UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

APR 03 2012

Mr. Gregory Haug, PE
Resource Enterprises, LLC
2419 James Drive
Jefferson City, Missouri 65109

Dear Mr. Haug:

In your letter of December 22, 2011, you requested that the U.S. Environmental Protection Agency confirm that your engineered fuel products to be burned for energy recovery in combustion units are non-waste fuels in accordance with the requirements in 40 CFR part 241.3(b)(4). To be designated as a non-waste fuel under that section, the rule requires that processing of non-hazardous secondary material (NHSM) meets the definition of processing in 40 CFR 241.2. Also, after processing, the NHSM must meet the legitimacy criteria for fuels in 40 CFR 241.3(d)(1).

Based on the information provided in your letter and supporting materials, we believe the 40 CFR part 241 regulations would identify the proposed engineered fuel products that will be generated by a third party fuel supplier and burned for energy recovery in combustion units owned and operated by Lhoist North America in St. Genevieve, Missouri as a non-waste fuel in the pilot test[1] described below.[2] The remainder of this letter provides the basis for our position. *If there is a discrepancy in the information provided to us, it could result in a different interpretation.*

Proposed Project:

Lhoist North America will conduct a pilot test that will consist of producing and burning 400 tons of engineered fuel to replace coal in the Lhoist lime kiln. The lime kiln unit is currently regulated under several provisions of the Clean Air Act. The facility is currently subject to National Emission Standards for Hazardous Air Pollutants, (NESHAP), Maximum Air Control Technology (MACT) Standards, Subpart AAAAA, 40 CFR 63.7080-63.7143, Air Pollutants for Lime Manufacturing Plants, and also the New Source Performance Standards (NSPS), Subpart HH, 40 CFR 60.340-60.344, Standards of Performance for Lime Manufacturing Plants, and NSPS Subpart Y, 40 CFR 60.250-60.254, Standards of Performance for Coal Preparation Plants.

[1] Based on the information presented , EPA's determination that the engineered fuel products are non-waste fuels applies to both the pilot test and to any subsequent full-scale operation using the same engineered fuels.

[2] Note that a non-waste determination under 40 C.F.R. Part 241 does not preempt a state's authority to regulate a non-hazardous secondary material as a solid waste. Non-hazardous secondary materials may be regulated simultaneously as a solid waste by the state, but as a non-waste fuel under 40 C.F.R. Part 241 for the purposes of determining appropriate emissions standards under the Clean Air Act for the combustion unit in which it is used.

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Your letter states that the purpose of the pilot test is threefold:

- Obtain a fuel that will have a significant biogenic component (i.e., carbon-neutral fuel) to replace a portion of the coal for the lime kilns while reducing overall stack emissions.
- Obtain a fuel product that meets the "legitimacy requirements" as specified in the March 21, 2011, the EPA regulations (and proposed amendments) and is coal-like in handling/feeding, with contaminants similar to or lower than the coal that the engineered fuel products will replace.
- Prove that the engineered fuel products can be successfully utilized so that permits can be modified for a full-scale, long-term system to incorporate the engineered fuel products into daily operations at the lime production facility.

The materials that will be used to produce the engineered fuel products will focus on two different types of materials:

Type A would be all biogenic fuel. This fuel would consist of 100% carbon-neutral greenhouse gas fuel consisting of materials from living plants. (Note: If the Type A Fuel is considered a "traditional fuel" because it is defined as "clean cellulosic biomass," this material is not considered a "non-hazardous secondary material," and therefore, not a waste when burned as a fuel. These terms are defined at 40 CFR 241.2.)

Type B fuel material would be the predominant fuel tested and would include any of the Type A fuel materials and waste by-products from other processes, off-spec materials, and non-contaminated wastes. The typical materials included in the Type B fuel are solid waste materials that have been grouped into three categories.

Group 1. Industrial Biogenic Materials (includes a combination of biodiesel filter cake, charcoal, demolition wood, grease from grease trap, and cornstarch) processed and used to create a engineered fuel product

Group 2. Specific Off-Specification Product Materials (includes a combination of juice wrappers, alcohol wipes, and hand cleaners) processed and used to create a engineered fuel product

Group 3. Specific Industrial Byproduct Materials (includes a combination of non-asbestos shingles, plastics (not PVC), and dewatered industrial wastewater sludge) processed and used to create an engineered fuel product.[3]

This assessment is for the Type B Fuel only.

A complete description of the Type B engineered fuel is described in your enclosed submittal - - Lhoist North America Engineered Fuel Pilot Test Description Ste. Genevieve, Missouri, Revised December 14, 2011.

[3] This fuel group also includes diatomaceous earth which is primarily silica-based and is used as an ingredient in the lime kiln rather than as a fuel

Processing

Processing is defined in 40 CFR 241.2 as operations that transform discarded NHSMs into a non-waste fuel or non-waste ingredient, including operations necessary to: remove or destroy contaminants; significantly improve the fuel characteristics (e.g., sizing or drying of the material, in combination with other operations); chemically improve the as-fired energy content; or improve the ingredient characteristics. Minimal operations that result only in modifying the size of the material by shredding do not constitute processing for purposes of the definition.

In your letter, you state that the processing of the waste materials described above into engineered fuel products will consist of several steps:

- Sampling and Testing – Each container in which the solid waste arrives will be visually observed. The visual check will be looking for contaminants in the solid waste, such as scrap metal, plastic debris, rocks, aluminum, and other contaminants that will impact the quality of the fuel. Representative samples of the solid waste will also be obtained and tested in the laboratory to determine chemical makeup.
- Removal Step – Once physical contaminants have been observed in the solid waste material, these contaminants will be removed from the waste by picking out the large items manually, as well as passing the materials under a magnetic separation system wherein a crossbelt magnet will pull out all ferrous metal components.
  Note: As reported to the EPA, any shingles containing asbestos will be removed from the process stream prior to receipt of the materials by Lhoist.
- Laboratory Analysis – Once all ferrous metal contaminants and large physical contaminants have been removed from the waste, a laboratory analysis of each waste stream[4] on a batch basis will be performed. Solid wastes that have contaminants above the levels found in the traditional fuels will be segregated from the waste stream. As an example, PVC packaging materials would be removed from the Group 3 industrial by-product materials. Painted and treated lumber will be removed. Other components of the wastes that may contain heavy metals and easily identified, can also be sorted from the fuel grade wastes.
- Blending – Once contaminants have been removed from the solid waste materials, a specific blend will be developed to improve the quality of the engineered fuel products. This blend will involve ensuring that consistent energy content in the form of Btu's per pound is being obtained. Blending agents will include such items as cornstarch and sawdust. Blending in these absorbents will improve the physical characteristics for handling and flowability of the engineered fuel products.
- Shredding and Screening – Once the blend has been prepared to improve the quality of the fuel, final shredding and screening of the engineered fuel products will be performed. This final shredding and screening process is to ensure that all material has been sized to less than ½ inch wherein the material will now be considered engineered fuel products.
- Testing of the Product – Testing is conducted before and after processing for each batch. The testing after processing will confirm that the engineered fuel products meet the legitimacy contaminant criterion. Please see the details in the section below called "*Comparability of Contaminant Levels.*"
- Storage – After the engineered fuel products have been sized to the required specifications, the material will be stored in 30 cubic yard (CY) roll-off boxes and labeled appropriately, prior to shipment to the user.

[4] EPA assumes that a representative sample of each waste stream is tested.

Based on this description, we believe the process used to produce the engineered fuel products meet the definition of processing in 40 CFR 241.2.

Legitimacy Criteria

Under 40 CFR 241.3(d)(1), the legitimacy criteria for fuels include: 1) management of the material as a valuable commodity based on the following factors—storage prior to use must not exceed reasonable time frames, and management of the material must be in a manner consistent with an analogous fuel, or where there is no analogous fuel, adequately contained to prevent releases to the environment; 2) the material must have meaningful heating value and be used as a fuel in a combustion unit that recovers energy; and 3) the material must contain contaminants at levels comparable to or less than those in traditional fuels which the combustion unit is designed to burn.[5]

Manage As a Valuable Commodity

Regarding the first criterion, you state that after the waste materials are processed into the engineered fuel product, they will be stored in 30 CY roll-off boxes and shipped to Lhoist within 10 days. [6] Lhoist will receive the engineered fuel product and combust the material in its lime kiln within 7 days of receipt. The fuel will be fed pneumatically, the same method used to feed coal to the kiln, at a feed rate of up to two tons per hour, along with the coal. The engineered fuel products will be less than 20% of the total fuel feed.

Based on this information, we believe the engineered fuel products will be managed as a valuable commodity: storage does not exceed a reasonable time frame and storage in roll-off boxes would appear to prevent releases. Also, management of the engineered fuel product by the combustion unit appears to be analogous to the management of coal that is burned as a fuel.

Meaningful Heating Value and Used As A Fuel to Recover Energy

Regarding the second legitimacy criterion on meaningful heating value, you state that the engineered fuel products will have an as-fired heating value of approximately 7,000 Btu/lb, with a range from 5,500 Btu/lb to 8,000 Btu/lb. As discussed in the final rule, 5,000 Btu/lb was established as a general guideline for meaningful heating value. In addition, you state that the engineered fuel products will replace up to

[5] In the Group 3 Materials, diatomaceous earth (mainly silica) is principally an ingredient in the lime kiln rather than a fuel. While two of the legitimacy criteria for fuels and ingredients are the same—managed as a valuable commodity and comparability of contaminant levels, there are two additional legitimacy criteria in evaluating NHSMs that are used as ingredients—(1) the NHSM must provide a useful contribution to the production or manufacturing process; the NHSM provides a useful contribution if it contributes a valuable ingredient to the product or intermediate or is an effective substitute for a commercial product and (2) the NHSM must be used to produce a valuable product or intermediate. The product or intermediate is valuable if—the NHSM is sold to a third party or is used as an effective substitute for a commercial product or as an ingredient or intermediate in an industrial process. The use of diatomaceous earth as an ingredient in this process is legitimate because the non-combusted silica in the diatomaceous earth becomes a part of the kiln's product just as the non-combusted silica content of coal becomes a part of the product.

[6] You also note that the NHSMs will generally be processed within 30 days of receipt.

20% of the coal (or up to two tons/hour) that is typically burned as a fuel. Based on this information, the engineered fuel products meet this criterion.[7]

Comparability of Contaminant Levels

Regarding the third criterion, your letter requested confirmation that the engineered fuel contains contaminants at levels comparable to or lower than levels found in coal. You submitted analytical data from samples of three different engineered fuels measuring levels of 15 elemental contaminants, as well as volatile and semi-volatile organics.[8] The enclosed table compares that analytical data to data for coal as shown in our EPA document "Contaminant Concentrations in Traditional Fuels: Tables for Comparison" (November 29, 2011).[9,10,11] Except as discussed below and in the enclosed Table, the contaminants for which data is provided is present at levels no higher than those contained in traditional fuels that the combustion unit is designed to burn.[12]

With respect to antimony, the concentration level of antimony for the 3 components in Group 2 are juice wrappers – 23.24 ppm (the maximum value listed in the table), alcohol wipes <5 ppm, and hand cleaners at < 5 ppm. However, the engineered fuel products will be a combination of these materials, which means the uppermost value is not reflective of the concentration of antimony in the engineered fuel products, but will be a value between a range of values of the mixture of components in Group 2. Accordingly, the concentrations in the final engineered fuel products (about <11.08 ppm if each component was mixed in equal proportions), are comparable to the comparison traditional fuel coal values since the values are within a small acceptable range of 10 ppm for coal. In addition, the detection limit for fluorine (<200 ppm as tested for all three groups of fuels) is slightly higher than the level for the cited coal values in the table (178 ppm), but is also within a small acceptable range.[13] Please note

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[7] Subsequent to your letter of December 22, 20111, you confirmed that the Btu/lb values provided were based on composites of the three groups of fuels and not on the individual components. We understand that Lhoist will ensure that each fuel group that is burned by them has a heating value of at least 5,000 Btu/lb before it will be used as a fuel.

[8] EPA has issued a proposed rule that amends the definition of contaminants in the final NHSM rule. The proposal revises the definition to add elemental precursors to pollutants listed in Clean Air Sections 112(b) and 129(a)(4) that form during combustion, including these 15 elemental contaminants identified in the data submittal (see 76 FR 80471).

[9] The "Contaminant Concentrations in Traditional Fuels: Tables for Comparison" can be found at www.epa.gov/epawaste/nonhaz/define/index.htm.

[10] EPA notes that the contaminant values listed in the *Traditional Fuels and Key Derivatives* MCP for coal (and other traditional fuels) may be revised in the future based on the availability of new or additional data. Any future revisions to the values will not impact the conclusions made in this letter; the values are based upon the data that is available at the time EPA responds to a request.

[11] You may use other data on the contaminant levels in traditional fuels in determining whether the levels are comparable to the engineered fuel product. That is, other data on the level of contaminants in traditional fuels that you have or may become aware of may also be considered in determining whether the level of contaminants in the engineered fuel products are comparable to those in the traditional fuel that the combustion unit is designed to burn.

[12] You letter stated that "The engineered fuel will be processed as described and then sampled and tested to confirm legitimacy. The engineered fuel supplier will obtain a composite sample of the waste and test the sample for each grouping of contaminants. The test results for each batch of engineered fuel supplied to Lhoist under this pilot test will be maintained on file. The testing will compare the concentrations of each group of contaminants in the engineered fuel to those found in coal. . . . .The testing, performed by a lab with waste fuel experience, will include both metals by ICP and organics by GCMS using EPA-approved testing methodologies. The list of contaminants being tested was obtained from the Clean Air Act, Section 112(b), Section 129(a)(4), and the guidance provided in the December 2011 proposed amendments to the Non-Hazardous Secondary Materials rule, Some of the contaminants on these lists are not identifiable through testing by ICP or GCMS. These contaminants will be identified from MSDS information on the waste material and from generator knowledge of the waste."

[13] As discussed in the final NHSM rule, the comparable to or lower than standard means any contaminants present in the NHSM that are within a small acceptable range, or lower than the contaminant in the traditional fuel. An example of a small acceptable range is given as an NHSM containing 500 ppm lead, while the traditional fuel burned in the unit contains 475

that since this is the detection limit, the amount of fluorine is expected to be lower than the limit in the individual components and even less so in the final engineered fuel products. Finally, we would also note that the engineered fuel products, after processing, will be tested again to ensure that they are within the specifications and that they meet the contaminant legitimacy criterion.

We, therefore, conclude that the engineered fuel products are comparable and meet the contaminant legitimacy criterion. This conclusion is only applicable to the engineered fuel products described and is based on the available data provided; it presumes that any additional contaminants for which the engineered fuel products were not tested are present at levels comparable to or lower than those in the appropriate traditional fuel, based on your knowledge of the material.

Overall, based on the information provided, we believe that the engineered fuel products that will be generated as described in your December 22, 2011 letter, and other supporting material meet both the processing definition and the legitimacy criteria outlined above. Accordingly, we would consider this NHSM a non-waste fuel under the 40 CFR Part 241 regulations, and can be combusted as a non-waste fuel in the pilot test described above. To the extent the engineered fuel products meet the legitimacy criteria, the engineered fuel products can be combusted as a non-waste fuel under full-scale daily operations at the Lhoist facility.

If you have any other questions, please contact Don Toensing of my staff at 913-551-7446.

Sincerely,

Becky Weber

Becky Weber, Director
Air and Waste Management Division

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ppm lead. (76 FR 15523). As indicated in the enclosed table, reported antimony and fluorine levels in the engineered fuel compared to coal are within a small acceptable range.

Enclosure

Coal[1] Contaminants	Units (in ppm)	Literature Sources and OAQPS Databases[2] Coal Range	Lhoist's Group 3 industrial byproduct fuels	Lhoist's Group 1 industrial biogenic fuels	Lhoist"s Group 2 off-spec product fuels	Notes
			The data is from the individual components, so the concentrations in the final fuel product in each group will not be the uppermost value shown, but will be a value between a range of values of the mixture of components (or under the detection limit). The final products, when processed, will be tested again to ensure that they are within the specifications and that they meet the legitimacy criteria.			
Antimony (Sb)	ppm	ND - 10	<5 - 5.35	<5 - <5.35	<5 - 23.24	Considered comparable since the levels are within a small acceptable range (see note 4 below)
Arsenic (As)	ppm	ND – 174	<5 - 8.46	<2.22 - <5	<2.22 - <5	Within range
Beryllium (Be)	ppm	ND – 206	<0.09 - <0.1	<0.09 - <0.1	<0.09 - <0.1	Within range
Cadmium (Cd)	ppm	ND – 19	<1 - <5	<1 - <5	<1 - <5	Within range
Chromium (Cr)	ppm	ND – 168	<5 - 18	<5 - <18.3	<5 - 18.3	Within range
Cobalt (Co)	ppm	ND – 30	<5 - <20	<5 - <20	<5 - <20	Within range
Lead (Pb)	ppm	ND – 148	<5 - 10.3	<1.16 - 7.05	<1.16 - <5	Within range
Manganese (Mn)	ppm	ND – 512	<5 - <100	<5 - 204	<5 - 63.9	Within range
Mercury (Hg)	ppm	ND – 3.1	<0.1 - <0.12	<0.1 - <0.12	<0.1 - <0.12	Within range
Nickel (Ni)	ppm	ND – 730	<5 - <9.19	<5 - <9.19	<5 - <9.19	Within range
Selenium (Se)	ppm	ND – 74.3	<5 - 13.46	<5 - 6.8	<5 - 6.41	Within range
Chlorine (Cl)	ppm	ND – 9,080	<800 - 1,003	<800 - <1000	800 - <1000	Within range
Fluorine (F)	ppm	ND – 178	<200	<200	<200	Considered comparable since the detection limit is within a small acceptable range
Nitrogen (N)	ppm	13,600 – 54,000	6,200	6,700	2,500	Within range
Sulfur (S)	ppm	740 – 61,300	<1000 - 6760	<100 - 1620	<200 - <1000	Within range

Coal[1] Contaminants	Units (in ppm)	Literature Sources and OAQPS Databases[2]	Lhoist's Group 3 industrial byproduct fuels	Lhoist's Group 1 industrial biogenic fuels	Lhoist"s Group 2 off-spec product fuels	Notes
Volatile Organic Compounds (VOCs)	ppm		<1	<1 - 24	<1 – 8	Comparable since coal can have as high as 56 ppm for just one component of VOCs[3]
Semi-Volatile Organic Compounds (SVOCs)	ppm		104	Not given	Not given	Comparable for the Group 3 industrial byproduct fuels since coal can be as high as 2,090 ppm for SVOCs[3]

Sources and Notes:

The values given in this table for coal are from this document "Contaminant Concentrations in Traditional Fuels: Tables for Comparison" and can be found at http://www.epa.gov/epawaste/nonhaz/define/pdfs/nhsm_cont_tf.pdf.

1. This table includes data for anthracite, bituminous, sub-bituminous, and lignite coal.
2. USEPA, Office of Air Quality Planning and Standards (2011a & 2011b).
3. 76 FR 80452
4. The concentration level of antimony for the 3 components in Group 2 are juice wrappers – 23.24 ppm (the maximum value listed in the table), alcohol wipes - <5 ppm, and hand cleaners at < 5 ppm. As indicated above, the final fuel product will not be the uppermost value, but will be a value between a range of values of the mixture of components. Accordingly, the highest concentrations in the final product would be <11.08 ppm (if each component was mixed in equal proportions), which are within a small acceptable range of the comparison coal values.