Applied Minerals, Inc.
Form 10-K/A
August 14, 2018

Table of Contents

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, DC 20549

AMENDMENT NO. 1

to

FORM 10-K

[X] ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(D) OF THE SECURITIES EXCHANGE ACT OF 1934

For the year ended December 31, 2017

Commission file number: 000-31380

APPLIED MINERALS, INC.
(Exact name of registrant as specified in its charter)

Delaware	82-0096527
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

55 Washington Street - Suite 301, Brooklyn, NY	11201
(Address of principal executive offices)	(Zip Code)

(800) 356-6463
Issuer's telephone number, including area code

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

YES NOX

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act:

YES NOX

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

YESXNO

Indicate by check mark whether the registrant submitted electronically and posted on its corporate website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

YESXNO

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulations 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.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller-reporting company” and “emerging growth company” in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer	Accelerated Filer	Non-accelerated Filer	Smaller Reporting Company	X	Emerging Growth Company

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

YES NOX

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant on June 30, 2017, based on the last sales price on the OTC Bulletin Board on that date, was approximately $4,354,542.

As of April 17, 2018 there were 150,388,549 shares of common stocks outstanding.

Table of Contents

EXPLANATION OF AMENDMENT NO. 1.

The registrant is amending the Annual Report on Form 10-K for the year ended December 31, 2017 in response to an SEC comment letter. In response to that comment letter, the registrant is (i) deleting information about resource studies that do not qualify as final bankable feasibility study under the SEC's Industry Guide 7, (ii) indicating that the Company has no plans for further exploration on the Dragon Mine property in the next year, and (iii) disclosing in the section "The Sales Process" that prices for its products are negotiated and that there is no established market prices for its products in the markets into which the Company is selling. This amendment has not been updated or amended to give effect to any subsequent events beyond those that existed as of the original filing date and should thus be read in conjunction with the original filing and any of the Company's other filings with Securities and Exchange Commission (SEC) subsequent to the original filing, together with any amendments to those filings."

APPLIED MINERALS, INC.

YEAR 2017 ANNUAL REPORT ON FORM 10-K

TABLE OF CONTENTS

Table of Contents

NOTE REGARDING FORWARD LOOKING STATEMENTS

This Annual Report on Form 10-K contains "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. These forward-looking statements are based on our current expectations, assumptions, estimates and projections about our business and our industry. Words such as "believe," "anticipate," "expect," "intend," "plan," "will," "may," and other similar expressions identify forward-looking statements. In addition, any statements that refer to expectations, projections or other characterizations of future events or circumstances are forward-looking statements.

In the discussion under “Item 1 – Business” and “Item 9 - Management’s Discussion and Analysis of Financial Condition and Results of Operations,” we discusses a wide range of forward-looking information, including our beliefs and expectations concerning business opportunities, potential customer interest, customer activities (including but not limited to testing, scale-ups, production trials, field trials, product development), and our expectations as to sales, the amount of sales, and the timing of sales. Whether any of the foregoing will actually come to fruition, occur, be successful, or result in sales and the timing and amount of such sales is uncertain.

More generally, all forward-looking statements are subject to certain risks and uncertainties that could cause actual results to differ materially from those reflected in the forward-looking statements. Factors that might cause such a difference include, but are not limited to, those discussed in the section of this Annual Report entitled “1A. RISK FACTORS.”

PART I

ITEM 1. BUSINESS

SUMMARY

Applied Minerals, Inc. (the “Company” or “Applied Minerals” or “we” or “us”) (OTCQB: AMNL) owns the Dragon Mine in central Utah. From the mine we extract, process, or have processed by a third party, halloysite clay and iron oxide for sale to a range of end markets. We market the minerals directly and through distributors and also under a profit-sharing agreement with the Kaolin business unit of BASF Corp. (“BASF”).

We also engage in research and development and frequently work collaboratively with potential customers, consultants, distributors, and a third party processor (BASF) to process and enhance our halloysite clay products to improve the performance of our customers' existing and new products.

Halloysite

Our halloysite clay, which we market under the DRAGONITE™ trade name, is an aluminosilicate mineral with a hollow tubular shape. DRAGONITE can utilize halloysite's shape, high surface area, and reactivity to add significant functionality to a number of applications. The Company sells halloysite at negotiated prices and there is no established market for the sale of DRAGONITE™ for the applications for which the Company is selling halloysite.

Iron Oxide

Our iron oxide, which we market under the AMIRON™ trade name, is a high purity product. We have sold it to one customer at a negotiated price for use as an absorbent for hydrogen sulfide gas contained in natural gas and we are continuing to offer AMIRON to that customer. The Company is not aware of an established market price in that market. Otherwise, we are not selling AMIRON™ to customers on a continuing basis.

Sales

In 2017, we recorded revenues of $2,444,677, of which $1,011,654 was related to sales of DRAGONITE to 13 customers and $1,433,023 was related to sales of AMIRON to one customer.

Development/Exploration Activities

In 2017 and 2016, the Company spent $508,861 and $981,045, respectively, on exploration and development. The Company does not expect to perform any exploration or development activities in the next year.

Classification for SEC Purposes

The Company is classified as an "exploration stage" company for purposes of Industry Guide 7 of the U.S. Securities and Exchange Commission ("SEC") Under Industry Guide 7, companies engaged in significant mining operations are classified into three categories, referred to as "stages" - exploration, development, and production. Exploration stage includes all companies that do not have established reserves in accordance with Industry Guide 7. Such companies are deemed to be "in the search for mineral deposits." Notwithstanding the nature and extent of development-type or

production-type activities that have been undertaken or completed, a company cannot be classified as a development or production stage company unless it has established reserves in accordance with Industry Guide 7.

1

Table of Contents

Processing Capability

In 2017, we entered into a tolling agreement with BASF under which BASF will use a water-based system that will process the Company's halloysite in accordance with the Company's specifications, which can include eliminating impurities, such as iron oxide, and surface treating the halloysite to achieve desired effects and functionality**.**

We have a mineral processing plant with a capacity of up to 45,000 tons of mineralization per annum for certain applications. That plant is dedicated to processing its halloysite.

Additionally, the Company has a second processing facility with a capacity of up to 10,000 tons per annum that is dedicated to processing its halloysite. Such facility can process halloysite using a dry-based, micronizing system. This dry-based system does not eliminate impurities such as iron oxide as effectively as wet processing but is useful in situations where wet processing in not necessary.

The Company also has a crusher that can be used to crush iron oxide. Crushing (as opposed to pulverizing, which is the processing method used for halloysite) will be sufficient for any sales that the Company deems reasonably possible to materialize in the foreseeable future.

Distribution Channels

The Company markets and sells its products directly and through distributors. The Company's CEO spends a significant amount of his time on sales, marketing and product development. The Director of Sales focuses on the marketing of the Company's DRAGONITE products. The Company also uses several leading distribution organizations, E.T. Horn, Brandt Technologies, LLC, and Azelis to market its products. The Company has a non-exclusive distribution agreement with a distributor for Taiwan and an exclusive agreement with a distributor for Japan.

In October, 2017, we entered into a supply agreement with the Kaolin business unit of BASF ("Supply Agreement"). The Supply Agreement provides that the Company will sell up top 15,000 tons of halloysite to BASF per year and BASF may process and/or treat and will have an exclusive license (a) to sell halloysite on a worldwide basis for use within the following third party markets: (i) paints and coatings; (ii) inks; (iii) rubbers (excludes flame retardant and wire and cable applications); (iv) adhesives; (v) paper, and (vi) ceramic honeycomb catalytic substrates and (b) to sell halloysite to other business units of BASF.

INFORMATION ABOUT THE COMPANY

Applied Minerals, Inc. (OTCQB: AMNL) owns the Dragon Mine from which we can extract halloysite clay and iron oxide, which we then process or have processed and sell. We also engage in research and development and frequently work collaboratively with potential customers, consultants, distributors, and BASF to engineer and enhance our halloysite clay and iron oxide products to improve the performance of our customers' existing and new products.

The Dragon Mine is a 267-acre property located in central Utah, approximately 70 miles south of Salt Lake City, Utah.

We market our halloysite clay-based line of products under the tradename DRAGONITE. We market our iron oxide line of products under the tradename AMIRON.

Halloysite is mined and marketed by other companies, primarily by a French company, Imerys, which owns the other major halloysite mine, which is located in New Zealand. The halloysite from that mine is sold primarily for use in ceramics and tableware. When new management came into the Company in 2009, new management decided to focus on new, premium-priced uses of halloysite. Those premium-priced uses had been, and continue to be, identified typically in published research. Because the Company is primarily dedicated to new, advanced uses of halloysite that would permit the Company to charge premium prices, the sales and marketing process is one that often takes an extended period of time.

The Company acquired the Dragon Mine primarily to exploit the mine's halloysite mineralization. At the time that the Dragon Mine was acquired, it was assumed that the iron oxide mineralization would be useful only for steelmaking. Given historical price conditions and our method of mining (underground), sales of iron oxide for steelmaking would often not be economic and at best would yield marginal or low profits. In November, 2015, the Company entered into an agreement to supply a customer its AMIRON iron oxide on an exclusive basis for a period of five years. The exclusivity provision is limited to the specialized catalyst application of the Customer and enables Applied Minerals to sell its iron oxide products for use in other technical applications that are not competitive with the Customer's intended field of use. An initial purchase order of $5.0 million of AMIRON products has been received and is to be delivered over the course of 18 months with deliveries commencing on December 1, 2015. Upon expiration of the initial 5-year term, the Customer has an option to extend the exclusive supply agreement for an additional 5 years by issuing an $8.0 million purchase order to be delivered over the course of the subsequent twenty-four months. In June, 2017, the Company fulfilled the $5.0 million purchase order. The Company is marketing its iron oxide only to that customer.

INFORMATION ABOUT THE DRAGON MINE

History of the Dragon Mine

The Dragon Mine was first mined in the third quarter of the 19th century and has since been mined by various owners and operators. It was mined for iron oxide from the late nineteenth century until approximately 1931 and it was mined for halloysite clay from approximately 1931 to 1976. From 1949 to 1976, the halloysite was sold for use as a petroleum cracking catalyst. A fire closed the mine in 1976. No mining took place from 1976 until 2001, at which point the Company leased the property with an option to buy it. The Company purchased the property in 2005.

Prior to a change in management in 2009, the Company did relatively little to categorize the mineralization at the Dragon Mine or to identify and exploit markets for the minerals. Since new management was installed in 2009, the Company has used and proposes to continue to use a consulting geologist to categorize the mineralization at the Dragon Mine and management has identified, developed and exploited premium-priced markets for halloysite and iron oxide.

Table of Contents

The Dragon Mine's Mineralization

There are two areas of the Dragon Mine minesite at which mining can be conducted and they are referred to as the "Dragon Pit" and the "Western Area." In addition, there are five surface piles on the site, mineralization that was left by prior operators.

Dragon Pit

The Dragon Pit area covers 4.95 acres and is mined underground. There are three separate types of mineralized material in the Dragon Pit area.

The first type is comprised of clay with a relatively high concentration of halloysite.

The second type is comprised of a mix of kaolinite, illite-smectite, and halloysite clays. Mixed clays are not used in our DRAGONITE products.

The third type of mineralized material found in the Dragon Pit is comprised of iron-bearing materials. This mineralization contains goethite and hematite. When dehydrated, goethite be comes hematite. We will sometimes refer to either mineral or combinations of the minerals as "iron oxide."

Western Area

The Western area covers 6.33 acres and is mined underground. There are two different types of mineralization in the Western Area.

One type of mineralization in the Western Area is clay. It is comprised primarily of a mix of kaolinite, illite-smectite, and halloysite clays. The Western Mine clays are not used in our DRAGONITE products.

The other type of mineralization is iron bearing. The Western Area contains goethite and hematite.

The Western Mine clays are not used in our DRAGONITE products.

Surface Piles

There are five surface piles that were created during the mining of halloysite clay between 1949 and 1976 when the Dragon Mine's halloysite resource was mined and sold for use as a petroleum cracking catalyst. Any clay that contained more than a minimal threshold amount (~ 2%) of iron oxide was not usable for petroleum cracking and was discarded into one of five surface piles. The waste pile clays are not used in DRAGONITE products.

In addition to the surface pile material described above, there is a surface pile of approximately 20,000 tons of mined iron oxide on the surface of the Dragon Mine property.

Development/Exploration Activities

In 2017 and 2016, the Company spent $508,861 and $981,045, respectively, on exploration and development. The Company does not expect to perform any exploration or development activities in the next year.

Table of Contents

More Detailed Description of the Mineralization at the Dragon Mine

Clays.Kaolinite and halloysite are clays and members of the kaolin group of clays. Both are aluminosilicate clays. Kaolinite and halloysite are essentially chemically identical, but have different morphologies (shapes). Kaolinite typically appears in plates or sheets. Halloysite, in contrast, typically appears in the shape of hollow tubes. On average, the halloysite tubes have a length in the range of 0.5 - 3.0 microns, an exterior diameter in the range of 50 - 70 nanometers and an internal diameter (lumen) in the range of 15 - 30 nanometers. Formation of halloysite occurs when kaolinite sheets roll into tubes due to the strain caused by a lattice mismatch between the adjacent silicon dioxide and aluminum oxide layers. Halloysite is non-toxic and natural, demonstrating high biocompatibility without posing any risk to the environment.

Kaolinite is one of the world's most common minerals. U.S. production in 2016 was approximately 6.1 million tons.

Halloysite is, by comparison, a rarer mineral and we believe worldwide production is less than 25,000 tons.

Illite refers to a group of clays that includes hydrous micas, phengite, brammalite, celadonite, and glauconite. Illite clays are common and large amounts are produced each year.

Smectite refers to a group of clays that includes montmorillonite, bentonite, nontronite, hectorite, saponite and sauconite. Smectite clays are common clay and large amounts are produced each year.

Iron Oxide.Hematite is the mineral form of iron oxide, which exists in a range of colors, including black to steel or silver-gray and brown to reddish brown, or red.

Geothite is an iron hydroxide oxide mineral, which exists in a range of colors, including yellowish to reddish to dark brown. If goethite is sufficiently heated to eliminate its contained water, it is transformed into hematite.

Mixtures of goethite and hematite are the color brown.

STATUS OF THE COMPANY FOR SEC REPORTING PURPOSES

The Company is classified as an “exploration stage” company for purposes of Industry Guide 7 of the U.S. Securities and Exchange Commission.

Under Industry Guide 7, companies engaged in significant mining operations are classified into three categories, referred to as “stages” - exploration, development, and production.

Exploration stage includes all companies engaged in the search for mineral deposits (that is, reserves), which are not in either the development or production stage. In order to be classified as a development or production stage company, the company must have already established reserves. Notwithstanding the nature and extent of development-type or production-type activities that have been undertaken or completed, a company cannot be classified as a development or production stage company unless it has established reserves.

Under Industry Guide 7, a “reserve” is “that part of a mineral deposit which could be economically and legally extracted or produced at the time of the reserve determination.” Generally speaking, a company may not declare reserves, unless, among other requirements, a competent professional engineer conducts a detailed engineering and economic study and prepares a “bankable” or “final” feasibility study that “demonstrates that a mineral deposit can be mined profitably at a commercial rate.”

Despite the fact that the Company has not established reserves for purposes of Industry Guide 7, the Company has mined, processed and sold, and intends to continue to mine, process, and sell halloysite clay and iron oxide from the Dragon Mine.

A consequence of the absence of reserves under Industry Guide 7 is that the mining company, such as the Company, is deemed to lack an objective basis to assert that it has a deposit with mineralization that can be economically and legally extracted or produced and sold to produce revenue.

Table of Contents

PROCESSING CAPABILITIES

In 2017, we entered into a tolling agreement with BASF Corp. ("BASF") under which BASF will "wet process" the Company's halloysite to comply with the Company's specifications, which can include eliminating impurities such as iron oxide and surface treating to achieve desired effects and functionality. The tolling agreement provides for tolling up to 15,000 tons per year. The Company has been orally assured that such capacity can be increased as reasonably necessary.

We have a mineral processing plant with a capacity of up to 45,000 tons per annum for certain applications. Currently, this facility is dedicated to processing our halloysite mineralizaton. Typically, the processing involves a preliminary step of crushing the iron oxide in a crusher and a further step of pulverizing the iron oxide in our Hosokawa Alpine table roller mill. Depending on the customer's specifications, if we need to only process the iron oxide through the preliminary step of crushing, our production capacity would be significantly greater than 45,000 tons per annum.

Additionally, the Company has a second processing facility with a capacity of up to 10,000 tons per annum that is dedicated to its halloysite mineralization. Such facility can "dry process" halloysite using a micronizing system. Dry processing does not eliminate impurities such as iron oxide as effectively as wet processing but is useful in situations where wet processing in not necessary.

The Company also has a crusher that can be used to crush iron oxide. Crushing (as opposed to pulverizing, which is the processing used for halloysite) will be sufficient for any sales that the Company deems reasonably possible to materialize in the foreseeable future. The table roller mill had previously been available for processing. If pulverization is required, the Company would either buy or rent equipment or use a third party processor.

MINING AND PRODUCTION ACTIVITY IN 2017 AND 2016

The following table discloses for the twelve (12) months ended December 31, 2017 and 2016, respectively (i) the number of tons of halloysite clay and iron oxide extracted by the Company from the Dragon Mine and (ii) the number of tons of finished product produced by the Company:

	2017	**2016**
Tons extracted		
Halloysite clay	407	35
Iron oxide	8,704	8,235

Products produced (tons)		
Halloysite clay	200	107
Iron oxide	8,962	22,428

CUSTOMERS

DRAGONITE

At the current time, the Company is selling halloysite on an ongoing basis to four (4) customers that have commercialized products using halloysite. One customer uses our DRAGONITE halloysite to manufacture a specialty zeolite, which is used in an adsorption application, two customers use it as a binder within a ceramic application and one customer uses it as a nucleating agent in a plastic injection molding. . Several prospective customers are conducting either commercial-scale trials or field trials for an array of products that are expected to use DRAGONITE as a functional additive. In 2017, we sold $1,011,654 of DRAGONITE.

There is no certainty that any potential customer that tests our products will actually become a customer on an ongoing basis. The Company currently is cautiously optimistic that additional customers will become ongoing customers with additional revenue in 2018 or early 2019.

AMIRON

In 2017, we sold $1,365,816 of iron oxide to one customer. As of the date of this report, the Company is not selling iron oxide on a continuing basis to customers, but is offering iron oxide to the customer who purchased in 2017.

Sales by Customer Use

The table below discloses the percentage of total revenue by product category for the twelve months ended December 31, 2017 and 2016. “Testing” represents revenue generated from the sale of products used for laboratory testing by customers or potential customers. “Scale-Ups” represents revenue generated from the sale of products to customers or potential customers to determine whether our products perform successfully within a production-scale environment. “Commercial Production” represents revenue generated from the sale of products to customers that are either consumed by the costumer or incorporated into a product that is sold by a customer to a third-party. “Other” represents revenue generated from the sale of products for which the Company is not aware of the use by a potential customer.

	Percentages of Sales Classified by Customer Use	
Sales for:	**2017**	**2016**
Commercial Production	95	98
Scale-Ups	5	2
Testing	*	*
Other	*	*
Total	100	100

* < 1%

Table of Contents

SALES AND MARKETING

In most application markets, the Company markets and sells its products directly and through distributors.

The Company's CEO spends a significant amount of his time on sales and marketing, directly and assisting the Company's sales staff, agents, and distributors. The Director of Sales focuses on the marketing of the Company's DRAGONITE products to high-value application markets and the establishment and management of relationships with distributors.

E.T. Horn acts as exclusive distributor for AMIRON in the following states: Washington, Oregon, Idaho, Montana, Wyoming, California, Nevada, Utah, Arizona, New Mexico. It acts as exclusive distributor of DRAGONITE in those states plus Texas, Oklahoma, Arkansas, and Louisiana.

Brandt Technologies, LLC acts as exclusive distributor for DRAGONITE and AMIRON in North Dakota, South Dakota, Nebraska, Kansas, Missouri, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Kentucky, Ohio, and Michigan.

Azelis, by itself and through its subsidiaries, Ribelin Sales, Inc., E.W. Kaufman Co., and GMZ Inc., cement acts as exclusive distributor for DRAGONITE in Mississippi. Alabama, Tennessee, Georgia, Florida, South Carolina, North Carolina, Virginia, West Virginia, Maryland, Delaware, Pennsylvania, New Jersey, Connecticut, New York, Vermont, Massachusetts, New Hampshire, and Maine. The Company intends to engage a distributor for AMIRON in these states.

The Company has a non-exclusive distribution agreement with a distributor for Taiwan and an exclusive agreement with a distributor for Japan.

In October, 2017, we entered into an supply agreement with the Kaolin business unit of BASF Corp. ("Supply Agreement"). The Supply Agreement provides that the Company will sell halloysite to BASF and BASF may process and/or treat and will have an exclusive license to sell halloysite on a worldwide basis for use within the following third party markets: (i) paints and coatings; (ii) inks; (iii) rubbers (excludes flame retardant and wire and cable applications); (iv) adhesives; (v) paper, and (vi) ceramic honeycomb catalytic substrates and (b) use by other business units of BASF provided that such BASF business unit only uses or sells the halloysite as part of a product another product. Under the terms of the Supply Agreement, each party is reimbursed from the proceeds of sale for its direct costs and the Company and the BASF Kaolin business unit equally share the profits of any sales of halloysite by the Kaolin business unit. The Supply Agreement has an initial term of three years and automatically renews unless one

party terminates. As of April 17, 2018, no sales of halloysite have been made by the Kaolin business unit.

APPLICATION MARKETS

The following discusses the markets into which the Company is marketing its DRAGONITE and AMIRON products. It cannot be assured that we will be successful penetrating these markets. The discussion does not discuss certain problems of selling into these markets, which are discussed elsewhere in the Business section or in the Risk Factors section.

DRAGONITE

The following is a description of the application markets in which the Company has commercial customers for halloysite-based DRAGONITE products:

Molecular Sieves and Catalysts.

Molecular Sieves. DRAGONITE™ is a binder to zeolite crystals to enhance a molecular sieve's productivity in critical functions such as drying of natural gas and air, separation of liquid from product streams, and separation of impurities from a gas stream. DRAGONITE possesses a dispersion ability that allows it to combine with the zeolite crystals without attracting to them or reducing the rate of diffusion of liquids and gases. DRAGONITE's fine particle size, porosity, and thermal stability also ensure that adsorbates diffuse rapidly through the sieve without affecting the adsorbent blend's physical properties.

Catalysts. DRAGONITE can be used as a catalyst and catalyst support for the hydrotreatment and hydrodemetalation of hydrocarbonaceous feedstocks. DRAGONITE can be used to remove impurities such as metals, sulfur, nitrogen, and asphaltenes. Crude oil petroleum must be processed in order to make it into gasoline and other fuels.. Catalytic cracking involves the addition of a catalyst to speed up the cracking. The reactive nature of halloysite lends itself to being a catalyst especially for high sulfur oil. Halloysite can also be used as a support for catalysts, which are applied to the halloysite as a coating.

Halloysite from the Dragon Mine was mined and processed as a catalyst for petroleum cracking from 1949 to 1976.

Flame Retardant Additives

Flame retardant additives are widely used in flammable and flame resistant plastics and are found in electronics, building insulation, polyurethane foam, and wire and cable.

Plastic manufacturers typically mix or load a small amount of flame retardant into plastic to lower the risk of flammability of their products. We believe that DRAGONITE can be used as a partial replacement for Alumina Trihydrate (ATH) and Magnesium Hydroxide (MDH) in certain applications and as a synergist to ATH and MDH in other applications.

Table of Contents

At typical loadings, ATH and MDH can adversely affect certain mechanical properties of plastics. We believe that DRAGONITE, in conjunction with ATH and MDH, exhibits a synergistic performance. Our research and development indicates that DRAGONITE can be used to replace 50% - 75% of antimony trioxide (ATO) in plastic without affecting flame retardancy, retaining the same rating under UL 94, the Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances testing.

We believe that in certain applications the use of DRAGONITE instead of other fire retardant products may allow a manufacturer to use less fire retardant and may, in addition, may enable the manufacturer to reduce the weight of the manufactured part. DRAGONITE-XR does not release its naturally bound water until 400°C, making it suitable for polymers processed under extreme conditions.

Other clays compete in the markets for partially replacing ATH, MDH, and ATO.

Binders for Ceramics

DRAGONITE is an effective binder for traditional ceramic products (any of various hard, brittle, heat-resistant and corrosion-resistant materials made by shaping and then firing a nonmetallic mineral, such as clay, at a high temperature). Binders are substances that improve the mechanical strength of green ceramic bodies so they can pass through production steps before firing without breakage. We believe that DRAGONITE, when used as a binder, also effectuates an improvement in the casting rate of the ceramic manufacturing process. This would equate to an increase in manufacturing efficiency.

Nucleation of Polymers; Reinforcement of Polymers.

Nucleation. Plastics and polymers are composed of long molecular chains that form irregular, entangled coils in a melted resin, the phase in which a resin is liquid and its molecules can move about freely. In semi-crystalline polymers, the chains rearrange upon freezing and form partly ordered regions. Examples of semi-crystalline polymers are polyethylene (PE), polypropylene (PP), Nylon 6 and Nylon 6-6. Crystallization of a polymer occurs as a result of nucleation, a process that starts with small, nanometer-sized domains upon which the polymer chains arrange in an orderly manner to develop larger crystals. The overall rate of crystallization of a polymer be can increased by a nucleating agent. In plastic molding processes, especially in injection molding, the plastic part must remain in the mold until crystallization is complete (freezing). To the extent that crystallization is accelerated, the time in the mold can be reduced, thereby resulting in productivity enhancement. We believe that DRAGONITE added to a resin at a loading of just 1% can significantly speed up the process of crystallization.

We believe DRAGONITE can be effective as a nucleating agent for both polyethylene and polypropylene.

Reinforcement Fillers. Many plastics are reinforced with a filler to enhance the mechanical properties of a polymer. Reinforced plastics, in certain instances, can compete with stiffer materials like metal while also offering an opportunity to reduce the weight of a manufactured part ("light-weighting").

We believe that the utilization of DRAGONITE as a reinforcing filler can result in the improvement of one or more mechanical properties of a polymer such as modulus (the measure of how well a polymer resists breaking when pulled apart), strength (the measure of the stress needed to break a polymer), and impact resistance (the measure of a polymer's resistance when impacted by a sharp and sudden stress).

Paints and Coatings

Halloysite has been shown to improve the adhesion and impact resistance properties of polymer-based paints and coatings. Additionally, halloysite has been shown to significantly improve the corrosion resistance of paints and coatings over synthetic anti-corrosion agents. Paints and coatings are one of the application markets on which BASF is focused as part of its Supply Agreement with the Company.

Other Opportunities. Other potential markets that present opportunities for halloysite but as to which the Company does not have commercial customers include cement (halloysite may increase tensile strength more than twice the increase in compressive strength while reducing permeability), batteries (the silicon material in halloysite, which is an aluminasilicate, may be extracted from halloysite and used in anode in lithium ion batteries and halloysite may be used in electrolyte in batteries), and controlled release carrier in cosmetics and in other applications.

AMIRON

The AMIRON line of natural iron oxide-based products can be used in technical application markets.

During part of 2015, 2016 and part of 2017, the Company sold AMIRON under a supply agreement for $5 million for use as an adsorbent to remove contaminants and moisture from gases. Under the supply agreement, the Company may not sell, at least until 2020, iron oxide to others to remove hydrogen sulfide from liquids or gases). If the other party to the transaction orders at least $5 million, the restriction of sales can be extended another five years.

7

Table of Contents

THE SALES PROCESS

It is important to understand that the price of halloysite in sales by the Company is negotiated. There are differences in halloysite mined from different deposits and differences in the amount and type of other material included in the halloysite materials that is sold. Such differences mean that there are differences in usability and functionality of the halloysite product. The Company is marketing its halloysite product as relatively free of other materials and with characteristics and functionality that lend themselves to advanced applications. There is no established market for halloysite product for such applications and hence no established market price. Marketing for new applications is difficult. Another producer sells halloysite for traditional applications such as for use in fine china, but does not market halloysite for advance applications. That halloysite producer sells halloysite for prices much less than the prices at which the Company is selling halloysite. Another producer sells halloysite for use in catalysts but such catalysts do not need the functionality supplied the Company's halloysite and such halloysite is not competitive with the Company's halloysite for uses demanding the functionality of the Company's halloysite. That producer sells its halloysite product at a fraction of the prices the Company negotiates for its halloysite

The Company sold iron oxide only in one transaction for a specialty catalyst applications for $5 million. That transaction was privately negotiated and the pricing took into account the large size of the transaction. The Company is currently attempting to sell iron oxide only to that customer in a privately negotiated transaction that would reflect the size of the transaction. The Company is not aware of an established market price in that market.

The Company sells its products using employees, agents, and distributors, selling on a global basis.

DRAGONITE

The Company markets its DRAGONITE into two general types of application markets.

The first type is a market in which halloysite has not been previously used, or is to be used as an additive in substitution for another additive, to enhance a functionality of an application. This type of market requires a number of steps to be completed before a sale can be consummated. Like any new material that will be incorporated into a commercial manufacturing process, a significant amount of testing must be performed by a customer before DRAGONITE can be incorporated into a manufacturing process and a product. Sales of this type often require working with the potential customers' existing formulations, which can vary from potential customer to potential customer.

Working with a potential customer could include identifying a solution, such as (i) surface coating or (ii) when to introduce DRAGONITE into the formulation or (iii) the conditions under which it should be introduced or (iv)

changes, deletions, additions, or substitutions involving other elements of the customer's formulation. Without the customer's collaboration in identifying a solution, DRAGONITE could be unsuccessful in achieving the customer's goals. This process can take an extended period of time (years in the case of discoloration of polymers as a result of the introduction of DRAGONITE) and, in some cases, there is no solution. In this type of market, price can be an important consideration and in some cases, we are not able to compete.

The second type of market is one in which halloysite clay is currently being used in traditional application markets. Within these established markets, we believe our DRAGONITE products often offers an enhanced value proposition with respect to purity and other properties sought by customers, although in some cases DRAGONITE's purity and/or other properties may not be required or useful. The pricing of our products relative to those of our competitors, however, will always be a significant factor in determining our ability to penetrate these markets.

AMIRON

The Company encounters the same types of challenges marketing AMIRON, as it faces in marketing DRAGONITE. In particular, the Company must compete on price and quality in relation to competitive materials.

It cannot be assured that we will be successful in further penetrating these markets.

RESEARCH, DEVELOPMENT AND TESTING