumed rates will result in additional increases or decreases in accumulated OPEB obligations, net periodic OPEB cost and funding requirements in future periods.

Note 12—Other income, net:

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Securities earnings:			
Dividends and interest	$26.6	$26.5	$27.2
Securities transactions, net	.3	—	.5

Total	26.9	26.5	27.7
Insurance recoveries	10.4	3.7	.4
Currency transactions, net	4.0	(.1)	5.5
Disposal of property and equipment, net	(.9)	(.8)	—
Business interruption insurance proceeds	—	—	4.3
Other, net	1.6	2.7	1.5
Total	$42.0	$32.0	$39.4

Dividends and interest income includes distributions from The Amalgamated Sugar Company LLC of $25.4 million in each of 2014, 2015 and 2016 (see Note 6).

Insurance recoveries relate primarily to amounts NL received from certain of its former insurance carriers, and relate principally to the recovery of prior lead pigment and asbestos litigation defense costs incurred by us. We have agreements with four former insurance carriers pursuant to which the carriers reimburse us for a portion of our future lead pigment litigation defense costs, and one such carrier reimburses us for a portion of our future asbestos litigation defense costs. We are not able to determine how much we will ultimately recover from these carriers for defense costs incurred by us because of certain issues that arise regarding which defense costs qualify for reimbursement. While we continue to seek additional insurance recoveries for lead pigment and asbestos litigation matters, we do not know the extent to which we will be successful in obtaining additional reimbursement for either defense costs or indemnity. Substantially all of $10.4 million in the insurance recoveries we recognized in 2014 relate to a settlement NL reached with one of its insurance carriers in September 2014 in which it agreed to reimburse NL for a portion of its past litigation defense costs. Any additional insurance recoveries would be recognized when the receipt is probable and the amount is determinable. See Note 18.

During 2016, we recognized $3.4 million in income related to cash Kronos received from settlement of a business interruption insurance claim arising in 2014, and income of $.9 million recognized in the fourth quarter related to cash Kronos received from settlement of another business interruption insurance claim arising in 2015. No additional material amounts are expected to be received with respect to such insurance claims.

Note 13 - Restructuring Costs

In the second quarter of 2015, our Chemicals Segment initiated a restructuring plan designed to improve its long-term cost structure. A portion of such expected cost savings is planned to occur through workforce reductions. During the second, third and fourth quarters of 2015 we implemented certain voluntary and involuntary workforce reductions at certain of our facilities impacting approximately 160 individuals. A substantial portion of such workforce reductions were accomplished through voluntary programs, for which eligible workforce reduction costs are recognized at the time both the employee and employer are irrevocably committed to the terms of the separation. For involuntary programs, eligible costs are recognized when management approves the separation program, the affected employees are properly notified and the costs are estimable. To the extent there is a statutorily-mandated notice period and the affected employee is not required to provide services to us during such notice period, severance and all wages during such notice period are accrued at the time of separation. To the extent the affected employee is required to provide services to us during all or a portion of such notice period, the severance (and if applicable notice period wages for any period beyond the time the affected employee is required to provide future services to us) is accrued ratably over the period in which services will be provided. As of December 31, 2015 we recognized an aggregate $21.7 million charge for such workforce reductions we had implemented through that date (substantially all of which was recognized in the second quarter of 2015), $10.8 million of which is classified in cost of sales and $10.9 million of which is classified in selling, general and administrative expense. For workforce reductions implemented through December 31, 2015, we do not expect to accrue any further material amounts associated with the affected individuals who are providing service to us past December 31, 2016. Substantially all accrued severance costs at December 31, 2016 are expected to be paid in the first quarter of 2017.

A summary of the activity in our accrued workforce reduction costs during 2016 is shown in the table below:

	Years ended December 31, 2015	2016
	(In millions)	
Balance at beginning of the year	$-	$5.6
Workforce reduction costs accrued	21.7	-
Workforce reduction costs paid	(15.9)	(4.1)
Currency translation adjustments, net	(.2)	(.1)
Balance at end of the year	$5.6	$1.4
Amounts recognized in the balance sheet:		
Current liability	$5.3	$1.2
Noncurrent liability	.3	.2
	$5.6	$1.4

Note 14—Income taxes:

	Years ended December 31, 2014	2015	2016
	(In millions)		
Pre-tax income (loss):			
United States	$40.1	$(35.3)	$(44.7)
Non-U.S. subsidiaries	71.9	(38.5)	47.7
Total	$112.0	$(73.8)	$3.0
Expected tax expense (benefit) at U.S. federal statutory income tax rate of 35%	$39.2	$(25.8)	$1.1
Non-U.S. tax rates	(4.1)	.6	(4.3)
Incremental net tax (benefit) on earnings and losses of non-U.S. and non-tax group companies	(2.2)	(37.6)	8.2
Valuation allowance	—	159.0	(2.2)
U.S. state income taxes, net	4.1	(1.3)	(.1)
Adjustment to the reserve for uncertain tax positions, net	(3.7)	.8	7.2
Nondeductible expenses	2.8	3.0	2.2
U.S. – Canada APA	—	—	(3.4)
Domestic production activities deduction	(.9)	(.6)	(2.1)
Other, net	(2.7)	(.8)	(.6)
Provision for income taxes (benefit)	$32.5	$97.3	$6.0
Components of income tax expense (benefit):			
Currently payable (refundable):			
U.S. federal and state	$7.4	$7.6	$27.5
Non-U.S.	15.2	3.3	9.5
Total	22.6	10.9	37.0
Deferred income taxes (benefit):			
U.S. federal and state	3.8	(58.5)	(33.7)
Non-U.S.	6.1	144.9	2.7
Total	9.9	86.4	(31.0)
Provision for income taxes (benefit)	$32.5	$97.3	$6.0
Comprehensive provision for income taxes (benefit) allocable to:			
Net income (loss)	$32.5	$97.3	$6.0
Other comprehensive income (loss):			
Marketable securities	(11.3)	(4.1)	2.1
Currency translation	(16.9)	(17.3)	(3.4)
Pension plans	(33.2)	4.1	(5.0)
OPEB plans	(1.2)	(.4)	(.5)
Interest rate swap	—	(1.7)	.2
Total	$(30.1)	$77.9	$(.6)

The amount shown in the above table of our income tax rate reconciliation for non-U.S. tax rates represents the result determined by multiplying the pre-tax earnings or losses of each of our non-U.S. subsidiaries by the difference between the applicable statutory income tax rate for each non-U.S. jurisdiction and the U.S. federal statutory tax rate of 35%. The amount shown on such table for incremental net tax (benefit) on earnings and losses on non-U.S. and non-tax group companies includes, as applicable, (i) current income taxes (including withholding taxes, if applicable), if any, associated with any current-year earnings of our Chemicals Segments non-U.S. subsidiaries to the extent such current-year earnings were distributed to us in the current year, (ii) deferred income taxes (or deferred income tax benefits) associated with the current-year change in the aggregate amount of undistributed earnings of our Chemicals Segment's Canadian subsidiary, which earnings are not subject to a permanent reinvestment plan, in an amount representing the current-year change in the aggregate current income tax that would be generated (including withholding taxes, if applicable) when such aggregate undistributed earnings are distributed to us, (iii) current U.S. income taxes (or current income tax benefit) , including U.S. personal holding company tax, as applicable, attributable to current-year income (losses) of one of Kronos' non-U.S. subsidiaries, which subsidiary is treated as a dual resident for U.S. income tax purposes, to the extent the current-year income (losses) of such subsidiary is subject to U.S. income tax under the U.S. dual-resident provisions of the Internal Revenue Code,

(iv) deferred income taxes associated with our direct investment in Kronos (beginning in 2015) and (v) current and deferred income taxes associated with distributions and earnings from our investment in LandWell and BMI.

The components of the net deferred tax liability at December 31, 2015 and 2016 are summarized below.

	December 31,			
	2015		2016	
	Assets	Liabilities	Assets	Liabilities
	(In millions)			
Tax effect of temporary differences related to:				
Inventories	$3.7	$ (3.7)	$4.2	$ (4.0)
Marketable securities	—	(98.2)	—	(59.9)
Property and equipment	—	(96.6)	—	(91.9)
Accrued OPEB costs	4.0	—	3.7	—
Accrued pension costs	44.0	—	52.6	—
Currency revaluation on intercompany debt	18.6	—	24.0	—
Accrued environmental liabilities	39.9	—	41.1	—
Other deductible differences	45.7	—	43.0	—
Other taxable differences	—	(21.7)	—	(18.9)
Investments in subsidiaries and affiliates	—	(238.8)	—	(235.3)
Tax on unremitted earnings of non-U.S. subsidiaries	—	(2.0)	—	(2.8)
Tax loss and tax credit carryforwards	154.3	—	143.8	—
Valuation allowance	(168.9)	—	(173.4)	—
Adjusted gross deferred tax assets (liabilities)	141.3	(461.0)	139.0	(412.8)
Netting of items by tax jurisdiction	(140.0)	(140.0)	(137.8)	(137.8)
Net noncurrent deferred tax asset (liability)	$1.3	$ (321.0)	$1.2	$ (275.0)

Tax authorities are examining certain of our U.S. and non-U.S. tax returns and have or may propose tax deficiencies, including penalties and interest. Because of the inherent uncertainties involved in settlement initiatives and court and tax proceedings, we cannot guarantee that these tax matters will be resolved in our favor, and therefore our potential exposure, if any, is also uncertain.

- In 2011 and 2012 Kronos received notices of re-assessment from the Canadian federal and provincial tax authorities related to the years 2002 through 2004. We objected to the re-assessments and believed the position was without merit. Accordingly, we appealed the re-assessments and in connection with such appeal we were required to post letters of credit aggregating Cdn. $7.9 million. In 2014, the Appeals Division of the Canadian Revenue Authority ruled in our favor and reversed in their entirety such notices of re-assessment. As a result, we recognized a non-cash income tax benefit of $3.0 million related to the release of a portion of our reserve for uncertain tax positions in 2014 related to the completion of this Canadian income tax audit. In addition, the related letters of credit have been cancelled.
- Also during 2014, we recognized a non-cash income tax benefit of $3.1 million related to the release of a portion of our reserve for uncertain tax positions in conjunction with the completion of an audit of our U.S. income tax return for 2009.
- As a result of ongoing audits in certain jurisdictions, in 2008 Kronos filed Advance Pricing Agreement Requests with the tax authorities in the U.S., Canada and Germany. These requests have been under review with the respective tax authorities since 2008 and prior to 2016, it was uncertain whether an agreement would be reached between the tax authorities and whether we would agree to execute and finalize such agreements. During 2016, Contran, as the ultimate parent of our U.S. Consolidated income tax group, executed and finalized an Advance Pricing Agreement

with the U.S. Internal Revenue Service and our Canadian subsidiary executed and finalized an Advance Pricing Agreement with the Competent Authority for Canada (collectively, the "U.S.-Canada APA") effective for tax years 2005 - 2015. Pursuant to the terms of the U.S.-Canada APA, the U.S. and Canadian tax authorities agreed to certain prior year changes to taxable income of our U.S. and Canadian subsidiaries. As a result of such agreed-upon changes, we recognized a $3.4 million current U.S. income tax benefit in 2016. In addition, our Canadian subsidiary will incur a cash income tax payment of approximately CAD $3 million (USD $2.3 million) as a result of the U.S.-Canada APA, but such payment was fully offset by previously provided accruals (such USD $2.3 million has not been paid as of December 31, 2016, and is classified as part of income taxes payable at such date). We currently expect the Advance Pricing Agreement between

Canada and Germany (collectively, the "Canada-Germany APA") to be executed and finalized within the next twelve months. We believe we have adequate accruals to cover any cash income tax payment which might result from the finalization of the Canada-Germany APA, and accordingly we do not expect the execution of such APA to have a material adverse effect on our consolidated financial position, results of operations or liquidity.

We believe we have adequate accruals for additional taxes and related interest expense which could ultimately result from tax examinations. We believe the ultimate disposition of tax examinations should not have a material adverse effect on our consolidated financial position, results of operations or liquidity.

The following table shows the changes in the amount of our uncertain tax positions (exclusive of the effect of interest and penalties) during 2014, 2015 and 2016:

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Unrecognized tax benefits:			
Amount beginning of year	$47.9	$30.1	$28.8
Net increase (decrease):			
Tax positions taken in prior periods	(19.6)	(.4)	(.6)
Tax positions taken in current period	3.6	6.4	11.0
Lapse due to applicable statute of limitations	(.7)	(6.0)	(1.6)
Settlement with taxing authorities	—	—	(2.3)
Changes in currency exchange rates	(1.1)	(1.3)	.3
Amount at end of year	$30.1	$28.8	$35.6

If our uncertain tax positions were recognized, a benefit of $24.2 million, $23.4 million and $30.9 million at December 31, 2014, 2015 and 2016, respectively, would affect our effective income tax rate. We currently estimate that our unrecognized tax benefits will decrease by approximately $14.3 million, excluding interest, during the next twelve months related to certain adjustments to our prior year returns and the expiration of certain statutes of limitations.

We and Contran file income tax returns in U.S. federal and various state and local jurisdictions. We also file income tax returns in various foreign jurisdictions, principally in Germany, Canada, Belgium and Norway. Our U.S. income tax returns prior to 2013 are generally considered closed to examination by applicable tax authorities. Our foreign income tax returns are generally considered closed to examination for years prior to: 2007 for Norway; 2011 for Canada; 2012 for Germany; and 2013 for Belgium.

We accrue interest and penalties on our uncertain tax positions as a component of our provision for income taxes. We accrued interest and penalties of $1.2 million during 2014 and $1.3 million during 2015 and $1.6 million during 2016, and at December 31, 2015 and 2016 we had $4.2 million and $5.2 million, respectively, accrued for interest and an immaterial amount accrued for penalties for our uncertain tax positions.

Our Chemicals Segment has substantial net operating loss ("NOL") carryforwards in Germany (the equivalent of $638 million and $71 million for German corporate and trade tax purposes, respectively, at December 31, 2016) and in Belgium (the equivalent of $93 million for Belgian corporate tax purposes at December 31, 2016), all of which have an indefinite carryforward period. As a result, we have net deferred income tax assets recognized with respect to these two jurisdictions, primarily related to these NOL carryforwards. The German corporate tax is similar to the U.S. federal income tax, and the German trade tax is similar to the U.S. state income tax. Prior to June 30, 2015, and using all available evidence, we had concluded no deferred income tax asset valuation allowance was required to be recognized with respect to these net deferred income tax assets under the more-likely-than-not recognition criteria, primarily because (i) the carryforwards have an indefinite carryforward period, (ii) we utilized a portion of such carryforwards during the most recent three-year period, and (iii) we expected to utilize the remainder of the carryforwards over the long term. We had also previously indicated that facts and circumstances could change, which might in the future result in the recognition of a valuation allowance against some or all of such deferred income tax assets. However, as of June 30, 2015, and given our operating results during the second quarter of 2015 and our expectations at that time for our operating results for the remainder of 2015, we did not have sufficient positive evidence to overcome the significant negative evidence of having cumulative losses in the most recent twelve consecutive quarters in both our German and Belgian jurisdictions at June 30, 2015 (even considering that the carryforward period of our German and Belgium NOL carryforwards is indefinite, one piece of positive evidence). Accordingly, at June 30, 2015, we concluded that we were required to recognize a non-cash deferred income tax asset valuation allowance under the more-likely-than-not recognition criteria with respect to our German and Belgian net deferred income tax assets. Such valuation allowance aggregated $150.3 million at June 30, 2015. We recognized an additional $8.7 million non-cash deferred income tax asset valuation allowance under the more-likely-than-not recognition criteria during the third and fourth quarters of 2015. During 2016, we recognized an aggregate $2.2 million non-cash tax benefit as the result of a net decrease in such deferred income tax valuation allowance, as the impact of utilizing a portion of our German NOLs during such period more than offset the impact of additional losses recognized by our Belgian operations during such period. In addition to the aggregate $159.0 million and $2.2 million decrease in the deferred income tax asset valuation allowance recognized as part of the provision for income taxes in 2015 and 2016, respectively, the deferred income tax asset valuation allowance also increased by an aggregate of $9.8 million in 2015 and $6.7 million in 2016 due to amounts recognized in other comprehensive income.

We recognize deferred income taxes with respect to the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock because the exemption under GAAP to avoid such recognition of deferred income taxes is not available to us. There is a maximum amount (or cap) of such deferred income taxes we are required to recognize with respect to our direct investment in Kronos, and we previously reached such maximum amount in the fourth quarter of 2010. Since that time and through March 31, 2015, we were not required to recognize any additional deferred income taxes with respect to our direct investment in Kronos because the deferred income taxes associated with the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock continued to be above such cap. However, at June 30, 2015, the deferred income taxes associated with the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock was, for the first time since the fourth quarter of 2010, below such cap, in large part due to the net loss reported by Kronos in the second quarter of 2015. Accordingly, our provision for income taxes in 2015 includes an aggregate non-cash income tax benefit of $29.3 million, recognized in the second, third and fourth quarters of, 2015, for the reduction in the deferred income taxes required to be recognized with respect to the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock, to the extent such reduction related to our equity in Kronos' net loss. We recognized a non-cash income tax expense of $6.5 million in 2016 for the increase in the deferred income taxes required to be recognized with respect to the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock, to the extent such increase related to our equity in Kronos' net income (loss). Such amounts are included in the above table of our income tax rate reconciliation for incremental net tax (benefit) on earnings and losses of non-U.S. and non-tax group companies (in addition to the other items indicated above). A portion of such increase (reduction) also related to our equity in Kronos' other comprehensive income (loss) items, and the amounts shown in the table above for income tax expense (benefit) allocated to other comprehensive income (loss) in 2015 and 2016 includes amounts related to our equity in Kronos' other comprehensive income (loss) items.

Note 15—Noncontrolling interest in subsidiaries:

	December 31,	
	2015	2016
	(In millions)	
Noncontrolling interest in net assets:		
Kronos Worldwide	$147.9	$134.5
NL Industries	39.5	44.3
CompX International	15.3	16.4

BMI	31.6	24.6
LandWell	23.9	23.7
Total	$258.2	$243.5

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Noncontrolling interest in net income (loss) of subsidiaries:			
Kronos Worldwide	$19.2	$(34.3)	$8.3
NL Industries	4.8	(4.0)	2.6
CompX International	1.1	1.2	1.4
BMI	.3	.1	(.4)
LandWell	.3	(.5)	1.0
Total	$25.7	$(37.5)	$12.9

Note 16—Valhi stockholders' equity:

	Shares of common stock		
	Issued	Treasury	Outstanding
	(In millions)		
Balance at December 31, 2014, 2015 and 2016	355.2	(13.2)	342.0

Valhi common stock. We issued a nominal number of shares of Valhi common stock during 2014, 2015 and 2016, associated with annual stock awards to members of our board of directors.

Valhi share repurchases and cancellations. Prior to 2014, our board of directors authorized the repurchase of up to 10.0 million shares of our common stock in open market transactions, including block purchases, or in privately negotiated transactions, which may include transactions with our affiliates or subsidiaries. We may purchase the stock from time to time as market conditions permit. The stock repurchase program does not include specific price targets or timetables and may be suspended at any time. Depending on market conditions, we may terminate the program prior to completion. We will use cash on hand to acquire the shares. Repurchased shares could be retired and cancelled or may be added to our treasury stock and used for employee benefit plans, future acquisitions or other corporate purposes. We did not make any such purchases under the plan in 2014, 2015 or 2016.

Treasury stock. The treasury stock we reported for financial reporting purposes at December 31, 2014, 2015 and 2016 represents our proportional interest in the shares of our common stock held by NL and Kronos. NL held approximately 14.4 million shares of our common stock at December 31, 2015 and 2016. At December 31, 2015 and 2016 Kronos held an aggregate of 1.7 million shares of our common stock. Under Delaware Corporation Law, 100% (and not the proportionate interest) of a parent company's shares held by a majority-owned subsidiary of the parent is considered to be treasury stock for voting purposes. As a result, our common shares outstanding for financial reporting purposes differ from those outstanding for legal purposes.

Preferred stock. Our outstanding preferred stock consists of 5,000 shares of our Series A Preferred Stock having a liquidation preference of $133,466.75 per share, or an aggregate liquidation preference of $667.3 million. The outstanding shares of Series A Preferred Stock are held by Contran and represent all of the shares of Series A Preferred Stock we are authorized to issue. The preferred stock has a par value of $.01 per share and pays a non-cumulative cash dividend at an annual rate of 6% of the aggregate liquidation preference only when authorized and declared by our board of directors. The shares of Series A Preferred Stock are non-convertible, and the shares do not carry any redemption or call features (either at our option or the option of the holder). A holder of the Series A shares does not have any voting rights, except in limited circumstances, and is not entitled to a preferential dividend right that is senior to our shares of common stock. Upon the liquidation, dissolution or winding up of our affairs, a holder of the Series A shares is entitled to be paid a liquidation preference of $133,466.75 per share, plus an amount (if any) equal to any declared but unpaid dividends, before any distribution of assets is made to holders of our common stock. Through December 31, 2016, we have not declared any dividends on the Series A Preferred Stock since its issuance prior to 2014.

Valhi long-term incentive compensation plan. Prior to 2014, our board of directors adopted a plan that provides for the award of stock to our board of directors, and up to a maximum of 200,000 shares could be awarded. Under the plan, we awarded 12,000 shares in 2014, 10,500 shares in 2015 and 16,000 shares in 2016, and at December 31, 2016 150,500 shares are available for future award under this new plan.

Stock plans of subsidiaries. Kronos, NL and CompX each maintain plans which provide for the award of their common stock to their board of directors. At December 31, 2016, Kronos, NL and CompX had 163,500, 163,000 and

173,000 shares of their respective common stock available for future award under respective plans.

Accumulated other comprehensive income (loss). Accumulated other comprehensive income (loss) attributable to Valhi stockholders comprises changes in equity as presented in the table below.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Accumulated other comprehensive income (loss) (net of tax and noncontrolling interest):			
Marketable securities:			
Balance at beginning of year	$2.8	$1.6	$1.6
Other comprehensive income (loss):			
Unrealized gain (losses) arising during the year	(1.0)	—	.1
Less reclassification adjustments for amounts included in realized loss	(.2)	—	—
Balance at end of year	$1.6	$1.6	$1.7
Interest rate swap:			
Balance at beginning of year	$—	$—	$(1.3)
Other comprehensive loss:			
Unrealized losses during the year	—	(1.7)	(1.2)
Less reclassification adjustments for amounts included in interest expense	—	.4	1.3
Balance at end of year	$—	$(1.3)	$(1.2)
Currency translation::			
Balance at beginning of year	$59.2	$(22.6)	$(78.1)
Other comprehensive loss arising during the year	(81.8)	(55.5)	(10.4)
Balance at end of year	$(22.6)	$(78.1)	$(88.5)
Defined benefit pension plans:			
Balance at beginning of year	$(76.5)	$(132.0)	$(123.0)
Other comprehensive income (loss):			
Amortization of prior service cost and net losses included in net periodic pension cost	6.3	6.7	5.7
Net actuarial gain (loss) arising during the year	(61.7)	2.3	(19.7)
Plan curtailment	(.1)	—	—
Balance at end of year	$(132.0)	$(123.0)	$(137.0)
OPEB plans:			
Balance at beginning of year	$6.5	$4.4	$3.8
Other comprehensive loss:			
Amortization of prior service credit and net losses included in net periodic OPEB cost	(1.3)	(1.0)	(1.0)
Net actuarial gain (loss) arising during the year	(.8)	.4	.3
Balance at end of year	$4.4	$3.8	$3.1
Total accumulated other comprehensive income (loss):			
Balance at beginning of year	$(8.0)	$(148.6)	$(197.0)
Other comprehensive loss	(140.6)	(48.4)	(24.9)
Balance at end of year	$(148.6)	$(197.0)	$(221.9)

See Note 11 for amounts related to our defined benefit pension plans and OPEB plans and Note 19 for a discussion of our interest rate swap contract.

Note 17—Related party transactions:

We may be deemed to be controlled by Ms. Simmons and Ms. Connelly. See Note 1. Corporations that may be deemed to be controlled by or affiliated with such individuals sometimes engage in (a) intercorporate transactions such as guarantees, management and expense sharing arrangements, shared fee arrangements, joint ventures, partnerships, loans, options, advances of funds on open account, and sales, leases and exchanges of assets, including securities issued by both related and unrelated parties and (b) common investment and acquisition strategies, business combinations, reorganizations, recapitalizations, securities repurchases, and purchases and sales (and other acquisitions and dispositions) of subsidiaries, divisions or other business units, which transactions have involved both related and unrelated parties and have included transactions which resulted in the acquisition by one related party of a publicly-held noncontrolling interest in another related party. While no transactions of the type described above are planned or proposed with respect to us other than as set forth in these financial statements, we continuously consider, review and evaluate, and understand that Contran and related entities consider, review and evaluate such transactions. Depending upon the business, tax and other objectives then relevant, it is possible that we might be a party to one or more such transactions in the future.

From time to time, we may have loans and advances outstanding between us and various related parties, including Contran, pursuant to term and demand notes. We generally enter into these loans and advances for cash management purposes. When we loan funds to related parties, we are generally able to earn a higher rate of return on the loan than we would earn if we invested the funds in other instruments. While certain of these loans may be of a lesser credit quality than cash equivalent instruments otherwise available to us, we believe we have evaluated the credit risks involved and appropriately reflect those credit risks in the terms of the applicable loans. When we borrow from related parties, we are generally able to pay a lower rate of interest than we would pay if we borrowed from unrelated parties. See Note 9 for more information on the Valhi and Kronos credit facilities with Contran. We paid Contran $11.0 million, $10.3 million and $12.9 million in interest on borrowings under credit facilities in 2014, 2015 and 2016, respectively.

A subsidiary of Contran has guaranteed (i) WCS's obligation under its financing capital lease with the County of Andrews, Texas discussed in Note 9, (ii) Tremont's obligation under its $14.5 million promissory note payable to NERT discussed in Note 9 and (iii) Tremont's $9.0 million ($11.1 million face value) deferred payment obligation discussed in Note 10. The guaranty obligation would only arise upon our failure to make any required repayments.

Under the terms of various intercorporate services agreements ("ISAs") we enter into with Contran, employees of Contran provide us certain management, tax planning, financial and administrative services on a fee basis. Such charges are based upon estimates of the time devoted by the Contran employees to our affairs, and the compensation and other expenses associated with those persons. Because of the large number of companies affiliated with Contran, we believe we benefit from cost savings and economies of scale gained by not having certain management, financial and administrative staffs duplicated at all of our subsidiaries, thus allowing certain Contran employees to provide services to multiple companies but only be compensated by Contran. The net ISA fees charged to us by Contran and approved by the independent members of the applicable board of directors aggregated $33.4 million in 2014, $35.8 million in 2015 and $36.5 million in 2016. These agreements are renewed annually, and we expect to pay a net amount of $34.5 million under the ISAs during 2017.

We had an aggregate 31.2 million shares at December 31, 2015 and 30.2 million shares at December 31, 2016 of our Kronos common stock pledged as collateral for certain debt obligations of Contran. We receive a fee from Contran for pledging these Kronos shares, determined by a formula based on the market value of the shares pledged. We received $.9 million in 2014, $.8 million in 2015 and $1.2 million in 2016 from Contran for this pledge.

Our subsidiaries Tall Pines Insurance Company and EWI RE, Inc. provide for or broker certain insurance or reinsurance policies for Contran and certain of its subsidiaries and affiliates, including us. Tall Pines purchases reinsurance for substantially all of the risks it underwrites from third party insurance carriers with an A.M. Best Company rating of generally at least A- (Excellent). Consistent with insurance industry practices, Tall Pines and EWI receive commissions from insurance and reinsurance underwriters and/or assess fees for the policies that they provide or broker to us. We received cash payments for insurance premiums from Contran and certain other affiliates not members of our consolidated financial reporting group of $5.7 million in 2014 and $5.4 million 2015 and $5.3 million in 2016. These amounts also include payments to insurers or reinsurers through EWI for the reimbursement of claims within our applicable deductible or retention ranges that such insurers or reinsurers paid to third parties on our behalf, as well as amounts for claims and risk management services and various other third-party fees and expenses incurred by the program. We expect these relationships with Tall Pines and EWI will continue in 2017.

With respect to certain of such jointly-owned policies, it is possible that unusually large losses incurred by one or more insureds during a given policy period could leave the other participating companies without adequate coverage under that policy for the balance of the policy period. As a result, and in the event that the available coverage under a particular policy would become exhausted by one or more claims, Contran and certain of its subsidiaries and affiliates, including us, have entered into a loss sharing agreement under which any uninsured loss arising because the available coverage had been exhausted by one or more claims will be shared ratably amongst those entities that had submitted claims under the relevant policy. We believe the benefits in the form of reduced premiums and broader coverage associated with the group coverage for such policies justify the risk associated with the potential for any uninsured loss.

Contran and certain of its subsidiaries, including us, participate in a combined information technology data recovery program that Contran provides from a data recovery center that it established. Pursuant to the program, Contran and certain of its subsidiaries, including us, as a group share information technology data recovery services. The program apportions its costs among the participating companies. We paid Contran $243,000 in 2014, $298,000 in 2015 and $253,000 in 2016 for such services. We expect that this relationship with Contran will continue in 2017.

WCS is required to provide certain financial assurances to the Texas government agencies with respect to certain decommissioning obligations related to our facility in West Texas. See Note 18. Such financial assurances may be provided by various means. We and certain of our affiliates have provided or assisted WCS with providing such financial assurance, as specified below. Upon completing the pending sale of WCS to Rockwell discussed in Note 3, we and our affiliates would no longer be required to provide or assist with such financial assurance.

- During 2014, 2015 and 2016, a subsidiary of Contran guaranteed certain of WCS' specified decommissioning obligations as it relates to its LLRW treatment and storage facility and RCRA permits, currently estimated at $3.9 million. Such Contran subsidiary was eligible to provide this guarantee because it met certain specified financial tests. The obligations would arise only upon a closure of our West Texas facility and our failure to perform the required decommissioning activities.
- During 2014, 2015 and 2016, Contran issued a letter of credit ("LOC") under its bank credit facility to the state of Texas related to specified decommissioning obligations associated with our byproduct facility. At December 31, 2016, the amount of such LOC was $6.2 million. The LOC would only be drawn down upon the closure of our byproduct facility and our failure to perform the required decommissioning activities. We reimbursed Contran for costs related to the LOC of $.1 million in each of 2014, 2015 and 2016.
- Prior to 2014, we, certain of our subsidiaries, Contran and certain subsidiaries of Contran guaranteed WCS' obligations under the surety bond (currently valued at $88.8 million) discussed in Note 18. The obligations would arise upon our failure to make the required quarterly payments into the surety bond trust discussed in Note 18.

Receivables from and payables to affiliates are summarized in the table below.

	December 31, 2015	December 31, 2016
	(In millions)	
Current receivables from affiliates:		
Contran:		
Trade items	$.2	$.4
Income taxes	7.6	—
Other	2.5	2.8
Total	$10.3	$3.2
Current payables to affiliates:		
Louisiana Pigment Company, L.P.	$19.4	$14.7
Contran:		
Trade items	26.1	31.4
Income taxes	—	5.5

Total	$45.5	$51.6
Payables to affiliate included in long-term debt:		
Valhi—Contran credit facility	$263.8	$278.9

Amounts payable to LPC are generally for the purchase of TiO_2, while amounts receivable from LPC are generally from the sale of TiO_2 feedstock. See Note 7. Purchases of TiO_2 from LPC were $193.1 million in 2014, $176.5 million in 2015 and $157.9 million in 2016. Sales of feedstock to LPC were $98.4 million in 2014, $80.6 million in 2015 and $68.8 million in 2016. Substantially all of the Contran trade payables relates to the ISA fees charged to WCS by Contran, which ISA fees had not been paid by WCS to Contran for 2012 and prior years and 2016. Any amounts WCS owes to Contran and any other affiliates would be contributed to WCS immediately prior to the completion of the pending sale of WCS to Rockwell and included in the calculation of gain or loss on the sale discussed in Note 3.

Note 18—Commitments and contingencies:

Lead pigment litigation—NL

NL's former operations included the manufacture of lead pigments for use in paint and lead-based paint. NL, other former manufacturers of lead pigments for use in paint and lead-based paint (together, the "former pigment manufacturers"), and the Lead Industries Association ("LIA"), which discontinued business operations in 2002, have been named as defendants in various legal proceedings seeking damages for personal injury, property damage and governmental expenditures allegedly caused by the use of lead-based paints. Certain of these actions have been filed by or on behalf of states, counties, cities or their public housing authorities and school districts, and certain others have been asserted as class actions. These lawsuits seek recovery under a variety of theories, including public and private nuisance, negligent product design, negligent failure to warn, strict liability, breach of warranty, conspiracy/concert of action, aiding and abetting, enterprise liability, market share or risk contribution liability, intentional tort, fraud and misrepresentation, violations of state consumer protection statutes, supplier negligence and similar claims.

The plaintiffs in these actions generally seek to impose on the defendants responsibility for lead paint abatement and health concerns associated with the use of lead-based paints, including damages for personal injury, contribution and/or indemnification for medical expenses, medical monitoring expenses and costs for educational programs. To the extent the plaintiffs seek compensatory or punitive damages in these actions, such damages are generally unspecified. In some cases, the damages are unspecified pursuant to the requirements of applicable state law. A number of cases are inactive or have been dismissed or withdrawn. Most of the remaining cases are in various pre-trial stages. Some are on appeal following dismissal or summary judgment rulings or a trial verdict in favor of either the defendants or the plaintiffs.

NL believes that these actions are without merit, and NL intends to continue to deny all allegations of wrongdoing and liability and to defend against all actions vigorously. NL does not believe it is probable that it has incurred any liability with respect to all of the lead pigment litigation cases to which NL is a party, and liability to us that may result, if any, in this regard cannot be reasonably estimated, because:

- NL has never settled any of the market share, intentional tort, fraud, nuisance, supplier negligence, breach of warranty, conspiracy, misrepresentation, aiding and abetting, enterprise liability, or statutory cases,
- no final, non-appealable adverse verdicts have ever been entered against NL, and
- NL has never ultimately been found liable with respect to any such litigation matters, including over 100 cases over a twenty-year period for which NL was previously a party and for which NL has been dismissed without any finding of liability.

Accordingly, neither we nor NL have accrued any amounts for any of the pending lead pigment and lead-based paint litigation cases filed by or on behalf of states, counties, cities or their public housing authorities and school districts, or those asserted as class actions. In addition, we have determined that liability to us which may result, if any, cannot be reasonably estimated because there is no prior history of a loss of this nature on which an estimate could be made and there is no substantive information available upon which an estimate could be based.

In one of these lead pigment cases, in April 2000 NL was served with a complaint in County of Santa Clara v. Atlantic Richfield Company, et al. (Superior Court of the State of California, County of Santa Clara, Case

No. 1-00-CV-788657) brought by a number of California government entities against the former pigment manufacturers, the LIA and certain paint manufacturers. The County of Santa Clara sought to recover compensatory damages for funds the plaintiffs have expended or would in the future expend for medical treatment, educational expenses, abatement or other costs due to exposure to, or potential exposure to, lead paint, disgorgement of profit, and punitive damages. In July 2003, the trial judge granted defendants' motion to dismiss all remaining claims. Plaintiffs appealed and the intermediate appellate court reinstated public nuisance, negligence, strict liability, and fraud claims in March 2006. A fourth amended complaint was filed in March 2011 on behalf of The People of California by the County Attorneys of Alameda, Ventura, Solano, San Mateo, Los Angeles and Santa Clara, and the City Attorneys of San Francisco, San Diego and Oakland. That complaint alleged that the presence of lead paint created a public nuisance in each of the prosecuting jurisdictions and sought its abatement. In July and August 2013, the case was tried. In January 2014, the Judge issued a judgment finding NL, The Sherwin Williams Company and ConAgra Grocery Products Company jointly and severally liable for the abatement of lead paint in pre-1980 homes, and ordered the defendants to pay an aggregate $1.15 billion to the people of the State of California to fund such abatement. In February 2014, NL filed a motion for a new trial, and in March 2014 the court denied the motion. Subsequently in March 2014, NL filed a notice of appeal with the Sixth District Court of Appeal for the State of California and the appeal is proceeding with the appellate court. NL believes that this judgment is inconsistent with California law and is unsupported by the evidence, and NL will defend vigorously against all claims.

The Santa Clara case is unusual in that this is the second time that an adverse verdict in the lead pigment litigation has been entered against NL (the first adverse verdict against NL was ultimately overturned on appeal). We have concluded that the likelihood of a loss in this case has not reached a standard of "probable" as contemplated by ASC 450, given (i) the substantive, substantial and meritorious grounds on which the adverse verdict in the Santa Clara case will be appealed, (ii) the uniqueness of the Santa Clara verdict (i.e. no final, non-appealable verdicts have ever been rendered against NL, or any of the other former lead pigment manufacturers, based on the public nuisance theory of liability or otherwise), and (iii) the rejection of the public nuisance theory of liability as it relates to lead pigment matters in many other jurisdictions (no jurisdiction in which a plaintiff has asserted a public nuisance theory of liability has ever successfully been upheld). In addition, liability that may result, if any, cannot be reasonably estimated, as NL continues to have no basis on which an estimate of liability could be made, as discussed above. However, as with any legal proceeding, there is no assurance that any appeal would be successful, and it is reasonably possible, based on the outcome of the appeals process, that NL may in the future incur some liability resulting in the recognition of a loss contingency accrual that could have a material adverse impact on our results of operations, financial position and liquidity.

New cases may continue to be filed against NL. We cannot assure you that we will not incur liability in the future in respect of any of the pending or possible litigation in view of the inherent uncertainties involved in court and jury rulings. In the future, if new information regarding such matters becomes available to us (such as a final, non-appealable adverse verdict against us or otherwise ultimately being found liable with respect to such matters), at that time we would consider such information in evaluating any remaining cases then-pending against us as to whether it might then have become probable we have incurred liability with respect to these matters, and whether such liability, if any, could have become reasonably estimable. The resolution of any of these cases could result in the recognition of a loss contingency accrual that could have a material adverse impact on our net income for the interim or annual period during which such liability is recognized and a material adverse impact on our consolidated financial condition and liquidity.

Environmental matters and litigation

Our operations are governed by various environmental laws and regulations. Certain of our businesses are and have been engaged in the handling, manufacture or use of substances or compounds that may be considered toxic or hazardous within the meaning of applicable environmental laws and regulations. As with other companies engaged in similar businesses, certain of our past and current operations and products have the potential to cause environmental or other damage. We have implemented and continue to implement various policies and programs in an effort to minimize these risks. Our policy is to maintain compliance with applicable environmental laws and regulations at all of our plants and to strive to improve environmental performance. From time to time, we may be subject to environmental regulatory enforcement under U.S. and non-U.S. statutes, the resolution of which typically involves the establishment of compliance programs. It is possible that future developments, such as stricter requirements of environmental laws and enforcement policies, could adversely affect our production, handling, use, storage, transportation, sale or disposal of such substances. We believe that all of our facilities are in substantial compliance with applicable environmental laws.

Certain properties and facilities used in NL's former operations, including divested primary and secondary lead smelters and former mining locations, are the subject of civil litigation, administrative proceedings or investigations arising under federal and state environmental laws and common law. Additionally, in connection with past operating practices, we are currently involved as a defendant, potentially responsible party ("PRP") or both, pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act ("CERCLA"), and similar state laws in various governmental and private actions associated with waste disposal sites, mining locations, and facilities that we or our predecessors, our subsidiaries or their predecessors currently or previously owned, operated or used, certain of which are on the United States

Environmental Protection Agency's ("EPA") Superfund National Priorities List or similar state lists. These proceedings seek cleanup costs, damages for personal injury or property damage and/or damages for injury to natural resources. Certain of these proceedings involve claims for substantial amounts. Although we may be jointly and severally liable for these costs, in most cases we are only one of a number of PRPs who may also be jointly and severally liable, and among whom costs may be shared or allocated. In addition, we are occasionally named as a party in a number of personal injury lawsuits filed in various jurisdictions alleging claims related to environmental conditions alleged to have resulted from our operations.

Obligations associated with environmental remediation and related matters are difficult to assess and estimate for numerous reasons including the:

- complexity and differing interpretations of governmental regulations,
- number of PRPs and their ability or willingness to fund such allocation of costs,
- financial capabilities of the PRPs and the allocation of costs among them,
- solvency of other PRPs,

- multiplicity of possible solutions,
- number of years of investigatory, remedial and monitoring activity required,
- uncertainty over the extent, if any, to which our former operations might have contributed to the conditions allegedly giving rise to such personal injury, property damage, natural resource and related claims, and
- number of years between former operations and notice of claims and lack of information and documents about the former operations.

In addition, the imposition of more stringent standards or requirements under environmental laws or regulations, new developments or changes regarding site cleanup costs or the allocation of costs among PRPs, solvency of other PRPs, the results of future testing and analysis undertaken with respect to certain sites or a determination that we are potentially responsible for the release of hazardous substances at other sites, could cause our expenditures to exceed our current estimates. We cannot assure you that actual costs will not exceed accrued amounts or the upper end of the range for sites for which estimates have been made, and we cannot assure you that costs will not be incurred for sites where no estimates presently can be made. Further, additional environmental and related matters may arise in the future. If we were to incur any future liability, this could have a material adverse effect on our consolidated financial statements, results of operations and liquidity.

We record liabilities related to environmental remediation and related matters (including costs associated with damages for personal injury or property damage and/or damages for injury to natural resources) when estimated future expenditures are probable and reasonably estimable. We adjust such accruals as further information becomes available to us or as circumstances change. Unless the amounts and timing of such estimated future expenditures are fixed and reasonably determinable, we generally do not discount estimated future expenditures to their present value due to the uncertainty of the timing of the payout. We recognize recoveries of costs from other parties, if any, as assets when their receipt is deemed probable. At December 31, 2015 and 2016, receivables for recoveries were not significant.

We do not know and cannot estimate the exact time frame over which we will make payments for our accrued environmental and related costs. The timing of payments depends upon a number of factors, including but not limited to the timing of the actual remediation process; which in turn depends on factors outside of our control. At each balance sheet date, we estimate the amount of our accrued environmental and related costs which we expect to pay within the next twelve months, and we classify this estimate as a current liability. We classify the remaining accrued environmental costs as a noncurrent liability.

The table below presents a summary of the activity in our accrued environmental costs during 2014, 2015, and 2016 are presented below.

	Years ended December 31,		
	2014	2015	2016
	(In millions)		
Balance at the beginning of the year	$122.7	$118.5	$120.4
Additions charged to expense, net	6.6	5.7	5.9
Payments, net	(13.0)	(3.5)	(3.7)
Changes in currency exchange rates and other	2.2	(.3)	—
Balance at the end of the year	$118.5	$120.4	$122.6
Amounts recognized in our Consolidated Balance Sheet at the end of the year:			

Current liabilities	$10.2	$11.7	$15.3
Noncurrent liabilities	108.3	108.7	107.3
Total	$118.5	$120.4	$122.6

NL—On a quarterly basis, NL evaluates the potential range of its liability for environmental remediation and related costs at sites where it has been named as a PRP or defendant. At December 31, 2016, NL had accrued approximately $117 million related to approximately 41 sites associated with remediation and related matters that it believes are at the present time and/or in their current phase reasonably estimable. The upper end of the range of reasonably possible costs to NL for remediation and related matters for which we believe it is possible to estimate costs is approximately $160 million, including the amount currently accrued.

NL believes that it is not reasonably possible to estimate the range of costs for certain sites. At December 31, 2016, there were approximately 5 sites for which NL is not currently able to estimate a range of costs. For these sites, generally the investigation is in the early stages, and NL is unable to determine whether or not NL actually had any association with the site, the nature of its responsibility, if any, for the contamination at the site and the extent of contamination at and cost to remediate the site. The timing and availability of information on these sites is dependent on events outside of our control, such as when the party alleging liability provides information to us. At certain of these previously inactive sites, NL has received general and special notices of liability from the EPA and/or state agencies alleging that NL, sometimes with other PRPs, are liable for past and future costs of remediating environmental contamination allegedly caused by former operations. These notifications may assert that NL, along with any other alleged PRPs, are liable for past and/or future clean-up costs. As further information becomes available to us for any of these sites which would allow us to estimate a range of costs, we would at that time adjust our accruals. Any such adjustment could result in the recognition of an accrual that would have a material effect on our consolidated financial statements, results of operations and liquidity.

WCS – Effective December 2015, WCS entered an Agreed Order with the TCEQ with regard to the disposition of certain U.S. Department of Energy (“DOE”) waste currently stored at the WCS facility. WCS entered into the Agreed Order as the licensee of the storage facility, and DOE entered into a similar order with the TCEQ as the owner of the waste. WCS asserts that the alleged violations set forth in the orders are due to the acts and omissions of DOE and its contractor. WCS expects to work with TCEQ and DOE to develop a compliance plan regarding the stored waste. While the cost of the compliance plan is not currently estimable, the amount of such compliance costs could be material. On October 21, 2015 the U.S. Nuclear Regulatory Commission (“NRC”) Office of Investigations commenced an investigation of WCS’s handling of the DOE waste described above. WCS cooperated fully, and the matter was concluded with no formal demands or claims by the NRC. WCS believes the DOE or its contractor is required to reimburse WCS for its cost to comply with the Agreed Order and the NRC investigation under the terms of the storage contract and pursuant to law, and as such we believe the cost of compliance with the Agreed Order and the NRC investigation should not have a material effect on our consolidated financial condition, results of operations or liquidity. DOE has generally paid for the costs to comply. On April 28, 2016 WCS filed with the DOE an administrative claim under the Federal Tort Claims Act related to this matter.

Other—We have also accrued approximately $5.6 million at December 31, 2016 for other environmental cleanup matters. This accrual is near the upper end of the range of our estimate of reasonably possible costs for such matters.

Insurance coverage claims

We are involved in certain legal proceedings with a number of our former insurance carriers regarding the nature and extent of the carriers’ obligations to us under insurance policies with respect to certain lead pigment and asbestos lawsuits. The issue of whether insurance coverage for defense costs or indemnity or both will be found to exist for our lead pigment and asbestos litigation depends upon a variety of factors and we cannot assure you that such insurance coverage will be available.

We have agreements with three former insurance carriers pursuant to which the carriers reimburse us for a portion of our future lead pigment litigation defense costs, and one such carrier reimburses us for a portion of our future asbestos litigation defense costs. We are not able to determine how much we will ultimately recover from these carriers for defense costs incurred by us because of certain issues that arise regarding which defense costs qualify for reimbursement. While we continue to seek additional insurance recoveries, we do not know if we will be successful in obtaining reimbursement for either defense costs or indemnity. Accordingly, we recognize insurance recoveries in income only when receipt of the recovery is probable and we are able to reasonably estimate the amount of the recovery.

In January 2014, NL was served with a complaint in Certain Underwriters at Lloyds, London, et al v. NL Industries, Inc. (Supreme Court of the State of New York, County of New York, Index No. 14/650103). The plaintiff, a former insurance carrier of ours, is seeking a declaratory judgment of its obligations to us under insurance policies issued to us by the plaintiff with respect to certain lead pigment lawsuits. The case is now proceeding in the trial court. We believe the action is without merit and intend to defend NL's rights in this action vigorously.

In February 2014, NL was served with a complaint in Zurich American Insurance Company, as successor-in-interest to Zurich Insurance Company, U.S. Branch vs. NL Industries, Inc., and The People of the State of California, acting by and through county Counsels of Santa Clara, Alameda, Los Angeles, Monterey, San Mateo, Solano and Ventura Counties and the city Attorneys of Oakland, San Diego, and San Francisco, et al (Superior Court of California, County of Santa Clara, Case No.: 1-14-CV-259924). In January 2015, an Order of Deposit Under CCP § 572 was entered by the trial court.

Other litigation

NL—– NL has been named as a defendant in various lawsuits in several jurisdictions, alleging personal injuries as a result of occupational exposure primarily to products manufactured by our former operations containing asbestos, silica and/or mixed dust. In addition, some plaintiffs allege exposure to asbestos from working in various facilities previously owned and/or operated by NL. There are 103 of these types of cases pending, involving a total of approximately 588 plaintiffs. In addition, the claims of approximately 8,687 plaintiffs have been administratively dismissed or placed on the inactive docket in Ohio courts. We do not expect these claims will be re-opened unless the plaintiffs meet the courts' medical criteria for asbestos-related claims. We have not accrued any amounts for this litigation because of the uncertainty of liability and inability to reasonably estimate the liability, if any. To date, we have not been adjudicated liable in any of these matters. Based on information available to us, including:

- facts concerning historical operations,
- the rate of new claims,
- the number of claims from which we have been dismissed, and
- our prior experience in the defense of these matters,

We believe that the range of reasonably possible outcomes of these matters will be consistent with our historical costs (which are not material). Furthermore, we do not expect any reasonably possible outcome would involve amounts material to our consolidated financial position, results of operations or liquidity. We have sought and will continue to vigorously seek, dismissal and/or a finding of no liability from each claim. In addition, from time to time, we have received notices regarding asbestos or silica claims purporting to be brought against former subsidiaries, including notices provided to insurers with which we have entered into settlements extinguishing certain insurance policies. These insurers may seek indemnification from us.

Kronos— In March 2013, Kronos was served with the complaint, Los Gatos Mercantile, Inc. d/b/a Los Gatos Ace Hardware, et al v. E.I. Du Pont de Nemours and Company, et al. (United States District Court, for the Northern District of California, Case No. 3:13-cv-01180-SI). The defendants include us, E.I. Du Pont de Nemours & Company, Huntsman International LLC and Millennium Inorganic Chemicals, Inc. As amended by plaintiffs' third amended complaint (Harrison, Jan, et al v. E.I. Du Pont de Nemours and Company, et al), plaintiffs seek to represent a class consisting of indirect purchasers of titanium dioxide in the states of Arizona, Arkansas, California, the District of Columbia, Florida, Iowa, Kansas, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Mexico, New York, North Carolina, Oregon and Tennessee that indirectly purchased titanium dioxide from one or more of the defendants on or after March 1, 2002. The complaint alleges that the defendants conspired and combined to fix, raise, maintain, and stabilize the price at which titanium dioxide was sold in the United States and engaged in other anticompetitive conduct. The case is now proceeding in the trial court. We believe the action is without merit, will deny all allegations of wrongdoing and liability and intend to defend against the action vigorously. Based on our quarterly status evaluation of this case, we have determined that it is not reasonably possible that a loss has been incurred in this case.

In September 2016, Kronos was served with the complaint, Home Depot U.S.A., Inc. v. E.I. Dupont Nemours and Company, et al. (United States District Court, for the Northern District of California, Case No. 3:16-cv-04865). The defendants include us, E.I. Du Pont de Nemours & Company, Huntsman International LLC and Millennium Inorganic Chemicals, Inc. The plaintiff alleges that it indirectly purchased titanium dioxide from one or more of the defendants on or after March 1, 2002. The complaint alleges that the defendants conspired and combined to fix, raise, maintain, and stabilize the price at which titanium dioxide was sold in the United States and engaged in other anticompetitive conduct. The case is now proceeding in the trial court. We believe the action is without merit, will deny all allegations of wrongdoing and liability and intend to defend against the action vigorously. Based on our evaluation of this case, we have determined that it is not reasonably possible that a loss has been incurred in this case.

For a description of the anti-trust action filed by the United States Department of Justice with respect to the sales of WCS, see Note 3.

Other—In addition to the litigation described above, we and our affiliates are involved in various other environmental, contractual, product liability, patent (or intellectual property), employment and other claims and disputes incidental to our present and former businesses. In certain cases, we have insurance coverage for these items, although we do not expect any additional material insurance coverage for our environmental claims.

We currently believe that the disposition of all of these various other claims and disputes, individually or in the aggregate, should not have a material adverse effect on our consolidated financial position, results of operations or liquidity beyond the accruals already provided.

Other matters

Concentrations of credit risk—Sales of TiO_2 accounted for approximately 90% of our Chemicals Segment's sales in 2014, 92% in 2015 and 93% in 2016. The remaining sales result from the mining and sale of ilmenite ore (a raw material used in the sulfate pigment production process), and the manufacture and sale of iron-based water treatment chemicals and certain titanium chemical products (derived from co-products of the TiO_2 production processes). TiO_2 is generally sold to the paint, plastics and paper industries. Such markets are generally considered "quality-of-life" markets whose demand for TiO_2 is influenced by the relative economic well-being of the various geographic regions. Our Chemicals Segment sells TiO_2 to over 4,000 customers, with the top ten customers approximating 35% of our Chemicals Segment's net sales in 2014, 34% in 2015 and 33% in 2016. In each of 2014, 2015 and 2016, one customer, Behr Process Corporation, accounted for approximately 10% of our Chemicals Segment's net sales. The table below shows the approximate percentage of our TiO_2 sales by volume for our significant markets, Europe and North America, for the last three years.

	2014	2015	2016
Europe	50 %	52 %	51 %
North America	33 %	29 %	29 %

Our Component Products Segment's products are sold primarily in North America to original equipment manufacturers. The ten largest customers related to our Component Product's Segment accounted for approximately 47% of sales in 2014, 48% in 2015, and 46% in 2016. United States Postal Service, a customer of the security products reporting unit, accounted for approximately 13% of the Component Products Segment's total sales in each of 2014 and 2015 and 14% in 2016. Harley Davidson, also a customer of the security products reporting unit, accounted for approximately 12% in each of 2014 and 2015 and 11% in 2016. .

Our Waste Management Segment's revenues consist of storage and disposal fees at our facility located in Andrews County, Texas. During 2014 we had sales to two customers that each exceed 10% of our Waste Management Segment's total sales: Zion Solutions (18%), and Sacramento Municipal Utility District (23%). During 2015 we had sales to five customers that each exceed 10% of our Waste Management Segment's total sales: Exelon Generation (19%), U.S. Department of Energy (16%), Nuclear Waste Partnership (12%), Arizona Public Service (12%), and Zion Solutions (11%). During 2016 we had sales to three customers that each exceed 10% of our Waste Management Segment's total sales: U.S. Department of Energy (27%), Pacific Gas & Electric Company (13%) and Exelon Generation (12%).

Our Real Estate Management and Development Segment's revenues are land sales income and water and electric delivery fees. During 2014 we had sales to four customers that each exceeded 10% of our Real Estate Management and Development Segment's net sales: Greystone Nevada (23%), Woodside Homes of Nevada (25%), and Richmond Homes of Nevada (20%) all relate to land sales; the City of Henderson (12%) relates to our water delivery services. During 2015 we had sales to four customers that each exceeded 10% of our Real Estate Management and Development Segment's net sales: Richmond Homes of Nevada (27%), LV East Gibson, LLC (17%), and Prologis, L.P. (11%) are all relate to land sales; the City of Henderson (15%) relates to our water delivery services. During 2016 we had sales to three customers that each exceeded 10% of our Real Estate Management and Development Segment's net sales: Grey Stone Nevada LLC (34%), Richmond Homes of Nevada (15%) and Henderson Interchange Centers LLC (12%).

Long-term contracts—Our Chemicals Segment has long-term supply contracts that provide for certain of our TiO_2 feedstock requirements through 2019. The agreements require Kronos to purchase certain minimum quantities of feedstock with minimum purchase commitments aggregating approximately $605 million over the life of the contracts in years subsequent to December 31, 2016. In addition, our Chemicals Segment has other long-term supply and service contracts that provide for various raw materials and services. These agreements require Kronos to purchase certain minimum quantities or services with minimum purchase commitments aggregating approximately $158 million at December 31, 2016.

Operating leases—Our Chemicals Segment's principal German operating subsidiary leases the land under its Leverkusen TiO_2 production facility pursuant to a lease with Bayer AG that expires in 2050. The Leverkusen facility itself, which our Chemicals Segment owns and which represents approximately one-third of its current TiO_2 production capacity, is located within Bayer's extensive manufacturing complex. Kronos periodically establishes the amount of rent for the land lease associated with the Leverkusen facility by agreement with Bayer for periods of at least two years at a time. The lease agreement provides for no formula, index or other mechanism to determine changes in the rent for such land lease; rather, any change in the rent is subject solely to periodic negotiation between Bayer and Kronos. We recognize any change in the rent based on such negotiations as part of lease expense starting from the time such change is agreed upon by both parties, as any such change in the rent is deemed "contingent rentals" under GAAP. Under the terms of various supply and services agreements majority-owned subsidiaries of Bayer provides raw materials, including chlorine, auxiliary and operating materials, utilities and services necessary to operate the Leverkusen facility.

These agreements, as amended, expire in 2017 through 2019. We expect to renew these agreements prior to expiration at similar terms and conditions.

We also lease various other manufacturing facilities and equipment. Some of the leases contain purchase and/or various term renewal options at fair market and fair rental values, respectively. In most cases we expect that, in the normal course of business, such leases will be renewed or replaced by other leases. Net rent expense approximated $16.6 million in 2014 and $16.1 million in each of 2015 and 2016. At December 31, 2016, future minimum payments under non-cancellable operating leases having an initial or remaining term of more than one year were as follows:

Years ending December 31,	Amount (In millions)
2017	$ 11.3
2018	6.7
2019	5.3
2020	4.4
2021	3.7
2022 and thereafter	24.0
Total (1)	$ 55.4

(1) Approximately $16 million of the $55.4 million aggregate future minimum rental commitments at December 31, 2016 relates to Kronos' Leverkusen facility lease discussed above. The minimum commitment amounts for such lease included in the table above for each year through the 2050 expiration of the lease are based upon the current annual rental rate as of December 31, 2016. As discussed above, any change in the rent is based solely on negotiations between Bayer and Kronos, and any such change in the rent is deemed "contingent rentals" under GAAP which is excluded from the future minimum lease payments disclosed above.

Income taxes—Prior to 2014, NL made certain pro-rata distributions to its stockholders in the form of shares of Kronos common stock. All of NL's distributions of Kronos common stock were taxable to NL and NL recognized a taxable gain equal to the difference between the fair market value of the Kronos shares distributed on the various dates of distribution and NL's adjusted tax basis in the shares at the dates of distribution. NL transferred shares of Kronos common stock to us in satisfaction of the tax liability related to NL's gain on the transfer or distribution of these shares of Kronos common stock and the tax liability generated from the use of Kronos shares to settle the tax liability. To date, we have not paid the liability to Contran because Contran has not paid the liability to the applicable tax authority. The income tax liability will become payable to Contran, and by Contran to the applicable tax authority, when the shares of Kronos transferred or distributed by NL to us are sold or otherwise transferred outside the Contran Tax Group or in the event of certain restructuring transactions involving us. We have recognized deferred income taxes for our investment in Kronos common stock.

We are a party to a tax sharing agreement with Contran providing for the allocation of tax liabilities and tax payments as described in Note 1. Under applicable law, we, as well as every other member of the Contran Tax Group, are each jointly and severally liable for the aggregate federal income tax liability of Contran and the other companies included in the Contran Tax Group for all periods in which we are included in the Contran Tax Group. Contran has agreed, however, to indemnify us for any liability for income taxes of the Contran Tax Group in excess of our tax liability computed in accordance with the tax sharing agreement.

Financial assurance associated with Waste Management Segment—Our Waste Management Segment is required to provide certain financial assurances to the Texas government agencies with respect to the decommissioning obligations related to the its facility in West Texas. We and certain of our affiliates have provided or assisted us in providing such financial assurances. See Note 17. Other matters related to the financial assurance associated with our

LLRW disposal facilities are discussed below:

A portion of WCS' required financial assurance associated with its LLRW disposal facilities is in the form of a surety bond issued by a third-party insurance company on its behalf for the benefit of the State of Texas. The value of the surety bond was $32.2 million in December 2013. As part of such surety bond, WCS is required to make quarterly cash payments into a collateral trust of 2.5% of the total value of the bonds which commenced in the fourth quarter of 2011. In April 2014, WCS obtained a further increase in the surety bond from $32.2 million to $85.3 million. As part of the increase in the surety bond, in April 2014, WCS paid an aggregate of $2.0 million into the first collateral trust. Similar to the $32.2 million surety bond, WCS is still required to make quarterly cash payments into the first collateral trust, but at a rate sufficient such that the aggregate amount of such payments funded into the collateral trust would equal 50% of the total value of the new bond by April 2021. Such new quarterly cash payments are equal to approximately $1.3 million and began in the third quarter of 2014. At December 31, 2016, we had made payments totaling $21.6 million into this collateral trust (including a one-time $2.0 million payment made in April 2014), which is reflected as part of our noncurrent restricted cash on our Consolidated Balance Sheet.

- As additional surety for its LLRW disposal facility, WCS had also been required to make cash payments into a second collateral trust annually in November of each of 2012 through 2016, and such payments aggregated $18.0 million at March 31, 2014. In April 2014, concurrent with WCS obtaining an increase in the surety bond from $32.2 million to $85.3 million as discussed above, in return the Texas government agency agreed to the release of the $18.0 million which WCS had previously paid into the second collateral trust. WCS received such $18.0 million in April 2014.
- Valhi previously pledged certain of our marketable securities as collateral for the state of Texas related to specified decommissioning obligations associated with WCS' LLRW disposal facilities. In September 2014, concurrent with a reduction in the amount of required financial assurance, the state of Texas released these marketable securities to us and they are no longer pledged as collateral to the state of Texas.

Owner Participation Agreement of Real Estate Management and Development Segment —Under an Owner Participation Agreement ("OPA") entered into by LandWell with the Redevelopment Agency of the City of Henderson, Nevada, if LandWell develops certain real property for commercial and residential purposes in a master planned community in Henderson, Nevada, the cost of certain public infrastructure may be reimbursed to us through tax increment. The maximum reimbursement under the OPA is $209 million, and is subject to, among other things, completing construction of approved qualifying public infrastructure, transferring title of such infrastructure to the City of Henderson, receiving approval from the Redevelopment Agency of the funds expended to be eligible for tax increment reimbursement and the existence of a sufficient property tax valuation base and property tax rates in order to generate tax increment reimbursement funds. We are entitled to receive 75% of the tax increment generated by the master planned community through 2036, subject to the qualifications and limitations indicated above. Due to the significant uncertainty of the timing and amount of any of such potential tax increment reimbursements, we recognize any such tax increment reimbursements only when received. The amount of such tax increments received in 2014, 2015 and 2016 were not material.

Note 19—Financial instruments:

The following table summarizes the valuation of our short-term investments and financial instruments by the ASC Topic 820 categories as of December 31, 2015 and 2016:

	Fair Value Measurements			
	Total	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
	(In millions)			
Asset (liability)				
December 31, 2015:				
Marketable securities:				
Current	$2.0	$ —	$ 2.0	$ —
Noncurrent	254.9	3.5	1.4	250.0
Currency forward contracts	(1.2)	(1.2)	—	—
Interest rate swap	(3.5)	—	(3.5)	—
December 31, 2016:				
Marketable securities:				

Current	$4.4	$ —	$ 4.4	$ —
Noncurrent	253.5	.6	2.9	250.0
Interest rate swap	(3.1)	—	(3.1)	—

See Note 6 for information on how we determine the fair value of our marketable securities.

Certain of our sales generated by Chemicals Segment's non-U.S. operations are denominated in U.S. dollars. Our Chemicals Segment periodically uses currency forward contracts to manage a very nominal portion of currency exchange rate risk associated with trade receivables denominated in a currency other than the holder's functional currency or similar exchange rate risk associated with future sales. Derivatives that we use are primarily currency forward contracts and interest rate swaps. We have not entered into these contracts for trading or speculative purposes in the past, nor do we currently anticipate entering into such contracts for trading or speculative purposes in the future. Derivatives used to hedge forecasted transactions and specific cash flows associated with financial assets and liabilities denominated in currencies other than the U.S. dollar and which meet the criteria for hedge accounting are designated as cash flow hedges. Consequently, the effective portion of gains and losses is deferred as a component of accumulated other comprehensive income (loss) and is recognized in earnings at the time the hedged item affects earnings. Contracts that do not meet the criteria for hedge accounting are marked-to-market at each balance sheet date with any resulting gain or loss recognized in income currently as part of net currency transactions. The fair value of the currency forward contracts is determined using Level 1 inputs based on the currency spot forward rates quoted by banks or currency dealers.

At December 31, 2016, Kronos had no currency forward contracts outstanding. We did not use hedge accounting for any of our contracts to the extent we held such contracts during 2014, 2015 and 2016.

Interest rate swap contract - As part of our interest rate risk management strategy, in August 2015 Kronos entered into a pay-fixed/receive-variable interest rate swap contract with Wells Fargo Bank, N.A. to minimize our exposure to volatility in LIBOR as it relates to our forecasted outstanding variable-rate indebtedness. Under this interest rate swap, we will pay a fixed rate of 2.016% per annum, payable quarterly, and receive a variable rate of three-month LIBOR (subject to a 1.00% floor), also payable quarterly, in each case based on the notional amount of the swap then outstanding. The effective date of the swap contract was September 30, 2015. The notional amount of the swap started at $344.75 million and declines by $875,000 each quarter beginning December 31, 2015, with a final maturity of the swap contract in February 2020. The notional amount of the swap as of December 31, 2016 was $340.4. This swap contract has been designated as a cash flow hedge and qualified as an effective hedge at inception under ASC Topic 815. The effective portion of changes in fair value on this interest rate swap is recorded as a component of other comprehensive income, net of deferred income taxes. Commencing in the fourth quarter of 2015, as interest expense accrues on LIBOR-based variable rate debt, we classify the amount we pay under the pay-fixed leg of the swap and the amount we receive under the receive-variable leg of the swap as part of interest expense, with the net effect that the amount of interest expense we recognize on our LIBOR-based variable rate debt each quarter, as it relates to the notional amount of the swap outstanding each quarter, to be based on a fixed rate of 2.016% per annum in lieu of the level of LIBOR prevailing during the quarter. The amount of hedge ineffectiveness, if any, related to the swap will be recorded in earnings (also as part of interest expense). Since the inception of the swap through December 31, 2016, there have been no gains or losses recognized in earnings in the current period representing hedge ineffectiveness with respect to the interest rate swap.

During 2015 and 2016 the pretax amount recognized in other comprehensive income (loss) related to the interest rate swap contract was a $3.1 million loss (in 2015 the amount was a $4.4 million loss). During 2015 and 2016 $.9 million and $3.5 million, respectively, was reclassified from accumulated other comprehensive income (loss) into earnings (interest expense). During the next twelve months the amount of the December 31, 2016 accumulated other comprehensive income balance that is expected to be reclassified to earnings is $3.5 million pre-tax.

The fair value of the interest rate swap contract at December 31, 2016 was a liability of $3.1 million and is reflected in the Consolidated Balance Sheet as part of accounts payable and accrued liabilities of $2.9 million and other noncurrent liabilities of $.2 million (in 2015, we had a $3.5 million liability of which $3.3 million was recognized as part of accounts payable and accrued liabilities and $.2 million recognized as part of other noncurrent liabilities). See Notes 9 and 10. The fair value of the interest rate swap was estimated by a third party using inputs that are observable or that can be corroborated by observable market data such as interest rate yield curves, and therefore, is classified within Level 2 of the valuation hierarchy.

The following table presents the financial instruments that are not carried at fair value but which require fair value disclosure as of December 31, 2015 and 2016:

	December 31, 2015		December 31, 2016	
	Carrying amount	Fair value	Carrying amount	Fair value
	(In millions)			
Cash, cash equivalents and restricted cash equivalents	$229.1	$229.1	$191.0	$191.0
Deferred payment obligation	8.8	8.8	9.0	9.0
Long-term debt (excluding capitalized leases):				
Kronos term loan	$338.0	$309.5	$335.9	$334.6
Snake River Sugar Company fixed rate loans	250.0	250.0	250.0	250.0
WCS fixed rate debt	65.6	65.6	64.0	64.0
Valhi credit facility with Contran	263.8	263.8	278.9	278.9
Tremont promissory note payable	17.1	17.1	14.5	14.5
BMI bank note payable	9.3	9.4	8.4	8.5
LandWell note payable to the City of Henderson	3.1	3.1	2.9	2.9

At December 31, 2016, the estimated market price of Kronos' term loan was $983 per $1,000 principal amount. At December 31, 2015, the estimated market price of Kronos' term loan was $900 per $1,000 principal amount. The fair value of Kronos' term loan was based on quoted market prices; however, these quoted market prices represent Level 2 inputs because the markets in which the term loan trades were not active. The fair value of our fixed-rate nonrecourse loans from Snake River Sugar Company is based upon the $250 million redemption price of our investment in the Amalgamated Sugar Company LLC, which collateralizes the nonrecourse loans, (this is a Level 3 input). Fair values of variable interest rate notes receivable and debt and other fixed-rate debt are deemed to approximate book value. Due to their near-term maturities, the carrying amounts of accounts receivable and accounts payable are considered equivalent to fair value. See Notes 5 and 9.

Note 20—Recent accounting pronouncements:

Adopted

In August 2016, the FASB issued Accounting Standards Update ("ASU") No. 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments. This standard provides guidance on eight specific cash flow issues including: debt prepayment or debt extinguishment costs, proceeds from the settlement of insurance claims, distributions from equity method investees and separately identifiable cash flows and application of the predominance principle. The new standard is effective for us beginning with the first quarter of 2018. We have elected to adopt this ASU with this Annual Report without any material effect on the presentation of cash flows in our previously issued Consolidated Financial Statements.

In November 2016, the FASB issued ASU No. 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash. This standard provides guidance on the cash flow classification of changes in restricted cash and additional disclosure requirements regarding the nature of restrictions on cash. The new standard is effective for us beginning with the first quarter of 2018. We have elected to adopt this ASU retrospectively beginning with this Annual Report and accordingly we have presented all changes in cash, cash equivalents and restricted cash in the statement of cash flows and provided additional disclosure regarding the composition and classification of cash, cash equivalents and restricted cash in our Consolidated Balance Sheets and related Footnotes. As a result, net cash used in investing activities increased from $55.1 million to $73.7 million for the year ended December 31, 2014, and increased from $57.0 million to $54.1 million for the year ended December 31, 2015, and the negative effect of exchange rate changes on cash, cash equivalents and restricted cash equivalents increased from $9.4 million to $10.1 million for the year ended December 31, 2014, and increased from $8.4 million to $8.5 million for the year ended December 31, 2015.

Pending Adoption

In May 2014, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) No. 2014-09, Revenue from Contracts with Customers (Topic 606). This standard replaces existing revenue recognition guidance, which in many cases was tailored for specific industries, with a uniform accounting standard applicable to all industries and transactions. The new standard, as amended, is currently effective for us beginning with the first quarter of 2018. Entities may elect to adopt ASU No. 2014-

09 retrospectively for all periods for all contracts and transactions which occurred during the period (with a few exceptions for practical expediency) or retrospectively with a cumulative effect recognized as of the date of adoption. ASU No. 2014-09 is a fundamental rewriting of existing GAAP with respect to revenue recognition, and we are still evaluating the effect the Standard will have on our Consolidated Financial Statements. We currently expect to adopt the standard in the first quarter of 2018 using the modified retrospective approach to adoption. Generally sales within our Chemicals and Component Products Segments involve single performance obligations to ship goods pursuant to customer purchase orders without further underlying contracts, and as such we expect adoption of this standard will have a minimal effect on revenues from these segments. Revenues from our Waste Management and Real Estate Management and Development Segments are generally under long-term contract and we are in the process of evaluating the impact of adoption on the revenues of these two segments. We are in the process of evaluating the additional disclosure requirements across all segments.

In January 2016, the FASB issued ASU 2016-01, Financial Instruments-Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities, which addresses certain aspects related to the recognition, measurement, presentation and disclosure of financial instruments. The ASU requires equity investments (except for those accounted for under the equity method of accounting or those that result in the consolidation of the investee) to generally be measured at fair value with changes in fair value recognized in net income. The amendment also requires a number of other changes, including among others: simplifying the impairment assessment for equity instruments without readily determinable fair values; eliminating the requirement for public business entities to disclose methods and assumptions used to determine fair value for financial instruments measured at amortized cost; requiring an exit price notion when measuring the fair value of financial instruments for disclosure purposes; and requiring separate presentation of financial assets and liabilities by measurement category and form of asset. The changes indicated above will be effective for us beginning in the first quarter of 2018, with prospective application required, and early adoption is not permitted. The most significant aspect of adopting this ASU will be the requirement to recognize changes in fair value of our available-for-sale marketable equity securities in net income (currently changes in fair value of such securities are recognized in other comprehensive income).

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842), which is a comprehensive rewriting of the lease accounting guidance which aims to increase comparability and transparency with regard to lease transactions. The primary change will be the recognition of lease assets for the right-of–use of the underlying asset and lease liabilities for the obligation to make payments by lessees on the balance sheet for leases currently classified as operating leases. The ASU also requires increased qualitative disclosure about leases in addition to quantitative disclosures currently required. Companies are required to use a modified retrospective approach to adoption with a practical expedient which will allow companies to continue to account for existing leases under the prior guidance unless a lease is modified, other than the requirement to recognize the right-of-use asset and lease liability for all operating leases. The changes indicated above will be effective for us beginning in the first quarter of 2019, with early adoption is permitted. We are currently in the process of assessing all of our current leases across all of our segments. We have not yet evaluated the effect this ASU will have on our Consolidated Financial Statements, but given the material amount of our future minimum payments under non-cancellable operating leases at December 31, 2016 discussed in Note 18, we expect to recognize a material right-of-use lease asset and lease liability upon adoption of the ASU.

Note 21—Quarterly results of operations (unaudited):

	Quarter ended			
	March 31	June 30	Sept. 30	Dec. 31
	(In millions, except per share data)			
Year ended December 31, 2015				
Net sales	$416.1	$408.8	$383.2	$324.8
Gross margin	89.3	56.3	49.8	27.5
Operating income (loss)	34.6	(10.1)	(5.0)	(24.9)
Net income (loss)	$17.3	$(139.4)	$(13.3)	$(35.7)
Amounts attributable to Valhi stockholders:				
Net income (loss) (2)	$11.9	$(103.9)	$(11.7)	$(29.9)
Basic and diluted income (loss) per share	$.04	$(.30)	$(.03)	$(.10)
Year ended December 31, 2016				
Net sales	$353.5	$398.6	$406.8	$407.9
Gross margin	42.0	62.2	85.3	102.6
Operating income (loss)	(10.3)	9.8	29.7	52.0
Net income (loss)	$(22.0)	$(7.7)	$9.0	$17.7
Amounts attributable to Valhi stockholders:				
Net income (loss) (2)	$(19.5)	$(8.5)	$3.0	$9.1
Basic and diluted income (loss) per share	$(.06)	$(.02)	$.01	$.03

(1) We recognized the following amounts during 2015:

- pre-tax charges of $21.1 million, $.4 million and $.2 million in the second, third and fourth quarters, respectively, in workforce reduction charges in our Chemicals Segment (see Note 13);
- aggregate insurance recoveries of $3.0 million, after-tax and noncontrolling interest primarily in the first quarter;
- non-cash deferred income tax expense of $150.3 million, $2.3 million and $6.4 million in the second, third and fourth quarters, respectively, related to the recognition of a deferred income tax asset valuation allowance related to our Chemicals Segment's German and Belgium operations (see Note 14); and
- related to the non-cash deferred income tax expense noted above we recognized non-cash income tax benefit of $29.3 million, in the second quarter of 2015 for the reduction in the deferred income taxes required to be recognized with respect to the excess of the financial reporting carrying amount over the income tax basis of our direct investment in Kronos common stock, (see Note 14).

(2) We recognized the following amounts during 2016:

- a pre-tax charge of $5.1 million in the first quarter related to the contract related intangible asset impairment (see Note 7);
- pre-tax insurance settlement gains of $2.0 million, $1.4 million and $.9 million in the first, second and fourth quarters, respectively, (see Note 14);
- a current income tax benefit of $5.6 million in the third quarter and a current income tax expense of $2.2 million in the fourth quarter related to the execution and finalization of an Advance Pricing Agreement between the U.S. and Canada (see Note 14);
- non-cash deferred income tax expense (benefit) of $2.9 million and $(.8) million and $(4.3) million in the second, third and fourth quarters, respectively, as the result of a net decrease in our deferred income tax asset valuation allowance related to Kronos' German and Belgian operations (see Note 14);
- non-cash income tax expense of $7.2 million related to an increase in our reserve for uncertain tax positions, mostly in the fourth quarter; and
-

net income in the fourth quarter includes an immaterial out of period adjustment of $4.3 million ($2.7 million net of income tax) to correct for transaction costs related to the proposed sale of our Waste Management Segment incurred in earlier periods.

The sum of the quarterly per share amounts may not equal the annual per share amounts due to relative changes in the weighted average number of shares used in the per share computations.