North Carolina Department of Environment and Natural Resources
Division of Air Quality

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March 8, 2013

Mr. Kerry Varkonda
Development Director
Poultry Power, USA
4300 Marsh Landing Parkway, Suite 201
Jacksonville Beach, FL 32250

SUBJECT: Applicability Determination No. 2131
Poultry Power USA
NHSM Determination

Dear Mr.Varkonda:

The North Carolina Division of Air Quality (NC DAQ) received your letter dated November 27, 2012 summarizing your analysis of used poultry litter from various sources. The NC DAQ received additional information in a letter dated January 31, 2013 as well as various e-mail correspondences submitted by Ms. Fern A. Paterson of Parker Poe Adams & Bernstein LLP on your behalf. Poultry Power USA (PPUSA) is proposing to burn used poultry litter as a fuel in a new boiler. The boiler will be used to generate steam for the production of electricity.

Used poultry litter is a non-hazardous secondary material (NHSM) within the meaning of Title 40, Part 241 of the Code of Federal Regulations (40 CFR Part 241). The used poultry litter described in your correspondence referenced above will be processed by PPUSA. It meets the legitimacy criteria provided in 40 CFR §241.3. The NC DAQ has determined, therefore, the combustion of this material would not be subject to the requirements of the Commercial and Industrial Solid Waste Incineration (CISWI) emission standard. This determination relies on the language of the recently published Federal rules defining NHSM, and 40 CFR Part 60, Subpart CCCC. As the former is only effective as of April 8, 2013, please be advised that this determination is not effective until that date.

Background

On February 7, 2013 the EPA published revisions to the CISWI regulations and the Solid Wastes Used as Fuels or Ingredients in Combustion Units rule (also known as the NHSM rule).[1] The CISWI rule (for new units) will become effective on August 7, 2013. It includes a definition of "contained gaseous material" and indicates that the definition of solid waste given in 40 CFR §258.2 is to be used to determine if a material is a solid waste.

[1] 78 Fed. Reg 9112 (2013).

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Note that the NHSM rule still states that "non-hazardous secondary materials that are combusted are solid wastes," unless they can be exempted under either 40 CFR §241.3(b) or through a petition to the US EPA under 40 CFR §241.3(c). The EPA's interpretation makes it clear that to be subject to the CISWI rule a unit must burn a "solid waste" as that term is defined at 40 CFR §258.2 *and* does not qualify for one of the NHSM exemptions at 40 CFR §241.3. If the material is not a solid waste as defined in 40 CFR §258.2, its combustion is not subject to CISWI. Alternatively, the combustion of a solid waste can be exempt from CISWI if the conditions under 40 CFR Part 241 can be met.

Whether a material is a solid waste depends on whether 40 CFR §258.2 or the NHSM rule is being relied upon. Recent memoranda from the NC DOJ are instructive in both contexts. Specifically, the NC DOJ memorandum of September 28, 2009 described ten factors that define whether a material is a solid waste under 40 CFR §258.2. Alternatively, the NC DOJ memorandum of July 20, 2011 defines whether a material is a solid waste in the context of the NHSM rule, and lists five factors that should be considered when making the determination under three subparts of that rule.[2]

Project as Described

PPUSA is developing a project to construct a new boiler fueled by processed used poultry litter. The project is being developed in response to the Renewable Energy and Energy Efficiency Portfolio Standards (REPS) adopted by the North Carolina state legislature in 2007. Under the REPS, North Carolina electric power suppliers are required to utilize used poultry litter as a resource to generate at least 900,000 megawatt-hours (MWh) of electricity by the year 2014.

Once operational, the PPUSA plant would produce electricity and Renewable Energy Certificates (REC) which would be sold to electric utilities and/or cooperatives. As part of the project, PPUSA plans to install a new boiler, emissions control equipment, and fuel handling, storage and processing equipment. PPUSA is currently preparing its air permit application for submission to NC DAQ. The purpose of this letter and analysis is to evaluate the proposed use of used poultry litter as fuel.

PPUSA will produce the fuel by gathering used poultry litter from nearby poultry houses and processing it into a non-solid waste fuel. Based on the description of the process, and the chemical analysis of the material, NC DAQ determines that the processed used poultry litter meets the legitimacy criteria in 40 CFR § 241.3(d)(1) and is a non-solid waste fuel pursuant to 40 CFR § 241.3(b)(4).

Analysis under 40 CFR Part 241

The NHSM definitional rule defines "processing" in 40 CFR § 241.2 as:
…any operations that transform discarded non-hazardous secondary material into a non-waste fuel or non-waste ingredient product. Processing includes, but is not limited to, operations necessary to: Remove or destroy contaminants; significantly improve the fuel characteristics of the material, e.g.,

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[2] These subparts were given as,
(1) Traditional fuels and clean cellulosic biomass (40 CFR §241.2),
(2) Fuels or ingredient products used in a combustion unit that are made from discarded materials (40 CFR §241.3(b)(4)), and
(3) Scrap tires and dewatered pulp and paper sludges (40 CFR §241.4(a)(1), and (4)).

sizing or drying 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 or the material by shredding do not constitute processing for the purposes of this definition.

PPUSA will collect used poultry litter generated from poultry farms and grow houses that are owned and operated by poultry growers in North Carolina and South Carolina. PPUSA then will prepare the used poultry litter to improve the fuel combustion properties of the used poultry litter to produce an engineered, non-solid waste fuel as follows:

- **Material Assessment & Contaminant Removal.** PPUSA personnel will visually observe each load of used poultry litter received and will physically remove observable foreign objects such as rocks and debris. The material will also be passed through a magnetic separation system to remove any ferrous metal constituents.
- **Moisture and Heat Content Testing.** PPUSA will test the moisture content of each load and determine the approximate lower heating value (LHV) of the material as received.
- **Sampling and Contaminant Level Analysis.** PPUSA will collect representative samples of the used poultry litter. The samples will be analyzed by a laboratory to determine the contaminant levels and ensure the levels are comparable to those in traditional solid fuels, including coal and biomass.
- **Storage.** Following contaminant removal and sampling, the used poultry litter will be stored. Storage of the used poultry litter will be segregated by moisture content.
- **Screening and Sizing.** PPUSA will screen the used poultry litter to produce material with the appropriate size, surface area, and density for efficient combustion in a boiler designed for solid fuel firing.
- **Blending.** The used poultry litter will be blended as needed to achieve the proper moisture and heat content for efficient combustion.

The steps listed above, including the removal of metal contaminants, sampling, testing, analysis, blending, and enhancement of fuel characteristics including size, surface area, density, and moisture content, transform the used poultry litter into a non-solid waste fuel.[3]

I. Legitimacy Criteria

Under 40 CFR § 241.3, a NHSM that is burned is a solid waste unless it can meet the criteria listed in 40 CFR §241.3(b) or 40 CFR §241.4(a). For the particular NHSM of processed used poultry litter the legitimacy criteria are given in 40 CFR §241.3(d)(1) and state that the NHSM must: (a) be managed as a valuable commodity; (b) have meaningful heat content and be used as a fuel in a combustion unit with energy recovery; and (c) contain contaminants or groups of contaminants at levels comparable in concentration to or lower than those in traditional fuels which the combustion unit is designed to burn. The used poultry litter that PPUSA proposes to burn meets each of these three criteria as detailed below.

a. Managed as a Valuable Commodity – 40 CFR 241.3(d)(1)(i)

[3] *See* Letter from Becky Weber, Director, Air and Waste Mgmt. Div., U.S. EPA, Region 7, to Mr. Gregory Haug, P.E., Resource Enterprises, LLC (Apr. 3, 2012), available at http://www.epa.gov/osw/nonhaz/define/pdfs/Lhoist-engineered-fuels.pdf.

NHSMs that are managed as a valuable commodity must not be stored for a period that exceeds reasonable time frames and must be managed in a manner that is consistent with analogous fuels (or otherwise adequately contained to prevent releases to the environment). PPUSA will store the used poultry litter in an enclosed building for a period not to exceed 90 days prior to burning the material as a fuel. PPUSA anticipates that processed fuel will typically be stored for approximately four days prior to use in the energy system. The purpose of maintaining the used poultry litter in an enclosed building is to prevent loss of the material to the environment, manage odors from the material, and limit moisture content in the fuel. The storage operations are consistent with typical management of wood chips and other biomass fuels.

b. Meaningful Heating Value – 40 CFR 241.3(d)(1)(ii)

In the preamble to the final NHSM definitional rule, the EPA indicated that materials with heat contents of less than 5,000 British thermal units per pound (Btu/lb) contain meaningful heat "if the energy recovery unit can cost-effectively recover meaningful energy from the NHSM used as fuel."[4] Factors that may be considered include "whether the facility encounters a cost savings due to not having to purchase significant amounts of traditional fuels they otherwise would need, whether they are purchasing the non-hazardous secondary materials to use as a fuel, whether the non-hazardous secondary materials they are combusting can self-sustain combustion, and whether their operation produces energy that is sold for a profit…."[5]

PPUSA analyzed the heat content of used poultry litter samples collected from poultry houses in North Carolina and South Carolina. PPUSA proposes to burn used poultry litter from these and other similarly situated poultry farms. The used poultry litter that was sampled and tested is expected to be representative of the used poultry litter that PPUSA proposes to burn. The lower heating value (as received) of the sampled material ranges between 1,917 and 5,735 Btu/lb. The average lower heating value (as received) is 3,992 Btu/lb. The average higher heating value of the used poultry litter (as received) is 4,435 Btu/lb. As a basis of comparison, the higher heating value of green wood chips (as received) on a wet basis is 4,300 Btu/lb. A summary of the data received on the heat content of the used poultry litter is provided in Attachment 1 of your November 27, 2012 submittal.

PPUSA proposes to burn the processed used poultry litter in an energy system that will be self-sustaining and able to fire the used poultry litter without the addition of supplemental fuels after startup. The energy system will cost-effectively recover meaningful energy from the used poultry litter, which will be sold at a profit to electric utilities through REC sales agreements. Because the used poultry litter will be burned in a self-sustaining combustion system to recover energy that will be sold for a profit, the material has meaningful heating value and meets the legitimacy criterion under 40 CFR 241.3(d)(1)(ii). Whether the process may or may not be profitable in the absence of the NC REPS is not considered.

c. Comparable Contaminant Concentrations – 40 CFR 241.3(d)(1)(iii)

For an NHSM to be classified as a non-solid waste fuel, it must "contain contaminants or groups of contaminants at levels comparable in concentration to or lower than those in traditional fuel(s) which

[4] 76 Fed. Reg. 15,541 (Mar. 11, 2011).
[5] 76 Fed. Reg. 15,523 (Mar. 11, 2011).

the combustion unit is designed to burn."[6] The US EPA issued a Comparable Contaminant Guidance Concept Paper indicating its intent to "address questions raised by industry, assist them in making determinations under the rule, and ensure their use of the flexibility embodied in the rule."[7] The guidance was provided on November 29, 2011, including tables that provide both a range and an average of compiled contaminant concentrations for coal, untreated wood and biomass materials, and fuel oils.[8] It is US EPA's stated intent that contaminant levels should be compared in such a manner that traditional fuel samples could not be "considered solid waste if burned in the very combustion units designed to burn them."[9] Further clarification was provided in the February 7, 2013 rule noting that "when comparing contaminant levels between NHSMs and traditional fuels, persons are not limited to comparing average concentrations. Traditional fuel contaminant levels can vary considerably and the full range of contaminant values may be used."[10] It is important to note that the traditional fuel used in the comparison need not be the traditional fuel the applicant will burn or is even permitted to burn. The only requirement is that the unit is designed to burn the traditional fuel used in the comparison.[11] This means that the unit will be subject to emission standards different, and possibly less stringent than those that would be required had the unit been permitted to burn the traditional fuel used in the comparison.

The EPA also clarified somewhat what the method of comparison used should measure. To avoid a metric comparison that would possibly define a traditional fuel itself as not meeting the legitimacy criteria, applicants should use the entire range of contaminant values of traditional fuels to compare with values in the NHSM. However, the comparison must also recognize the variability of contaminant values in the NHSM. That is, "the full range of traditional fuel contaminant values can only be used if persons also consider some measure of variability in the NHSM contaminant data."[12] It is not clear, unfortunately, whether the EPA believes that the maximum stated values provided for traditional fuels are the actual maximum values or not. Alternatively, the EPA would recognize the variability of contaminant levels in the traditional fuels.

The EPA has also approved the processing of mixed NHSM streams in which the average contaminant level of the mixture is used in the comparison rather than comparing the contaminant levels in each NHSM material stream contributing to the ultimate processed fuel. US EPA used this approach because the concentrations of the individual NHSM material streams were "not reflective of the concentration . . . in the engineered fuel products." Later the EPA affirmed that the processed mixture would be sampled and tested to confirm legitimacy. This indicates that materials may be blended in order to reduce their contaminant levels to below the traditional fuel levels. This would be distinguished from the prohibition of this method for the definition of hazardous waste (so-called "Mixture Rule"). PPUSA is similarly proposing to produce a non-solid waste fuel by collecting multiple streams of used poultry litter collected from different poultry houses in North Carolina and

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[6] 40 CFR 241.3(d)(1)(iii).

[7] US EPA, "Non-Hazardous Secondary Materials (NHSM) Rule: Comparable Contaminant Guidance Concept Paper" (July 11, 2011), available at http://www.epa.gov/osw/nonhaz/define/pdfs/nhsm-concept.pdf .

[8] US EPA, "Contaminant concentrations in Traditional Fuels: Tables for Comparison" (November 29, 2011), available at http://www.epa.gov/osw/nonhaz/define/pdfs/nhsm_cont_tf.pdf .

[9] 76 Fed. Reg. 80841 (Dec. 23, 2011). *See also* Letter from Donald R. van der Vaart, Chief, Permit Section, NC Div. Air Quality, to Mr. John Prestage, Sr. Vice President, Prestage Farms, P. 6 (July 19, 2012), available at http://www.ncair.org/permits/memos/prestage%20farms%20NHSM%20determination.pdf.

[10] 78 FR 9112 at 9144. (Feb. 7, 2013).

[11] Id. at 9145.

[12] Id. at 9152.

South Carolina. The NHSM streams will then be processed to produce the final fuel product. Nonetheless, the NC DAQ did not use the US EPA approach for the contaminant concentration analysis, but rather looked at the variability of contaminant concentrations in sampled used poultry litter streams, and compared the upper prediction limits (UPLs) to the high end of the traditional fuel levels.

The EPA has made clear that no single statistical method or test should be defined in this regard.[13] In one instance the EPA responded to a commenter who compared the 99% UPL of chlorine in pulp and paper sludge with "chlorine concentrations observed in coal."[14] In a subsequent discussion, the EPA offered as an example method that met their approval the comparison of the 90% predicted level of the contaminant in the NHSM with the maximum value in the traditional fuel.[15] Therefore, the US EPA has condoned comparing of UPLs against the maximum traditional fuel levels based on either a 99% or 90% confidence level. It is not clear whether US EPA would condone the use of a UPL based on a confidence level below 90% in this regard.

PPUSA is proposing to install and operate an energy system that is designed to burn solid fuel, including but not limited to all coal ranks (*i.e.*, anthracite, bituminous, sub-bituminous, and lignite), wood chips, timber, bark, and other biomass. The predicted contaminant levels of the processed fuel were compared to the following contaminant levels in coal, wood, and other biomass materials:

- **Metals:** Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Lead, Manganese, Mercury, Nickel, Selenium
- **Total Halogens** (including chlorine and fluorine)
- **Additional Precursors:** Nitrogen, Sulfur

Results of Comparison

There are long established statistical tests to determine whether two materials are statistically different based on samples from both material populations. However, the US EPA is simply interested in not designating a candidate NHSM as solid waste if doing so based on its contaminant level would *ever* also define the traditional fuel as a solid waste as well.[16] To this end, the US EPA has indicated that a variety of comparisons could be made. For example, the highest contaminant levels in the NHSM could be compared against the highest contaminant levels in the relevant traditional fuels. Alternatively, the average values of the NHSM could be compared with the average values of the traditional fuels. "Anything less could result in 'traditional fuel' samples being considered solid waste if burned in the very combustion units designed to burn them – not the Agency's intent in either the 2011 NHSM final rule or today's proposed rule."[17] However, using different bases for comparison could lead to different results. The US EPA warned that "[i]t would not be appropriate to compare an average NHSM contaminant value to the high end of a traditional fuel range, as the existence of an

[13] "The agency disagrees that any one statistical tool or comparison methodology will fit every situation given the variety of NHSMs, traditional fuels, contaminants and combustion units that exist." 78 Fed. Reg. 9112 at 9168.
[14] Id.
[15] Id. at 9153.
[16] Indeed, the EPA points out in its proposed rule that, for example, the coals used in a comparison need not be limited to the coal received from either the current or past suppliers. Of course, in cases where the unit is not permitted to burn coal, but is designed to burn coal, any coal rank can be considered including anthracite, lignite, bituminous, and sub-bituminous. 76 Fed. Reg. 80477 (Dec. 23, 2011).
[17] 76 Fed. Reg. 80841 (Dec. 23, 2011).

average implies multiple data points from which a more suitable statistic (*e.g.*, range or standard deviation) could have been calculated." Finally, the EPA warned that "in the context of an inspection or enforcement action, the Agency will evaluate the appropriateness of alternative methodologies and data sources on a case-by-case basis when determining whether the legitimacy criteria have been met."[18]

In this case, each predicted contaminant concentration of the processed used poultry litter is comparable to the contaminant concentrations in coal or wood. For total halogen content, the NC DAQ calculated the UPL for various confidence intervals for the total halogen content in poultry litter on an as-fired basis. Total halogens in used poultry litter is predominately comprised of chlorine.

UPL Confidence Level	Total Halogens, ppm at 28% moisture by weight
90	8,275
95	8,870
99	10,093

According to EPA responses to comments, these values should be compared with the maximum observed total halogen content for coal on an as-fired basis, which is 8,610 ppm at 7% moisture by weight.[19] The UPL of total halogens in used poultry litter based on a 90% confidence level is below the maximum concentration of total halogens in coal. Therefore, the total halogen concentration in used poultry litter is comparable to coal, and the material is not a solid waste. Since the poultry litter satisfies this criterion under 40 CFR §241.3 there is no reason to consider used poultry litter under the definition of solid waste under 40 CFR §258.2.

Conclusion

As described in the letters received from you or on your behalf, the used poultry litter does meet the legitimacy criteria provided in 40 CFR § 241.3(d)(1). Therefore, the NC DAQ has determined that it is not a solid waste when used as fuel in a combustion unit. As a result of this determination, the proposed boiler would not be subject to the combustion source emission standards promulgated pursuant to Section 129 of the Clean Air Act. If you have any questions regarding this determination, please contact me at (919) 707-8475.

Sincerely,

Donald R. van der Vaart, Ph.D., J.D., P.E.
Chief

cc: Fayetteville Regional Office
Central Files

[18] 76 Fed. Reg. 80482-3. (Dec. 23, 2011).

[19] Note that the EPA approved the comparison of the UPL of the NHSM with the maximum value for the traditional fuel rather than with the UPL of the traditional fuel.