



DELHI CHARTER TOWNSHIP

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June 16, 2011

Ms. Julie Gevrenov
Environmental Engineer
US EPA Region 5
Ralph Metcalfe Federal Building
77 West Jackson Boulevard
Mail Code: LM-8J
Chicago, IL 60604

RE: Application for a Non-Waste Determination for
Processed Sludge from Delhi Charter Township's Wastewater Treatment Plant (WWTP)

Dear Ms. Gevrenov:

Consistent with 40 CFR §241.3(c), Delhi Charter Township, Department of Public Services (the Township) is requesting a non-waste determination material exemption for processed sludge (WWTP sludge) when combusted as fuel in an industrial boiler as described below.

The Township can show the discarded non-hazardous secondary material (sewage sludge) will be sufficiently processed to produce a legitimate fuel product and the resulting new material meets the legitimacy criteria.

Background

The Township is requesting a non-waste determination for processed WWTP sludge that is intended to be re-used as boiler fuel at the Michigan State University (MSU) T.B. Simon Power Plant located in Ingham County, Michigan. MSU desires the use of the processed sludge as part of their supplemental biomass fuel stock to generate electricity and industrial steam. The T.B. Simon Plant, a combined heat and power plant consists of three pulverized coal/natural gas-fired steam electric cogeneration units (Units 1-3), one coal/natural gas-fired circulating fluidized bed steam electric cogeneration unit (Unit 4), associated coal, ash and limestone storage and handling

equipment, and a natural gas-fired turbine and heat recovery steam generator with a natural gas-fired duct burner. Prior to the promulgation of 40 CFR Part 241 earlier this year, MSU had submitted a permit to install (PTI) application proposing to use a family of biofuels that will replace up to 5 percent coal by weight in Units 1, 2, and 3, and up to 30 percent by weight in Unit 4. The family of biofuels outlined in MSU's PTI application included processed sludge from the Delhi Township Waste Water Treatment Plant; the processed sludge is intended to be used as biomass fuel in Unit 4.

Exemption from Classification as Solid Waste

In order to address certain requirements of the newly issued federal regulations found at 40 CFR §241.3(b)(4) published in the Federal Register on March 21, 2011 we have prepared this letter requesting a non-waste determination for the processed sludge from the Township's WWTP as an effective substitute for traditional fuel materials as one of the biomass fuels that will replace portions of the coal fuel burned at MSU's T.B. Simon power plant.

According to 40 CFR §241.3(b)(4), when used in a combustion unit "fuel . . . produced from the processing of discarded non-hazardous secondary materials and that meet the legitimacy criteria specified in paragraph (d)(1) of this section, with respect to fuels . . ." are not solid wastes when combusted.

Sufficient Processing (40 CFR §241.3(b)(4))

In support of this request for a non-waste determination, we are providing the following summary information to document the processing steps used to produce the biofuel product and information to demonstrate that the processed sludge satisfies the processing criteria for discarded non-hazardous secondary materials consistent with 40 CFR §241.3(b)(4).

The Township's WWTP sludge is processed (and/or discharges of hazardous materials to the WWTP are controlled) according to the following steps:

- Rag removal
 - Rag removal is currently being significantly upgraded at the WWTP.

- The new process, which will be on line before fuel processing begins, will consist of fine screening with 3 millimeter exclusion size.
- Fine screening will remove plastic, latex, paper, cigarette butts, fabric, leaves, corn, and any other solids larger than 3 mm in size.
- Fine screening is NOT a common practice at wastewater treatment plants. Typically the exclusion size ranges from 6 to 51 mm.
- In addition, fine screening will eliminate “stringy” material and improve sludge quality.
- ***This treatment will remove solid materials, reducing pollutant concentrations of the sludge.***
- Grit removal
 - Grit removal consists of an aerated tank (to keep organic waste in suspension and thus not removed while the heavier inorganic particles settle to the bottom of the tank), an air lift pump (to convey the inorganic and thus “non fuel value” solids), and a grit classifier (to remove the grit from the system and deposit it in a dumpster).
 - ***This treatment also removes inorganic solids containing heavy metals and increases the fuel value of the product.***
- Anaerobic Digestion
 - The Township has constructed a biosolids digester system incorporating heat recovery and electrical power generation. The sludge processing incorporates a two-phase thermophilic/mesophilic anaerobic digestion system that generates methane while processing the biosolids to Class A, the highest sludge classification.
 - This treatment removes pathogenic organisms making the fuel safe for human handling.
- Dewatering (to be constructed)
 - Dewatering of digested sludge from 1.5 to 2% total solids to approximately 20% total solids by addition of a water treatment polymer and use of a screw or rotary press dewatering system.

- This treatment process increases the fuel value of the product; however due to the remaining moisture content, it does not increase it enough to be a fuel “as fired”. The “as fired” fuel content of dewatered sludge will be approximately 1400 Btu/lb.
- Drying and milling (to be constructed)
 - Solar radiation combined with mechanical tumbling will create a homogeneous granular “pellet like” solid product with a total solids content of at least 75%. At this moisture content and consistency, it can be mixed with coal and fed to the boiler directly “as is”.
 - This further processing of sludge is very unique for wastewater treatment facilities in the United States as there are only approximately 15 others.
 - ***This process is identical to the sewage sludge processing cited in 75 FR 31878 except solar energy will be used instead of natural gas. Both 75 FR 31878 and 76 FR 15488 declare this treatment to be “sufficient processing”.***
- Up-Stream pollutant reducing “processes” or source reduction of pollutants. The Township conducts several programs to reduce the pollutant content of its sludge:
 - Industrial Pretreatment Program (with stringent metal limits)
 - This program consists of calculating local limits for pollutant concentrations and making sure all users do not exceed them.
 - Failure to comply with discharge standards includes many levels of enforcement up to and including disconnection from the system.
 - The pollutant restrictions are based on the most stringent limiting factor.
 - For sludge quality, the Township has elected to regulate heavy metal discharges based on the most stringent (or lowest) resulting sludge concentrations.
 - Resultant metal discharge limits are very low compared to the majority of other wastewater treatment plants.
 - ***This “process” reduces the pollutant concentration of the sludge.***
 - Mercury minimization program
 - The Township monitors all suspected mercury sources as well as randomly selected locations in the sewer system for mercury.

- If mercury is detected, the Township works with the discharger to eliminate sources of mercury and put in place best management practices to reduce mercury discharge to the sewer.
- ***This “process” reduces the mercury concentration of the sludge.***
- Mercury thermometer exchange program
 - To reduce the possibility of accidental discharge of mercury from homes, the Township has (at no charge to the citizen) exchanged hundreds of digital thermometers for mercury containing thermometers.
 - ***This “process” reduces the mercury concentration of the sludge.***
- Pharmaceutical collection
 - Delhi has held one drug take back collection and has scheduled a second.
 - This program allows citizens to drop off ANY pharmaceutical for free.
 - The program eliminates those materials from entering the collection system and contaminating the sludge.
 - ***This “process” reduces the pollutant concentration of the sludge.***
- Hazardous waste collection available through Ingham County programs
 - This program offers a free outlet to citizens for liquid pollutants such as lead based paint, solvent based paints, pesticides, herbicides, flammable liquids, acids, and bases OTHER THAN flushing them or discharging to the sewer.
 - ***This “process” reduces the pollutant concentration of the sludge.***
- Used fluorescent bulb collection available through Ingham County programs
 - Fluorescent bulbs are a source of mercury
 - If a bulb breaks and a person cleans the area with water; mercury enters the sewer.
 - Offering a safe place to discard the bulbs eliminates the possibility of breakage and contamination.
 - ***This “process” reduces the mercury concentration of the sludge***

Legitimacy Criteria (40 CFR §241.3(d)(1))

• ***Managed as a Valuable Commodity (40 CFR §241.3(d)(1)(i))***

- The Township's biofuel product will be managed at the power plant identically as coal
 - The product will be delivered to the power facility and offloaded into the coal containment floor where it will be mixed with the coal / other biomass that will be burned on the day of delivery.
 - When fuel processing begins and a sufficient quantity of sludge has been processed, the material is intended to be transported to MSU and used as part of the biofuel mixed with the coal that will be burned on the day the material is delivered.
 - The blended fuel will be pushed into the day fuel bin and combusted within 24 hours of delivery
- The product will be adequately contained to prevent releases to the environment
 - The solar dryer is a greenhouse; hence the product will be contained and prevented from release to the environment
 - A concrete bunker will be constructed at one end of the green houses, protecting the processed material and minimizing losses by containing all processed materials.
 - The power plant fuel handling facility is covered and sheltered from the elements.
 - The biofuel will be transported in covered containers/trucks
- The product will only be stored for a reasonable time frame
 - The product will only be stored in the dryer bunker until a sufficient quantity for transport is accumulated.
 - Depending on seasonable variations, transportation may take place multiple times daily down to every few months.
- The biofuel will be sold to the power plant; the price will be reflective of the Btu content vs. coal and processing costs

- ***Meaningful Heating Value and Use as a Fuel (40 CFR §241.3(d)(1)(ii)) and Preamble Section VII.H.***

- The biofuel will have, on average, greater than 5,000 Btu/pound “as fired” heating value
 - The biofuel product has been tested multiple times for calorific value. The “as fired” content will change depending on the final product dryness.
 - The power plant has required the dryness to be *at least* 75%
 - Typical product dryness will range from 80% to 90%
 - Results are as follows and show an average “as fired/delivered” content of 5,300 Btu/pound:

Table 1: Delhi Township WWTP Sludge Heating Value Data

Sample Date	Calorific Value (Btu/pound dry weight basis)	“As Fired” If 75% (Btu/pound)	“As Fired” If 80% (Btu/pound)	“As Fired” If 90% (Btu/pound)
1/13/2010	6500	4875	5200	5850
3/15/10	7100	5325	5680	6390
4/1/2010	6400	4800	5120	5760
7/22/2010	5900	4425	4720	5310
10/27/2010	7012	5259	5610	6311
12/7/2010	6500	4875	5200	5850
2/24/2011	6500	4875	5200	5850
4/1/2011	6800	5100	5440	6120
Average	6600	4900	5300	5900

- The non-waste fuel will be fired in a combustion unit that recovers energy
 - The Township’s biofuel product will be fired in a coal/natural gas-fired circulating fluidized bed steam electric cogeneration unit.
 - The combustion unit produces both electricity and steam.
- ***Have Contaminants at Comparable Levels or Lower Than Traditional Fuels (40 CFR §241.3(d)(1)(iii))***

Although the EPA has previously commented “...the TNSSS data provided by commenters still indicates higher levels, and those that EPA would not consider to be “comparable” for most of the contaminants found in sewage sludge when compared to

coal” (76 FR 15515), the *Township’s biofuel product contains significantly lower levels of Cadmium, Chromium, Copper, Lead, Mercury, and Selenium* than the National Sewage Sludge Study results.

- Analytical data from samples representative of the dried processed sludge biofuel have been collected since April 2010; these results are summarized in **Table 2**. For values reported to be less than the detection limit, zero was used to calculate parameter averages. This is the methodology required in the Township’s NPDES discharge permit.
- A comparison of average metals concentrations in samples of processed sludge biofuel from the Delhi Township WWTP to values found in coal are shown in **Table 3** (from the USGS COALQUAL Database, received from Carol Luukkonen of the USGS, for 7422 samples) and **Table 4** (from the Open File Report 2006-1162, USGS, by Joseph R. Hatch, John H. Bullock, Jr., and Robert B. Finkelman, for over 700 coal samples). These comparisons indicate the sludge values are well within low to high ranges for the coal samples.

Table 2: Delhi Township WWTP Sludge Data

	4/1/2010 (mg/kg)	4/1/2010 (mg/kg)	7/22/2010 (mg/kg)	7/22/2010 (mg/kg)	12/7/2010 (mg/kg)	2/24/2011 (mg/kg)	Average (mg/kg)
Calcium	37,000	46,929	41,000	50,529	46,000	42,000	43,910
Magnesium	3,600	4,925	4,800	11,228	4,900	4,200	5,608
Sodium	1,900	2,528	2,800	3,197	2,900	2,700	2,671
Potassium	1,500	1,528	1,800	1,870	1,800	1,700	1,700
Silver	16.0	<18.6	18.0	24.9	19.0	14.0	15.3
Arsenic	9.5	10.2	9.0	11.3	10.0	9.5	9.9
Barium	710	809	710	773	800	740	757
Cadmium	1.3	<3.4	3.2	1.6	3.9	<2.0	1.7
Chromium	67	80	55	67	76	67	69
Copper	440	505	430	482	520	480	476
Mercury	1.0	<11.0	1.3	<3.5	2.1	2.2	1.1
Molybdenum	26	28	23	25	29	28	26.5
Nickel	16	17.5	14	15.7	19	16	16.4
Lead	12	<16.0	12	14.5	14	<51	8.8
Selenium	6.7	<10.4	5.9	7.6	6.8	8.0	5.8
Zinc	910	958	720	967	980	950	914

Note: Average concentration calculations used zero for the less than detection limit values.

Table 3: *USGS COALQUAL Database (Received from Carol Luukkonen of USGS, for 7422 Samples) Compared to Delhi Township Sludge Data*

Parameter	USGS COALQUAL (mg/kg)	Delhi Twp POTW Sludge (mg/kg)	USGS COALQUAL (mg/kg)
	Minimum	Average	Maximum
Calcium	0	43,910	71,000
Magnesium	0	5,608	15,000
Sodium	0	2,671	13,000
Potassium	0	1,700	14,000
Silver	0	15.3	11
Arsenic	0	9.9	2,200
Barium	0	757	22,000
Cadmium	0	1.7	160
Chromium	0	69	200
Copper	0	476	280
Mercury	0	1.1	2.9
Molybdenum	0	26.5	280
Nickel	0	16.4	280
Lead	0	8.8	1,900
Selenium	0	5.8	150
Zinc	0	914	51,000

Table 4: *United States Open File Report 2006-1162, USGS (Joseph R. Hatch, John H. Bullock and Robert B. Finkelman, for over 700 coal samples) Compared to Delhi Township Sludge Data*

Parameter	Open File Report USGS Coal Samples (mg/kg)	Delhi Twp POTW Sludge (mg/kg)	Open File Report USGS Coal Samples (mg/kg)
	Minimum	Average	Maximum
Calcium	125	43,910	255,000
Magnesium	28.1	5,608	11,122
Sodium	13.8	2,671	18,482
Potassium	17.5	1,700	27,817
Silver	0	15.3	4.71
Arsenic	0.14	9.9	1,444
Barium	3.02	757	1,624
Cadmium	0	1.7	83
Chromium	0.44	69	467
Copper	0.66	476	383
Mercury	0	1.1	4.9
Molybdenum	0.09	26.5	472
Nickel	0.38	16.4	312
Lead	0.11	8.8	448
Selenium	0	5.8	241
Zinc	0	914	2,980

- Copper and silver show higher, although comparable and within a small range, concentrations than coal. Due to the low environmental concern with these

metals, the Township requests the EPA consider them similarly to the high zinc in Tire Derived Fuels; even though zinc levels in TDF and its combustion emissions are significantly higher than those for coal, EPA has granted TDF “non-waste” status.

- *The results from samples of what would constitute Delhi Township’s processed sludge biofuel demonstrate the material will contain contaminants that are at levels comparable to or lower than the traditional fuel, coal, and therefore satisfies the 40 CFR §241.3(d)(1)(iii) legitimacy criteria.*

Environmental Benefits

Processing and proper handling of WWTP sludge from the Delhi Township WWTP for re-use as fuel provides a useful alternative to land application or landfill disposal, and will help create electricity and heat for use on the campus of Michigan State University.

The use of this secondary material will also result in other benefits including but not limited to resource conservation, recovery of valuable resources, emission reductions, reduced fuel imports, and a microeconomic benefit.

In short, the Township believes use of its processed sewage sludge as a coal substitute embodies the EPA’s vision of helping “...advance economic growth as a result of improved industrial efficiency, which, in turn, helps move the country toward material sustainability and energy self sufficiency, while protecting human health and the environment.” (FR 75 31849)

Conclusion

Upon receiving approval of a non-waste determination based upon the requirements of 40 CFR §241.3 and completion of the final phase of construction, Delhi Township’s processed WWTP sludge could be made available for use as part of the biomass fuel blend at MSU’s T.B. Simon power plant.

We appreciate your input and request your approval of this request. If you have questions or need additional information, please contact the undersigned at (517) 699-3874. Additional contacts include Mr. Thomas Grant of Hubbell, Roth, & Clark, Inc. or Mr. Brad Venman of NTH Consultants, Ltd. at (616) 454-4286 or (517) 702-2956, respectively.

Sincerely,

Delhi Charter Township



Sandra Diorka
Director of Public Services

cc: Melissa Horste, Senator Carl Levin's Office
John Elsinga, Delhi Twp.
Robert Ellerhorst, MSU
Thomas Grant, HRC
Brad Venman, NTH