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

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OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

Anthony Novello
Chief Executive Officer
Evergreen Recycling Solutions, LLC
110 Evergreen Avenue
Newark, New Jersey 07114

Dear Mr. Novello:

In your letter of September 10, 2013, you requested clarification from the U.S. Environmental Protection Agency (EPA) that your process engineered fuel, called Evergreen Fuel, is a non-waste fuel product under the Non-Hazardous Secondary Materials (NHSM) rule. In your letter, and follow-up email correspondence[1], you provided information regarding your process and product specifications, as well as information regarding your position that Evergreen Fuel 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).

Based on the information provided in your letter and supplemental electronic correspondence with EPA officials, we believe that Evergreen Fuel, produced by Evergreen Recycling Solutions, and burned in combustion units designed to burn coal for energy recovery, would constitute a non-waste fuel under 40 CFR part 241.[2] The remainder of the letter outlines the information and logic used to reach this determination.

Background Information on Evergreen Fuel

Evergreen is a recycled materials company that processes and distributes Evergreen Fuel, an engineered fuel produced by processing and blending construction and demolition material, and/or select industrial

[1] Email correspondence between Jesse Miller (EPA) and Anthony Novello (Evergreen) between 6/26/2014 and 6/11/2015.
[2] 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 appropriate emissions standards under the Clean Air Act for the combustion unit in which it is used.

and/or commercial byproduct material streams including: plastic, paper, paper mill contraries, paper fiber, cardboard, textiles, carpet, and rubber. Evergreen Recycling Solution's facility is located in Newark, NJ and predominately receives its feedstock from licensed construction and demolition contractors. The majority of the feedstock is from new construction and demolition; minor portions of the qualified feedstock material originates directly from select industrial and commercial facilities (clean scrap pallets, waste paper and cardboard, textiles, etc.). While some of the feedstocks such as cardboard, plastic, and textiles are also found in municipal solid waste (MSW), because Evergreen's feedstocks are from commercial and industrial sources, they are not considered MSW. In fact, Evergreen is not approved by the New Jersey Department of Environmental Protection (NJDEP) to accept MSW at their facility.

As provided in the process description, feedstock materials are subject to: (i) a thorough prequalification screening procedure; (ii) a "received material" quality control procedure; and (iii) subsequent material processing procedures.

According to the information provided, Evergreen Fuel is engineered to meet a precise specification for size and heating value. Generally, Evergreen Fuel is primarily composed of 70-85% wood-based products, 5-10% paper and cardboard, and a remaining 5% of plastics and textiles. The contaminant analysis discussed later is based on this composition. Your letter described that the percent composition of the component materials of the Evergreen Fuel can be shifted to meet the fuel heat content needs of an end user.

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 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 details 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 your letter and through conversations, the material used in the Evergreen Fuel production process is subject to a prequalification stage. Before a hauler is ever sent to a site, an Evergreen sales representative visits the site to perform a visual inspection to verify that the waste is primarily construction and demolition (C&D) waste. After a site is determined to meet the pre-qualification standards, then haulers are sent to begin loading the material. Every hauler that arrives at

the Evergreen facility proceeds to the inbound scale operator. The scale operator then verifies the Origin & Destination form. This form shows the size of the vehicle, where the waste came from, and the type of material. The hauler is required to sign the Origin & Destination form verifying that all information is accurate. As stated above, the majority of incoming wastes comes from C&D sites. If a load is deemed by an Evergreen Material inspector to have a high percentage of pressure treated wood, then that load will not be tipped on the main floor for processing.

The hauler then proceeds to the tipping floor where the load is dumped and another visual inspection is performed. Materials that may have high contaminant levels or are otherwise undesirable such as insulation, mattresses, PVC plastic products, certain textiles, Styrofoam, and upholstered furniture are removed to ensure a primarily wood-based product. If a load has a small percentage of pressure treated wood, then that treated wood is removed prior to being placed on the recycling line. The remaining material proceeds to the primary shredder where it is size reduced to 14 inches. The material then goes through two sets of screens for further sorting. This sorting increases the final BTU value by removing metal, dirt, concrete, masonry and grit materials from the pre-fuel product. The screens also assist in reducing the ash content of the final fuel.

Following the screening process, any material that is one inch or greater is sent to the Destoner. The Destoner pumps in high pressure air and removes any ultra-light material (paper, cardboard, and plastics) from the mixed masonry[3]. The ultra-light material is then sent through a magnet where ferrous metals are removed. Any material that is under one inch (referred to as C&D fines which is made of grit, dirt, lead fines and small bits of masonry) is diverted[4].

The remaining ultra-light material reunites with the remaining sorted material from the original screens. This combined stream proceeds to the manual sorting line. The manual sorting line is comprised of staff who further remove non-desirable material referred to as negative picking. The manual sorting is divided into four bunkers. The first two bunkers receive residual waste (i.e. PVC plastics, pipes, roofing material). The third bunker receives any non-ferrous metals (any metal that has not been removed by the prior magnets). The fourth bunker serves as quality control, and the manual sorters also remove any masonry material over eight inches that has not been removed through the Finger Screen.

The remaining stream is sized using two shredders: the top shredder and the bottom shredder. The material passes through the top shredder first, where it is sized to four inches or below. Next, the material passes through the bottom shredder, where it is further sized to one and a half inches or below. After sizing, the stream is screened again and any material larger than one and half inches is returned to the beginning of the sizing process. The remaining stream proceeds to a trommel screen, which removes any material under three eighths of an inch. This ensures that the final fuel has low ash levels and improved combustion[5]. The removed material from the trommel screen is beneficially used and sold as a solidification agent consisting of small fines of sawdust and other materials. The final material that does not pass through the trommel screen is the final Evergreen Fuel product.

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[3] The separated out mixed masonry goes to a separate bunker where it is crushed and used for road base.
[4] This material is used for landfill cover.
[5] Evergreen engineers its fuel so that its ash level is below 10%.

The final Evergreen Fuel product is tested by two methods to ensure consistency. Visual inspections of the final fuel is performed every three hours of production. Weekly composite testing is conducted to verify that the final fuel product meets the correct specifications. The final Evergreen Fuel product is tested for the following specifications: BTU value ($\geq$ 5,000), ash content ($\leq$ 10%), sulfur ($\leq$ 57%), moisture ($\leq$ 30%), and chlorine ($\leq$ 1500 ppm).

Based on this description, the processing meets the definition in section 241.2 and demonstrates the feedstock material is transformed into a product fuel. Specifically, the processing includes:

- pre-screening of potential customers' material before it is received;
- feedstock acceptance practices to ensure a primarily wood-based product and removal of materials that may have high contaminant levels;
- removal of metals and fines;
- manual sorting to remove residual contaminated material such as PVC plastics and metals;
- shredding to improve the fuel characteristics of the material; and
- final screening to ensure consistency and low ash levels and improved combustion in the fuel.

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

According to the information provided in your letter, Evergreen currently markets and sells Evergreen Fuel to a variety of end-use combustion customers, including several energy producing boiler operations and a number of Portland cement and lime kilns. The fuel is delivered to end-use combustors, and after delivery it is typically stored, prior to combustion, in a similar manner to other analogous solid fuels like coal, wood, or biomass (i.e., in fuel piles or silos). Prior to combustion, the Evergreen Fuel is transferred and/or handled from temporary storage in a manner consistent with the transfer and handling of other analogous solid fuels – procedures that typically include screening again by the end-use combustor, combining with other fuels, and transferring to the combustor via conveyor belt, front-end loader, or pneumatic conveyance. Combustion typically takes place within a day to a week of arrival at the facility.

Based on this information, we agree that Evergreen Fuel is managed as a valuable commodity after it is produced and that storage does not exceed reasonable time frames.

Meaningful Heating Value and Used as a Fuel to Recover Energy

Results from the sampling and analysis of Evergreen Fuel showed the material to have a heating value of 10,300 Btu/lb, as fired. 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[6].

Comparability of Contaminant Levels

Your letter requests confirmation that the Evergreen Fuel meets the contaminant legitimacy criterion when compared to coal, the traditional fuel for which the combustion unit is designed to burn. In the enclosure to your September 2013 letter, you compared contaminant data for Evergreen Fuel to contaminant data for coal, as outlined in Appendix A – Contaminant Comparison Tables.

A direct contaminant-to-contaminant comparison, based on the information provided in your enclosure, is presented in Table 1A. The EPA previously stated that for the purposes of contaminant comparisons, it may be appropriate to group contaminants sharing similar physical and chemical properties that influence behavior in the combustion unit prior to the point where emissions occur. Although not included in the Agency's sample approach[7], grouping of the total halogens chlorine and fluorine would be appropriate as contaminants within each of these groups share key physical and chemical properties and would be expected to behave similarly in a combustion unit prior to the point where emissions occur. For example, chlorine and fluorine are both highly reactive and form acid gases when bonded with hydrogen in the combustion chamber. Nevertheless, there may be circumstances in which grouping of total halogens would not be appropriate and the EPA will evaluate each instance on a case-by-case basis. In the case of Evergreen Fuel, both chlorine and fluorine fall within the range for coal. The "<" nomenclature for fluorine is standard for indicating a non-detect value. To be comprehensive, the total halogens are also grouped, and the total falls within the range for coal as shown in Table 1B. Based on the comparisons in Tables 1A and 1B, all contaminants in Evergreen Fuel are comparable to or lower than those contaminants in coal.

Analyses were also performed to determine the concentrations of 28 volatile organic compounds (VOCs), all of which were found to be non-detect, as well as the common 16 polycyclic aromatic hydrocarbons (PAHs), and additional semi-volatile organic compounds (SVOCs). These comparisons are provided in Table 1C. For the purposes of comparison, Evergreen combined contaminants into specific groups, including total VOC, total PAH, and total SVOC.

The data show that, for each of the groups of contaminants, the range of the totals present in Evergreen Fuel is within the range found in coal. This conclusion assumes that Evergreen Fuel was tested for any constituents expected to be present. Additional contaminants for which Evergreen Fuel was not tested

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[6] 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."

[7] See 78 FR 9146

must, as is the case for those tested, be present at levels comparable to or lower than those in coal, based on your knowledge of the material.

Conclusion

Overall, based on the information provided, we believe that Evergreen Fuel, as described in your letter and supplemental information, meets both the processing definition and the legitimacy criteria when burned in combustion units designed to burn coal for energy recovery. This assumes that the above specifications in your request are maintained. These specifications/conditions will ensure the consistency and homogeneity of the fuel product and that it will not contain waste materials for combustion, including contaminant levels that exceed those comparable to those typically found in coal. Accordingly, we would consider this NHSM a non-waste fuel (as described in this letter) under the 40 Part 241 regulations.

If you have any other questions regarding the non-waste determination, please contact Jesse Miller of my staff at (703) 308-1180.

Sincerely,

Barnes Johnson, Director
Office of Resource Conservation and Recovery

Enclosures

Enclosures

Table 1A: Contaminant-by-Contaminant Comparison, Elemental Contaminants

Contaminant	Units	Evergreen Fuel[1]	Coal: Range[2]	Results of Comparison
Metal Elements – dry basis				
Antimony (Sb)	ppm	<0.760	ND – 10	Within coal range
Arsenic (As)	ppm	38.3	ND – 174	Within coal range
Beryllium (Be)	ppm	0.0066	ND – 206	Within coal range
Cadmium (Cd)	ppm	0.216	ND – 19	Within coal range
Chromium (Cr)	ppm	57.4	ND – 168	Within coal range
Cobalt (Co)	ppm	1.57	ND – 25.2	Within coal range
Lead (Pb)	ppm	52	ND – 148	Within coal range
Manganese (Mn)	ppm	61.2	ND – 512	Within coal range
Mercury (Hg)	ppm	0.284	ND – 3.1	Within coal range
Nickel (Ni)	ppm	6.79	ND – 730	Within coal range
Selenium (Se)	ppm	<0.928	ND – 74.3	Within coal range
Non-metal elements – dry basis				
Chlorine (Cl)	ppm	900	ND – 9,080	Within coal range
Fluorine (F)[3]	ppm	< 200	ND – 178	Within coal range
Nitrogen (N)	ppm	1,500	13,600 – 54,000	Within coal range
Sulfur (S)	ppm	2,300	740 – 61,300	Within coal range

Notes:

1. Data provided by Evergreen Recycling Solutions, Inc. September 10, 2013.
2. Ranges for 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. Fluorine was not detected in the samples analyzed. The number listed (200 ppm) is the detection limit of the analytical method for the analyte measured, and is provided by the analytical laboratory

Table 1B: Contaminant Comparison, Total Halogens Group

Halogen	Units	Range	
		Evergreen Fuel[a]	Coal[b]
Chlorine	ppm	900	ND – 9,080
Fluorine	ppm	< 200	ND - 178
Total Halogens	ppm	< 1,000	ND – 9,078

Notes:

a. Data provided by Evergreen Recycling Solutions, Inc. September 10, 2013.

b. Ranges for Coal are 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.

Table 1C: Contaminant-by-Contaminant Comparison, HAP Compounds

Contaminant	Units	Evergreen Fuel[1]	Coal: Range[2]	Results of Comparison
Volatile Organic Compounds (VOC)[3]				
Total VOCs [3]	ppm	<35.7	10.3 - 125.4	Within coal range
Semi-Volatile Organic Compounds (SVOCs)				
Dibenzofuran	ppm	4.27	No Data	
Phenol	ppm	0.933	No Data	
Bis(2-ethylhexyl) phthalate (DEHP) [4]	ppm	3.61	No Data	
Di-n-Butylphthalate	ppm	0.655	No Data	
Dimethyl Phthalate	ppm	0.445	No Data	
Naphthalene	ppm	0.226	No Data	
Pentachlorophenol	ppm	0.530	No Data	
17 Additional SVOC	ppm	ND for all 17	No Data	
Total SVOCs [5]	ppm	<15.0	No Data	
Polycyclic Aromatic Hydrocarbons (PAH)				
Naphthalene	ppm	0.226	No Data	
Phenanthrene	ppm	0.343	No Data	
Pyrene	ppm	0.358	No Data	
13 Additional PAHs	ppm	ND for all 13	No Data	
16-PAH [6]	ppm	<2.40	6 - 253	Within coal range

Notes:

1. Data provided by Evergreen Recycling Solutions, Inc. September 10, 2013.
2. Ranges for coal are 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. All Evergreen Fuel samples tested non-detect for the following 28 VOC HAPs: benzene; ethyl benzene; styrene; toluene; bromomethane; carbon tetrachloride; carbon disulfide; chlorobenzene; methylene chloride; m,p-xylene; o-xylene; vinyl chloride; 1,1-

dichloroethene; 1,2-dichloroethane; 1,4-dichlorobenzene; chloroform; bromoform; 1,2-dibromo-3-chloropropane; cis-1,3-dichloropropene; trans-1,3-dichloropropene; 1,4-dioxane; chloroethane; 1,2-dibromoethane; chloromethane; 1,1,1-trichloroethane; 1,1,2,2-tetrachloroethane; 1,2,4-trichlorobenzene; and 1,1,2-trichloroethane.

4. DEHP is a synthetic plasticizer. Although EPA has no data for DEHP in coal, the agency would not expect the chemical to be present in either traditional fuel.
5. All Evergreen Fuel samples tested non-detect for the following 17 SVOC HAPs: aniline, benzidine, bis(2-chloroethyl)ether, 1,2-diphenylhydrazine, 3,3-dichlorobenzidene, 2,4-dinitrophenol, 2,4-dinitrotoluene, hexachlorobenzene, hexachlorobutadiene, hexachlorocyclopentadiene, hexachloroethane, isophorone, nitrobenzene, 4-nitrophenol, N-nitrosodimethylamine, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol.
6. Evergreen tested for 16 PAHs. Non-detects included acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(a)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, and indeno(1,2,3-cd)pyrene.