



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

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Governor

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Director

Dee Freeman
Secretary

August 31, 2012

Mr. Sam McLamb
Principal
AHP Financial Services, LLC
825 Merrimon Avenue, #377
Asheville, NC 28804

SUBJECT: Applicability Determination No. 2063 – Secondary Material Determination
AHP Financial Services, LLC – Long Branch Steam Plant
Harmony, Iredell County

Dear Mr. McLamb:

The North Carolina Division of Air Quality (NC DAQ) received your letter dated May 23, 2012 summarizing your analysis of used poultry bedding from poultry houses. The NC DAQ received additional information in an e-mail dated July 25, 2012. AHP Financial Services, LLC – Long Branch Steam Plant (AHP) is proposing to burn used poultry bedding as a fuel in a new gasification/combustion (boiler) system that will provide steam to an existing rendering plant owned by Tyson Foods, Inc. located in Harmony, Iredell County, North Carolina. The boiler will be used to generate steam for the feed manufacturing process and to produce electricity for distribution.

Used poultry bedding 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 bedding described in the letters referenced above is processed, and meets the legitimacy criteria provided in 40 CFR 241.3(d)(1). The NC DAQ has determined, therefore, that the material is not a solid waste when used as fuel in a combustion unit.

Processing of Discarded NHSM – 40 CFR 241.3(b)(4)

Pursuant to 40 CFR 241.2, “processing” means any operations that transform discarded NHSM into a non-waste fuel. “Processing” includes, but is not limited to, operations necessary to: remove or destroy contaminants; significantly improve fuel characteristics of the material, *e.g.* sizing or drying the material in combination with other operations; or chemically improve the as-fired energy content. Minimal operations that result only in modifying the size of the material by shredding do not constitute processing for purposes of this definition. “Secondary material” means any material that is not the primary product of a manufacturing or commercial process, and can include post-consumer material, off-specification commercial chemical products or manufacturing chemical intermediates, post-industrial material, and scrap.

Permitting Section

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The used poultry bedding that AHP proposes to burn is generated from poultry houses owned by poultry growers in region. AHP proposes to significantly improve the fuel combustion properties of the used poultry bedding in order to produce an engineered fuel prior to use in the gasification/boiler system. AHP will improve the fuel characteristics of the material through sampling/testing, screening (removal of materials), sizing, grinding and blending. Each load of used poultry bedding will be sampled and tested for moisture content and approximate heat value. Large physical materials will be removed manually and by mechanical screening. Ferrous metal substances will be removed by passing the material through a magnetic separation system. Quality assurance testing on representative samples on a batch basis will ensure that contaminant levels are comparable to or less than those found in traditional fuels which the system is designed to burn. Then the used poultry bedding will be separated by moisture content and stored in an appropriate enclosed building for less than 90 days. Finally, the stored used poultry bedding fuel will be blended to ensure adequate consistency in moisture and energy content, and limit emissions from combustion.

The NC DAQ has determined that the processing steps described above meet the regulatory definition of “processing” in 40 CFR 241.2 with further support from a recent EPA determination of proposed NHSM fuels.¹

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

AHP will store the used poultry bedding in an enclosed building prior to using it as a fuel to prevent moisture uptake in the material and to control potential odors from the used poultry bedding. Use of enclosed storage areas, particularly to limit moisture intake, is consistent with typical management of wood chips and other biomass fuels. In addition, AHP has indicated that it will store the used poultry bedding for less than 90 days prior to burning the material as a fuel. The NC DAQ concludes that these management practices satisfy the requirement that the NHSM be managed as a valuable commodity, and if so managed, the used poultry bedding meets the legitimacy criterion pursuant to 40 CFR 241.3(d)(1)(i).

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

In the preamble to the final NHSM definitional rule, US EPA indicated that materials with a heat content of at least 5,000 Btu/lb presumptively satisfy this criterion.² However, materials with lower heat contents may also satisfy the criterion on a case-by-case basis by showing that “the energy recovery unit can cost-effectively recover meaningful energy from the non-hazardous secondary materials used as fuels.”³ Factors that may be considered in this case-by-case analysis 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 burning can self-sustain combustion, and whether their operation produces energy that is sold for a profit....”⁴

AHP analyzed a composite sample of used poultry bedding collected from a poultry house at Anderson Farm in North Carolina. AHP intends to acquire used poultry bedding from Anderson Farm

¹ See Letter dated April 3, 2012 from Becky Weber, Director, Air and Waste Management Division, US EPA Region 7, to Mr. Gregory Haug, PE of Resource Enterprises, LLC.

<http://www.epa.gov/osw/nonhaz/define/pdfs/Lhoist-engineered-fuels.pdf>

² 76 Fed. Reg. 15,523 (Mar. 11, 2011).

³ *Id.*

⁴ *Id.*

and other similar farms. Used poultry bedding from Anderson Farm is considered to be representative of used poultry bedding that will be supplied by other farms. In addition, AHP stated that the used poultry bedding analysis previously provided to NC DAQ by Prestage Farms (Prestage) is also representative of the used poultry bedding that AHP intends to burn. See NC DAQ Applicability Determination No. 1887 for Prestage (<http://daq.state.nc.us/permits/memos/prestage%20farms%20NHSM%20determination.pdf>). Because AHP (similar to Prestage) is not intending to dry the material prior to burning it as a fuel it is appropriate to look at the lower heating value (LHV) of the material. The LHV of the Anderson Farm sample is 4,340 British thermal units per pound (Btu/lb) as received. The LHV of the Prestage sampled material varies between 2,970 and 4,613 Btu/lb. For AHP and Prestage combined the average heating value is 3,791 Btu/lb, and the median heating value is 3,757 Btu/lb. As a basis of comparison, the heat content of green wood chips on a wet basis is 4,300 Btu/lb. A summary of the data received on the heat content of the used poultry bedding is provided in Attachment 1 to this letter.

Because the used poultry bedding has an average heat content below 5,000 Btu/hr (approximately 3800 Btu/lb), the proposed boiler must be able to cost-effectively recover meaningful energy from the material to satisfy this legitimacy criterion. In your letter and subsequent correspondence, you indicate that the proposed boiler would be self-sustaining and able to fire the used poultry bedding without the addition of supplemental fuels. Further, you indicate that the used poultry bedding will cost less than wood chips, and that electricity generated from its combustion will be eligible under North Carolina's Renewable Energy Standard for sale with incentives. The NC DAQ has determined that, because the used poultry bedding can be used in a self-sustaining combustion system to recover energy at a cost that is comparable to the cost of generating energy using a traditional fuel, the material has meaningful heating value and meets the legitimacy criterion under 40 CFR 241.3(d)(1)(ii).

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

In order for a NHSM to be classified as a non-solid waste fuel, it must “contain contaminants *at levels comparable in concentration to or lower than* those in traditional fuels which the combustion unit is designed to burn.”⁵

Contaminants

A contaminant is defined as “any constituent in a non-hazardous secondary material *that will result in emissions* of the air pollutants identified in the Clean Air Act section 112(b) or the nine pollutants listed under Clean Air Act section 129(a)(4) when such non-hazardous secondary material are burned as fuel or used as an ingredient, including those constituents that could generate products of incomplete combustion.”⁶ This definition could be interpreted to include (1) chemical pollutants that are present within the NHSM that may be emitted as regulated air pollutants during the combustion process⁷, (2) chemicals that are not regulated air pollutants, but which may form air pollutants during the combustion process⁸, and (3) chemicals that are not regulated pollutants, but which may promote the formation of air pollutants during the combustion process.⁹ In response to comments in the final NHSM

⁵ 40 CFR 241.3(d)(1)(iii) (March 23, 2011) (*emphasis added*).

⁶ 40 CFR 241.1 (March 23, 2011) (*emphasis added*).

⁷ *Example*: Regulated toxic metals in the NHSM may be emitted in the form of particulate matter. Toxic metals include antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and selenium.

⁸ *Example*: Sulfur in the NHSM may be emitted as sulfur dioxide (SO₂), which is a pollutant listed under CAA § 129(a)(4).

⁹ *Example*: Copper “significantly enhance[s] the yield of [dioxins]” (see references below). Therefore, the presence of copper in the NHSM may result in the emission of these pollutants, which are listed under CAA § 129(a)(4). For

rule the EPA noted in the context of pulp and paper sludge that “high chlorine levels are an indicator that the combustion of such materials may result in increased emissions of dioxins and furans, such that if chlorine levels in pulp and paper sludges are excessively high, it may be an indication that the burning of those sludges is more reflective of waste management. Thus, chlorine levels in pulp and paper sludges should particularly be monitored and evaluated as part of a plants determination that their pulp and paper sludges meet the contaminant legitimacy criterion.”¹⁰

Since the final rule was promulgated the US EPA has indicated that it did not intend for the definition of contaminants to be so broadly interpreted. On December 23, 2011, the US EPA proposed a revision to the contaminant definition “to clarify what will be considered contaminants for the purposes of the legitimacy criteria.”¹¹ The US EPA proposed including a specific list of pollutants and precursors that fall within the definition of “contaminants” in place of the existing definition that includes constituents that would result in emissions of air pollutants.¹² In the preamble to the proposed rulemaking, US EPA repeatedly asserts that the revised language is only intended to clarify the intent of the March 2011 rule and that the Agency does “not expect this change to affect any of the decisions previously made on whether NHSMs are solid wastes when burned as fuels.”¹³

In communications with the NC DAQ, the US EPA reaffirmed its intent to define contaminants in the narrower manner described in the proposed revision. Specifically, the NC DAQ sought the US EPA’s guidance on whether copper¹⁴ should be considered a contaminant under the current rule because it is a catalyst for the formation of dioxins.¹⁵ The US EPA believes it is appropriate to include chemicals that form air pollutants (e.g., chlorine, fluorine, nitrogen, and sulfur) within the definition of contaminants, but had not thought of copper as a contaminant to date. “Regulating copper as a contaminant based on its role in dioxin formation would take that logic [of including precursors] even further and would likely be more difficult. Copper doesn’t turn into dioxin. It may facilitate it, but the extent to which that is true depends heavily on temperature, chlorine concentrations and other combustion conditions that are independent of the waste determination that must be made under the NHSM rule.”¹⁶ While the US EPA acknowledged that “[c]opper could potentially be considered a contaminant under the current rule (although it would be

information on the efficacy of copper in catalyzing the formation of Dioxin/Furnas, see for example, http://www.epa.gov/ncea/pdfs/dioxin/2k-update/pdfs/Dioxin_Chapter_2.pdf.

¹⁰ 76 FR 15489.

¹¹ 76 Fed. Reg. 80470 (Dec. 23, 2011).

¹² The proposed definition is as follows: “*Contaminants* means all pollutants listed in Clean Air Act sections 112(b) and 129(a)(4), with modifications outlined in this definition to reflect constituents found in non-hazardous secondary materials prior to combustion. The definition includes the following elemental contaminants that commonly form Clean Air Act section 112(b) and 129(a)(4) pollutants: Antimony, arsenic, beryllium, cadmium, chlorine, chromium, cobalt, fluorine, lead, manganese, mercury, nickel, nitrogen, selenium, and sulfur. The definition does not include the following Clean Air Act section 112(b) and 129(a)(4) pollutants that are either unlikely to be found in non-hazardous secondary materials prior to combustion or are adequately measured by other parts of this definition: Hydrogen chloride (HCl), chlorine gas (Cl₂), hydrogen fluoride (HF), nitrogen oxides (NO_x), sulfur dioxide (SO₂), fine mineral fibers, particulate matter, coke oven emissions, diazomethane, white phosphorus, titanium tetrachloride, m-cresol, o-cresol, p-cresol, m-xylene, o-xylene, and p-xylene.” See 76 Fed. Reg. 80529 (Dec. 23, 2011).

¹³ 76 Fed. Reg. 80470 (Dec. 23, 2011).

¹⁴ Used poultry litter would be expected to have higher copper concentrations than wood since copper sulfate is a feed supplement for poultry.

¹⁵ See the United States EPA reassessment of Dioxin at http://www.epa.gov/ncea/pdfs/dioxin/2k-update/pdfs/Dioxin_Chapter_2.pdf (last visited May 24, 2012).

¹⁶ E-mail from George Faison (US EPA) to Donald van der Vaart (NC DAQ), dated April 24, 2012.

a stretch),” it indicated that copper could not be considered a contaminant under the proposed revised definition because it is not included in the specific list of precursors.¹⁷

Based on these representations from the US EPA, both on the catalytic effects of copper as well as the current rule’s interpretation, the NC DAQ reviewed the concentrations of the following contaminants without including copper in the used poultry bedding:

- **Metals:** Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Lead, Manganese, Mercury, Nickel, Selenium, Silver, and Zinc
- **Halogens:** Chlorine, Fluorine
- **Additional Precursors:** Nitrogen, Sulfur

Designed, not Permitted to Burn

To determine whether a NHSM satisfies the legitimacy criteria, the current rule requires that the contaminant levels in the NHSM be compared against the levels in “traditional fuels which the combustion unit is designed to burn.”¹⁸ The current rule is silent as to whether the traditional fuels used in the comparison should include all fuels that the combustion unit is capable of burning, or whether it is limited to those fuels that the combustion unit is legally allowed to burn. However, US EPA has subsequently made it clear both through communications with the NC DAQ and in subsequent proposed rulemaking, that the contaminant comparison should be based on what the combustion unit is simply capable of burning.¹⁹ Thus, according to the EPA while the combustion unit used to burn used poultry bedding will be permitted as a biomass boiler, the used poultry bedding can be compared with coal for the purposes of meeting the legitimacy criteria.²⁰

Further, following the publication of the final NHSM rule in the Federal Register, the US EPA issued a 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.”²¹ The Agency forecasted that the guidance would include a compilation of data it had collected on contaminant levels in traditional fuels which could be used by industry and other interested parties in the contaminant level comparison.

¹⁷ E-mail from George Faison (US EPA) to Donald van der Vaart (NC DAQ), dated April 25, 2012.

¹⁸ 40 CFR 241.3(d)(1)(iii) (March 23, 2011).

¹⁹ E-mail from George Faison (US EPA) to Donald van der Vaart (NC DAQ), dated May 2, 2012 (indicating that the contaminant levels in the NHSM “should be compared to what traditional fuel the unit is [burning] or CAN burn, not what it is permitted for.”; 76 Fed. Reg. 80530 (Dec. 23, 2011) (proposing to revise 40 CFR 241.3(d)(1)(ii) to indicate that, “In determining which traditional fuel(s) a unit is designed to burn, persons can choose a traditional fuel that can be or is burned in the particular type of boiler, whether or not the combustion unit is permitted to burn that traditional fuel.”

²⁰ If a combustion unit is designed to burn both wood and coal, the EPA interprets the current rule to say that the contaminant concentrations of both wood and coal can be compared with those of the NHSM. However, if based on that comparison the material is found to meet the legitimacy criteria, the combustion unit would not be regulated under CISWI, but instead under the Part 63 MACT program. The standards under that program depend solely on the fuel the unit is permitted rather than simply designed to burn. This means that a combustion unit may be regulated under less stringent standards than those the unit is designed to burn. Thus, allowing the comparison to be made with the “as designed” fuel rather than the “as permitted” fuel may not ensure the unit’s emission standards will correspond to the comparison fuel.

²¹ US EPA, “Non-Hazardous Secondary Materials (NHSM) Rule: Comparable Contaminant Guidance Concept Paper” (July 11, 2011). <http://www.epa.gov/osw/nonhaz/define/pdfs/nhsm-concept.pdf>

The guidance was provided by US EPA on November 29, 2011. It consists of three tables that provide a range of compiled contaminant concentrations for coal, untreated wood and biomass materials, and fuel oils.²² The table does not distinguish between concentration levels of different coal ranks (i.e., anthracite, bituminous, sub-bituminous, and lignite) or different types of biomass (i.e., wood, bark, biogas, hogged fuel, and agricultural plant residues).²³ This approach is consistent with the NHSM rule revisions that US EPA proposed on December 23, 2011. The US EPA is proposing to codify the meaning of “designed to burn” to include “a traditional fuel that can be or is burned in the particular type of boiler, whether or not the combustion unit is permitted to burn that traditional fuel.”²⁴ In the preamble, the US EPA further clarifies that comparisons to contaminant levels in coal could include data on all coal ranks and comparisons to wood and biomass materials could include data on untreated lumber, timber, bark, biomass, and hogged fuel.²⁵ In communications with NC DAQ, the US EPA confirmed that the language in the proposed rule is consistent with their interpretation of the current rule and that “we [EPA] do not differentiate between ‘ranks’ of coal for comparison purposes; thus any rank of coal can be used.”²⁶

AHP is proposing to burn the used poultry bedding in a new gasification/boiler system. You have indicated that the boiler system will be designed to burn solid fuels, including coal and wood. In accordance with US EPA’s interpretation of “designed to burn,” the NC DAQ compared the concentrations of contaminants in the used poultry bedding to the contaminant levels in coal and wood and biomass materials as provided in the November 29, 2011 guidance document and literature values.

Results of the Contaminant 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.²⁷ 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.”²⁸ 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 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

²² US EPA, “Contaminant concentrations in Traditional Fuels: Tables for Comparison” (November 29, 2011). http://www.epa.gov/osw/nonhaz/define/pdfs/nhsm_cont_tf.pdf

²³ This, despite the fact that a coal fired boiler is designed differently based on the rank of coal it will burn.

²⁴ 76 Fed. Reg. 80530 (Dec. 23, 2011).

²⁵ 76 Fed. Reg. 80481 (Dec. 23, 2011).

²⁶ E-mail from George Faison (US EPA) to Donald van der Vaart (NC DAQ), dated April 24, 2012.

²⁷ 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).

²⁸ 76 Fed. Reg. 80841 (Dec. 23, 2011).

whether the legitimacy criteria have been met.”²⁹ The NC DAQ chose to use both maximum values and averages in this comparison. The vast number of samples available for coal obviated the need for the NCDAQ to estimate its distribution.

AHP analyzed the contaminant levels in composite samples of used poultry bedding collected from Anderson Farm. A summary of the measured contaminant levels and the contaminant levels in coal and wood and biomass materials is provided in Attachment 2 to this letter. For many contaminants the results show that the measured contaminant levels in the used poultry bedding are within the range of contaminant concentrations in the traditional fuels that the new boiler system will be designed to burn (both using maximum values and averages). In the case of manganese, the manganese content of used poultry bedding from Anderson Farm is 507 ppmvd which is higher than the average manganese content of either wood or coal. However, the “comparison” test is not limited to the ultimate analysis of the as-fired material. Rather EPA has acknowledged that emission rates can be considered as one factor of the comparison test, and therefore, NC DAQ employed a de minimis emission rate approach for comparability. The de minimis approach consisted of estimating the potential emission rate of each contaminant and comparing that rate to the federal EPA’s de minimis emission rates developed using air dispersion modeling and ambient health based data to establish emission rates that EPA considers trivial for regulatory purposes. The expected emission rate (0.00476 tons per year) of manganese from the combustion of this used poultry bedding fuel was below the respective EPA de minimis emission rate (0.8 tons per year).

The measured chlorine (Cl) content in the used poultry bedding from AHP was 7,118 ppmvd. Since AHP stated that the used poultry bedding from Prestage was representative of the used poultry bedding that would be burned, the NC DAQ based the Cl contaminant comparison on the combined values from both AHP and Prestage. The highest measured Cl content in the used poultry bedding from Prestage was 8,647 ppmvd, which is lower than the upper range of Cl content in coal (9,080 ppmvd), but the average Cl content (8278 ppmvd) was significantly higher than the average Cl content in coal (992 ppmvd). However, the maximum predicted Cl value from the Prestage analysis was 9750 ppmvd and this is within 10% of the maximum value for coal, and therefore the NCDAQ determined the Prestage Cl contaminant levels were comparable for NHSM purposes.³⁰ In this case, the AHP sample was 7,118 ppmvd, and this value is expected to further reduce the maximum predicted value. Following the EPA’s determination of engineered fuel products, the NC DAQ believes the less than 10% difference between these values constitutes comparability. Based on the Cl concentration values from the AHP and Prestage samples, the NC DAQ concludes that Cl contaminant levels are comparable for NHSM purposes.

The measured nitrogen (N) content in the used poultry bedding from AHP was 46,800 ppmvd. Since AHP stated that the used poultry bedding from Prestage was representative of the used poultry bedding that would be burned, the NC DAQ based the N contaminant comparison on the combined values from both AHP and Prestage. Using the three data points (46,800 ppmvd from AHP, and 34,400 ppmvd and 30,000 ppmvd from Prestage) of N content in the used poultry bedding the maximum predicted N value for the used poultry bedding is less than the maximum predicted N value for coal. Therefore the NC DAQ concludes that the N contaminant levels are comparable for NHSM purposes.

²⁹ 76 Fed. Reg. 80482-3. (Dec. 23, 2011).

³⁰ See April 3, 2012 determination from Becky Weber, Director, Air and Waste Management Division, US EPA Region 7, to Mr. Gregory Haug, PE of Resource Enterprises, LLC.

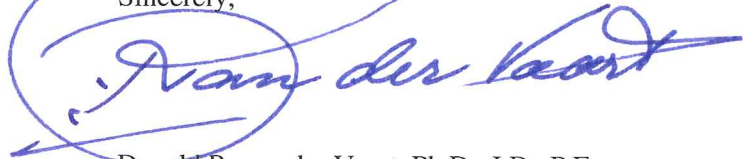
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Given the comparability of all relevant contaminants between coal and used poultry bedding as characterized by your submittal, the NC DAQ has determined that the used poultry bedding does meet the legitimacy criteria under 40 CFR 241.3(d)(1)(iii).

Conclusion

As described in the letters received by you or on your behalf on May 23, 2012 and July 25, 2012, the used poultry bedding is processed and 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 will 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 NHSM determination, please contact me at (919) 707-8475.

Sincerely,



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

Attachments

c: Mooresville Regional Office
Central Files

Attachment 1: Heat Contents of Used Poultry Bedding

Sample Source	Sample ID No.	Higher Heating Value (HHV) Btu/lb	Moisture Content ¹ % by Weight	Lower Heating Value ² (LHV) Btu/lb
NC - Breeder Dark Out	120	5,226	23.55%	4,602
	121	5,244	25.62%	4,613
	122	5,712	17.83%	5,117
NC Breeder Laying	130	4,355	18.61%	3,848
	131	4,286	28.39%	3,685
NC Tom Grow Out	142	3,888	42.32%	3,176
NC Tom w/ Brooder	150	3,813	48.31%	3,048
	151	3,726	48.33%	2,970
	152	3,930	41.98%	3,223
NC Light Hen	160	4,127	37.56%	3,442
	161	4,588	30.60%	3,941
	162	4,744	28.72%	4,113
NC Heavy Hen	170	4,882	31.75%	4,221
	171	3,851	42.63%	3,142
	172	4,396	25.58%	3,829
NC Composite	11/16-17	4,283	32.32%	3,655
SC Prestage	11/16	3,890	33.63%	3,274
AHP – Anderson Farm	4.2.2012	4,913	21.76%	4,340
Range:		3,726 - 5,712	17.83% - 48.33%	2,970 - 5,117
Average:		4,436	32.20%	3,791
Median:		4,321	31.18%	3,757

1. All moisture contents were measured from the samples as received.

2. Because AHP (and Prestage) is (are) not proposing to dry the used poultry bedding prior to firing, it is appropriate to use the LHV when determining whether the material has a meaningful heating value within the meaning of 40 CFR 241.3(d)(1)(ii).

Attachment 2: Contaminant Level Comparison for Used Poultry Bedding

Unless otherwise provided, all measurements in parts per million on a dry basis (ppmv). Highest contaminant levels are shaded orange.

ND = Non-Detect

TRADITIONAL FUELS - Tables for Comparison ¹									
Contaminant	Coal ²			Wood & Biomass Materials			AF ³	AHP	Note
	Range	Average	ND Rate	Range	Average	ND Rate			
Metals									
Antimony	ND - 6.9	1.7	25%	ND - 6.0	0.9	45%	<0.62	< traditional fuel average	
Arsenic	ND - 174	8.2	8%	ND - 298	6.3	57%	5.6	< traditional fuel average	
Beryllium	ND - 206	1.9	12%	ND - 10	0.3	69%	<0.12	< traditional fuel average	
Cadmium	ND - 19	0.6	38%	ND - 178	0.6	32%	<0.12	< traditional fuel average	
Chromium	ND - 168	13.4	1%	ND - 340	5.9	14%	7.1	< traditional fuel average	
Cobalt	ND - 25.2	6.9	8%	ND - 213	6.5	23%	2.4	< traditional fuel average	
Lead	ND - 148	8.7	5%	ND - 229	4.5	28%	1.4	< traditional fuel average	
Manganese	ND - 512	26.2	<1%	ND - 15800	302	<1%	507	< EPA de minimis value	
Mercury	ND - 3.1	0.09	5%	ND - 1.1	0.03	22%	(4.76 E-3 tpy)	(0.8 tons per year)	
Nickel	ND - 730	21.5	<1%	ND - 175	2.8	17%	<0.0053	< traditional fuel average	
Selenium	ND - 74.3	3.4	22%	ND - 9.0	1.1	69%	8.1	< traditional fuel average	
Silver		No data available			No data available		<0.62	No data available	
Zinc		No data available			No data available		467	No data available	
Copper	ND - 275.4 ⁴	20.47		0.3 - 400 ⁵	22.28		195 - 570.5 ^{6,7,8}	Literature (not measured)	
Halogens									
Chlorine	ND - 9,080	992	4%	ND - 5,400	259	5%	7118 ⁹	See discussion in Applicability Determination	
Fluorine	ND - 178	64.0	9%	ND - 128	32.4	43%			
Precursors									
Nitrogen	13,600 - 54,000	15,090	0%	2,200 - 4,600	3460	0%	46,800	See discussion in Applicability Determination	
Sulfur	740 - 61,300	13,580	0%	ND - 6,100	704	5%	10,200	< traditional fuel average	

1. U.S. EPA's Contaminant Concentrations in Traditional Fuels: Tables for Comparison (Nov. 29, 2011). http://www.epa.gov/wastes/nonhaz/define/pdfs/nhsm_cont_tf.pdf

2. Includes data for anthracite, bituminous, sub-bituminous, and lignite coal.

3. Sample collected from Anderson Farm operations on April 27, 2012. Included in AHP's May 23, 2012 submittal.

4. West Virginia Geological and Economic Survey, Copper (Cu) Summary Statistics. <http://www.wvgs.wvnet.edu/www/datastat/te/Cuhist.htm> (last visited May 21,

2012).

5. ECN Phyllis NL Biomass database. <http://www.ecn.nl/phyllis/ntamulti.asp> (last visited May 24, 2012).
6. John P. Chastain, et. al., Poultry Manure Production and Nutrient Content. See at
7. NCSU, Soil Facts, Poultry Manure as a Fertilizer Source. See at <http://www.soil.ncsu.edu/publications/Soilfacts/AG-439-05/> (last visited May 8, 2012).
8. Robert L. Woods, Poultry Litter - Nutrient Content and Value. See at http://www.ok-littermarket.org/upload/Poultry_Litter_nutrient_content.doc (last visited May 8, 2012).
9. Chlorine and fluorine were reported as total halogens. Total halogens (5569 ppmw) reported on wet weight basis in Summit lab report but converted to dry weight basis using reported moisture content (21.76%). Included in the May 23, 2012 submittal.