UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 29 2014

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

William F. Rhatigan
President
WERC-2, Inc.
4 Barlows Landing Road, Suite 19
Bourne, Massachusetts 02559

Dear Mr. Rhatigan:

In the May 31, 2013 letter submitted on your behalf by Leonard Arigano of BTUKWH Power Gen LLC, WERC-2, Inc. (WERC-2), it was requested that the U.S. Environmental Protection Agency (EPA) confirm that the process engineered fuel, called EcoTac (™ pending), is a non-waste fuel product under the Non-Hazardous Secondary Materials (NHSM) rule. In addition, supplemental written information was provided regarding the process and product specifications,[1] and representatives from WERC-2 discussed in phone calls with EPA representatives how EcoTac is characterized under the NHSM rule.[2] Both in the letter and in the supplemental information, WERC-2 stated its position that EcoTac meets the legitimacy criteria (per 40 CFR 241.3(b)(4)) and, thus, should be considered a non-waste fuel.

To be designated as a non-waste fuel under 40 CFR 241.3(b)(4), the regulations require that processing of the NHSM meet the definition of processing in 40 CFR 241.2. After processing, the NHSM must also meet the legitimacy criteria for fuels in 40 CFR 241.3(d)(1). Units that combust NHSM as fuels that do not meet these requirements must meet applicable emissions standards issued under section 129 of the Clean Air Act (CAA).

Based on all the information provided in the May 31, 2013, letter and supplemental materials, as well as information provided during phone discussions with EPA officials, we believe that EcoTac would be considered a non-waste fuel under the 40 CFR part 241 regulations provided the specifications identified in your request are maintained, including, but not limited to, the moisture and ash content remain at 15% or less, the chlorine content remains less than 0.3% and the sulfur content remains at or above a 1:1 stoichiometric ratio with chlorine, determined by daily composite sampling. The remainder of this letter

[1] Supplemental information includes: October 21, 2013, email from Len Ariagno, on behalf of William Rhatigan, WERC-2, to George Faison, EPA, containing updated independent lab analysis results for contaminant comparisons; January 31, 2014, email from Len Ariagno, on behalf of William Rhatigan, WERC-2, to Michael Svizzero, EPA, containing additional detail in support of WERC-2 processing operations; March 12, 2014, email from Len Ariagno, on behalf of William Rhatigan, WERC-2, to George Faison, EPA, containing a supplemental description of the removal of PVC and other chlorine bearing materials from the feedstock; April 18 email from Len Ariagno on behalf of William Rhatigan describing the State Waste Ban inspections; and May 13 and 27, 2014 emails from Len Ariagno, on behalf of William Rhatigan, WERC-2, to George Faison, EPA on sorting lines.

[2] EPA conducted conference calls with WERC-2 representatives on March 6, May 22, and June 10, 2014.

provides the basis for our position, including the reasons for these conditions. *If these conditions are not maintained, the Agency may reach a different conclusion.*

Note that a non-waste determination under 40 CFR 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 CFR Part 241 for the purposes of determining the applicable emissions standards under the Clean Air Act for the combustion unit in which it is used.

Background Information on EcoTac

WERC-2 has operated a small-scale production test facility since October 2012 and has developed a non-hazardous, waste-derived substitute fuel that was tested in a co-fired application in a wood-biomass, stoker boiler. This material, called EcoTac, will be made available to other end-users, and a larger-scale operation in Rochester, MA, is in final permitting stages. EcoTac is intended for use as a substitute for both coal and biomass in stoker boilers. The primary feedstock is derived from post-recycled materials that would otherwise be landfilled and consists primarily of plastics, polystyrene, organics, wood, paper, and cardboard. The processing facility will be part of a renovated and expanded materials recovery facility (MRF) that will receive construction and demolition (C&D) waste, municipal solid waste (MSW), and recyclables.

According to the information provided, EcoTac can be engineered to meet the end-users specifications for heating value and material composition. The information describes the fuel specifications for EcoTac as follows:

- Contains between 20-40% plastics, 10-40% paper and cardboard, 5-10% organics, 5-10% polystyrene, and some residual waste (the amount to be determined, primarily comprising clean wood and plastic from C&D processing operations).
- Fuel/heat content between 9,000 Btu/lb and 11,000 Btu/lb, with each batch formulated to meet customer specifications using in-situ instrumentation to vary the polystyrene and plastic inputs.
- Is hydrophobic, non-leachable, and odorless.
- Is formed by minimal heat and compression and has no binding agent.
- Is in the form of briquettes, with a typical size of 2" minus.
- Moisture content will be at 15% or less.[3]
- Chlorine content will range from non-detect up to 0.3%.
- Sulfur content will be at or above a 1:1 stoichiometric ratio with chlorine (determined by daily composite sampling).

Processing

Processing is defined in 40 CFR 241.2 as operations that transform discarded NHSM 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

[3] The letter of May 13, 2013 identified a typical customer specifications moisture content of 1.45%. Test data from October 21, 2013 shows a moisture value of 1.17%.

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 the purposes of the definition.

The determination of whether a particular operation or set of operations constitutes sufficient processing to meet the definition in 40 CFR 241.2 is necessarily a case-specific and fact-specific determination. This determination applies the regulatory definition of processing to the specific discarded material(s) being processed, as described in correspondence and supporting materials, taking into account the nature and content of the material, as well as the types and extent of the operations performed on it. Thus, the same operations may or may not constitute sufficient processing under the regulation in a particular circumstance, depending on the material being processed and the specific facts of the processing. In some cases, certain operations will be sufficient to "transform discarded non-hazardous secondary material into a non-waste fuel[,]" and in other cases, the same operations may not be sufficient to do so.

As described in the May 31st letter and follow-up materials, the EcoTac production process involves the following stages discussed in detail below: 1) pre-EcoTac production – waste stream segregation; 2) processing of segregated waste streams; and 3) final EcoTac fuel processing.

1. Stage 1 - Pre-EcoTac production- waste stream segregation.

All waste material accepted at the Rochester processing facility is tipped, handled, processed and loaded within the processing building. The tipping floor is segregated into four distinct areas - - residential single stream and commercial single stream materials consisting of co-mingled glass, plastic containers, cans etc. suitable for recycling; MSW; raw C&D waste that will be sent off-site for processing; and non-PVC plastic and polystyrene. The four waste streams are handled separately and are not commingled on the tipping floor. Any recyclable materials found are bailed and transported off-site as marketable recyclables.

2. Stage 2 - Processing of segregated waste streams.

The four segregated materials accepted at the Rochester facility and described in stage 1 are the primary ingredients for EcoTac fuel, and are directed to: onsite processing line "A" for residential single stream and commercial single stream materials; onsite processing line "B" for MSW; offsite processing for raw C&D waste; and on-site storage in silos for non-PVC plastic/polystyrene. The processing steps taken for each fuel input are described in further detail, below.

Residential Single Stream Recyclables and Source Separated Recyclables—Line A

1. A waste inspection of all material received at the facility's segregated product tipping floor is performed.
2. These materials, once inspected, are deposited by a front end-loader into a hopper that feeds a metering drum. The drum evens the feed rate to the recycling equipment. Metered feed is then conveyed to another manual sorting line and any contaminated or suspect material is positive picked for removal and recycling at off-site locations. Unpicked material is then conveyed to an old corrugated cardboard (OCC) disk screen.

3. The OCC under-sized material is conveyed to a second disk screen and glass breaker. The 2" minus material is conveyed to an air knife which separates the glass from light material. Glass is separately collected for off-site recycling. Some light material may be used as a potential fuel component and, if used, would be introduced to the fuel production line prior to the final NIRS. Rejected light materials go to a landfill. The 2" plus material is conveyed to another disk screen to separate the fiber from the containers. The fiber is conveyed to another manual sort line to separate OCC, mixed paper, and plastic film. The OCC and mixed paper are baled for recycling at off-site locations and the plastic film is separately conveyed as an EcoTac material input. The containers separated at the disk screen are conveyed to another manual sort station where trash is removed by facility personnel.

4. Containers next are conveyed to an over-belt magnetic separator for removal of ferrous metals, followed by an optical sorter which removes PET, and HDPE. Material is then conveyed through an eddy current separator to remove any remaining non-ferrous (aluminum) material for recycling at off-site locations.

MSW—Line B

1. Similar to the materials in Line A, a waste inspection takes place when the truck-delivered MSW is deposited on the facility tipping floor.[4] Here, the Facility Operator physically moves the material using hand tools and a front-end loader to evenly distribute the MSW. The Facility Operator performs a visual Waste Inspection, and subsequently removes any suspect or unknown materials, including PVC and other chlorine bearing materials from the feed stock.

2. The MSW is then moved by a front-end loader into a hopper and conveyed to a shredder-bag breaker. After which it is conveyed to an over-belt magnet where any ferrous material in the MSW feed stock stream is removed.

3. After the over-belt magnet, the material is conveyed through a manual sorting line where facility personnel further remove any bulky items, unsuitable trash, or any questionable material remaining on the conveyor belt.

4. From the manual sort line, the MSW material is conveyed to a trommel screen. Trommel under-sized pieces (<2") are conveyed to a separate storage area for recycling. Near infrared spectroscopy (NIRS) equipment is located downstream of the trommel screen. This allows for identification and removal of any material contaminants from the over-sized pieces >2", (contaminants not previously removed by manual sorting or the over-belt magnet), including PVC and other chlorine bearing materials.

5. Trommel over-sized pieces are then conveyed to an air separator that separates the materials into a heavy fraction and a light fraction. The heavy fraction material is conveyed to a second over-belt magnetic separator to remove any potentially remaining ferrous metals. The material is

[4] Prior to MSW delivery to the processing facility, all materials will have been subject to the requirements of the Massachusetts Waste Disposal Ban. The ban helps ensure that MSW and other waste materials in the state do not contain contaminated materials, such as residual petroleum based products, oil based paints, and obvious signs of chemical residuals. Waste inspections at the facility focus on any materials subject to the waste ban that may remain.

subsequently inspected via an eddy current analyzer for removal of any aluminum material. This material is then conveyed to an optical sorter to identify and remove any remaining material not acceptable for input to the EcoTac fuel production process.

C&D Residual Waste Sent for Off-Site Processing

1. As indicated above, initial sorting and inspection take place at the Rochester facility of raw C&D materials before the C&D material is re-loaded for transport to a partnering facility in New Bedford, MA. This material is processed and recycled at the New Bedford facility along with any additional raw C&D material the New Bedford facility receives from other sources. Processing at the New Bedford facility consists of sorting the material to remove non-wood materials, wood treated with pentachlorophenol or chromated copper arsenic and other preservatives, lead, as well as gypsum, dirt, bricks, etc. This processing is achieved by both manual and mechanical methods, including various screens, magnets, eddy current inspection, manual separation, as well as float tank processes. Once contaminants are removed, the processed C&D residuals that are transported back to the Rochester facility are clean wood and certain films.

2. Once received back at the Rochester facility, the returned clean wood and films are stored in a dedicated silo and used in the EcoTac fuel production process line as needed to meet customer-specific Btu requirements. Residual wood and certain films from off-site C&D processing is one of the two supplemental ingredients to the EcoTac fuel product. It serves to chemically change the original MSW feed stock material, by displacing any original contaminated product or suspect material, add desired heating value, and thus improve the overall energy characteristics of the EcoTac fuel material.

On-Site Storage for Plastics and Polystyrene

1. Separately sourced polystyrene chips and non-PVC plastics are stored in a dedicated silo on-site and may also be added as a second supplemental ingredient to the EcoTac fuel product.

2. Material serves to chemically change the original MSW by displacing any original contaminated or suspect material, and add desired heating value, for the purpose of improving the overall energy characteristics of the EcoTac fuel material.

3. Stage 3 - Final EcoTac fuel processing.

The EcoTac ingredients described above are blended according to customer specifications and conveyed to grinders that reduce the material to 1" minus in size. The material then passes through a second NIRS in-situ electronic scanner to detect BTU value, size, and material composition to produce a customer specific fuel specification.[5] The NIRS process also serves to remove any remaining latent PVC (as well as other contaminants) by using high-resolution color sensors and digital processing electronics and software algorithms to determine whether a particle is targeted for ejection.

[5] Information provided indicates that typical parameters for customer specifications and reject criteria include BTU/lb; sizing; ash content; sulfur content; moisture and volatility.

The material is conveyed over an electronic weigh belt to determine rate of material flow. The computerized plant control system determines any need for incremental BTU material input, and if needed, precise amounts of supplementary fuel items (residual high BTU material and polystyrene chips) are added.

The blended material is then transported to the final briquette production machines via a two-stage heat-jacketed screw conveyor. The heat-jacketing around the screw conveyors increase the material temperature to approximately 270°F, which slightly dries the material. Also, the combination of the higher material temperature and the mixing achieved by the screw conveyor densifies the material. The briquette production machine compresses the EcoTac material at over 21,000 psi.

Based on this description of the three stages, we believe your operations meet the definition of processing in 40 CFR 241.2 and will transform waste materials into a processed, non-waste fuel. Specifically, incoming materials, already subject to the state waste ban, undergo inspection to ensure no waste ban material remains in the feedstock. Over-belt magnets remove ferrous material and bulky items and questionable material are removed by hand. NIRS equipment allows for identification and removal of contaminated materials, including PVC. Air separators separate the material into light and heavy fractions, subsequent material is inspected via an eddy current analyzer, while an optical sorter identifies and removes materials not meeting EcoTac specification. Offsite processing of the C&D material includes removal of non-wood materials and treated wood. Non-PVC plastics/polystyrene and the processed C&D material are added to improve the fuels characteristics, the combined feedstock streams are ground to reduce material size and a second NIRS is used to ensure customer specifications and removal of any remaining PVC. Blended material is transported to final briquette production. These operations are clearly more than the "minimal operations" described in the Part 241 processing definition.[6]

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 a 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.

Manage as a Valuable Commodity

Information provided indicates that the finished EcoTac briquettes are transferred via conveyor to an elevated silo designed for truck load-out delivery of the EcoTac briquettes to the customer. The silo has a storage capacity of 1,000 tons. Two trucks will be used for transporting the finished EcoTac briquettes to the customers. It is expected that the EcoTac will be transported on multiple days per week, based on the volumes indicated in secured and pending letters of intent from regional wood-biomass plants who want to use EcoTac as a substitute co-fired fuel. Therefore, WERC-2 does not anticipate any prolonged

[6] Prior to completion of the processing of the waste, these materials are considered solid waste and are subject to appropriate federal, state, and local regulations.

on-site residence or storage time for the EcoTac briquettes. As noted above, although current letters of intent are solely from wood-biomass plants, WERC-2 has indicated that EcoTac fuel may also be used as a coal substitute in stoker boilers, and co-fired with coal at approximately 10% to 20% of the boiler total heat input.

This information indicates that EcoTac will be managed as a valuable commodity by WERC-2 after it is produced, and that storage—before and after delivery to customers—will not exceed reasonable time frames.[7] However, since no information was provided as to how the EcoTac will be managed as a valuable commodity by the end users per the factors described above, this letter does not address this aspect of the legitimacy criteria.

Meaningful Heating Value and Used as a Fuel to Recover Energy

Regarding the second legitimacy criterion, you indicate that WERC-2 has the ability via in-situ instrumentation to vary the polystyrene and plastic supplementary inputs to the EcoTac process to meet specific end-user needs who may want a higher BTU value in their EcoTac briquettes. You further state that the overall range of heating value can vary from 9,000 to 11,000 Btu/lb and that the material will be used as a fuel in a combustion unit that recovers energy.

As the Agency stated in the preamble to the NHSM final rule, NHSMs with an energy value greater than 5,000 Btu/lb, as fired are considered to have a meaningful heating value.[8] According to your specifications, EcoTac can have moisture levels as high as 15 percent. Assuming a 15 percent moisture level, EcoTac would still have an as-fired heating value between 7,650 and 9,350 Btu/lb. Thus, we believe that EcoTac meets the meaningful heating value criterion.

Comparability of Contaminant Levels

Regarding the third legitimacy criterion, you initially submitted summary tables in May 2013 comparing contaminant levels in traditional fuels (specifically, coal and wood and biomass) with concentrations found in the EcoTac briquettes. EcoTac concentrations included results from independent lab analyses. In a subsequent submittal,[9] WERC-2 provided updated independent lab analysis results.

A direct contaminant-to-contaminant comparison of these updated results are attached as Table 1A. Based on this contaminant-to-contaminant comparison, all contaminants in EcoTac are comparable to or lower than those contaminants in both coal and wood/biomass.

We note that the contaminant data submitted in May 2013 indicated: 1) detection limits higher than the traditional fuel contaminant concentrations for metals; and 2) contaminant concentrations for the non-metal elements below traditional fuel concentration levels but higher than those values reported in the subsequent submittal. EcoTac stated that the differences in the two sets of data were due to a change in

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[7] As discussed in the NHSM final rule (76 FR 1552) "reasonable time frame" is not specifically defined as such time frames vary among the large number of NHSMs and the industry involved.

[8] See 76 FR 15541, March 21, 2011. Also see 76 FR 15482: "Except as otherwise noted, to satisfy the meaningful heating value criterion, the non-hazardous secondary material must have at least 5,000 Btu/lb, as fired (accounting for moisture), since the as-fired energy content is the relevant parameter that must be assessed to determine if it is being discarded rather than used as a fuel for energy recovery."

[9] On October 21, 2013, WERC-2 forwarded updated independent lab analysis results.

the lab performing the analysis which resulted in lower detection limits and implementation of increased quality assurance procedures over time.

The conclusion that EcoTac meets the contaminant legitimacy criterion for units designed to burn coal or biomass assumes that EcoTac was tested for any contaminant expected to be present. Additional contaminants for which EcoTac was not tested must be present at levels comparable to or lower than those in the appropriate traditional fuel, based on your knowledge of the material.

Conclusion

Overall, based on the information provided, the EcoTac briquettes, as described in your letter and supplemental information, are expected to meet both the processing definition and the legitimacy criteria outlined above, provided the specifications in your request are maintained. These specifications include, but are not limited to, the moisture and ash content are maintained at 15% or less, the chlorine remains less than 0.3% and the sulfur content remains at or above a 1:1 stoichiometric ratio with chlorine, as determined by daily composite sampling. Because our assessment is based on information you provided showing that the EcoTac briquettes meet certain specifications/conditions, our decision is based on the maintenance of the specifications/conditions in the EcoTac material. These specifications/conditions will ensure the consistency and homogeneity of the briquettes and that they will not contain waste materials for combustion. Accordingly, we would consider EcoTac briquettes a NHSM non-waste fuel (as described in this letter) under the 40 Part 241 regulations.

If you have any other questions, please contact George Faison of my staff at (703) 305-7652.

Sincerely,

Barnes Johnson, Director
Office of Resource Conservation and Recovery

Attachment

cc: James Owens
EPA Region I, Office of Site Remediation and Restoration

Peter Tsirigotis
EPA Office of Air Quality Planning and Standards

Attachment

Table 1A: Contaminant-by-Contaminant Comparison

Contaminant	Units	EcoTac[1]	Wood / Biomass: Range[2]	Coal: Range[2]	Results of Comparison
Metal Elements - dry basis					
Antimony (Sb)[3]	Ppm	<0.38	ND - 26	ND - 10	Lower than wood & coal
Arsenic (As)[3]	Ppm	<0.32	ND - 298	ND - 174	Lower than wood & coal
Beryllium (Be)[3]	Ppm	<0.035	ND - 10	ND - 206	Lower than wood & coal
Cadmium (Cd)	Ppm	0.078	ND - 17	ND - 19	Lower than wood & coal
Chromium (Cr)	Ppm	0.87	ND - 340	ND - 168	Lower than wood & coal
Cobalt (Co)	Ppm	0.93	ND - 213	ND - 25.2	Lower than wood & coal
Lead (Pb)	Ppm	1.8	ND - 229	ND - 148	Lower than wood & coal
Manganese (Mn)	Ppm	17	ND - 15800	ND - 512	Lower than wood & coal
Mercury (Hg)[3]	Ppm	<0.0014	ND - 1.1	ND - 3.1	Lower than wood & coal
Nickel (Ni)	Ppm	0.41	ND - 540	ND - 730	Lower than wood & coal
Selenium (Se)[3]	Ppm	<0.37	ND - 9.0	ND - 74.3	Lower than wood & coal
Non-metal elements - dry basis					
Chlorine (Cl)	Ppm	469	ND - 5400	ND - 9080	Lower than wood & coal
Fluorine (F)	Ppm	<1	ND - 300	ND - 178	Lower than wood & coal
Nitrogen (N)	Ppm	2,000	200 - 39500	13600 - 54000	Lower than wood & coal
Sulfur (S)	Ppm	400	ND - 8700	740 - 61300	Lower than wood & coal
Volatile Organic Compounds (VOC)					
Formaldehyde	Ppm	0.69	1.6 - 27	No Data	Lower than wood
Benzene	Ppm	<.068	No Data	ND - 38	Lower than coal
Ethyl benzene	Ppm	<.001	No Data	0.7 - 5.4	Lower than coal
16-PAH	Ppm	0.0372	No Data	6 - 253	Lower than coal
Styrene	Ppm	<.001	No Data	1.0 - 26	Lower than coal
Toluene	Ppm	<.005	No Data	8.6 - 56	Lower than coal
Xylenes	Ppm	<.003	No Data	4.0 - 28	Lower than coal

Notes:

1. EcoTac values provided by WERC-2 on October 21, 2013.
2. Ranges for Wood & Biomass Materials and Coal from a combination of EPA data and literature sources, as presented in EPA document *Contaminant Concentrations in Traditional Fuels: Tables for Comparison, November 29, 2011,* available at www.epa.gov/epawaste/nonhaz/define/index.htm.
3. Antimony, arsenic, beryllium, mercury, and selenium were not detected. In these cases, values presented in this table are the method detection levels for each contaminant.