



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8
999 18TH STREET - SUITE 300
DENVER, CO 80202-2466
Phone 800-227-8917
<http://www.epa.gov/region08>

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Ref: P-W-P

Tommy Weldon
USDA/FSA/Georgia State Office
Agricultural Program Specialist
355 E. Hancock Ave. Stop 102
Athens, GA 30601-2775

Dear Mr. Weldon,

This letter is in response to your emailed request for information, received on 10/14/03 concerning any information that I may have on the McElmurray Farms. I hope that this information will be helpful in resolving your issues. I have tried to construct this letter in a manner best suited to answering your questions. I list the questions/concern first in *italics* and give a short answer followed by a longer discussion.

EPA difficulty with access to the Boyce and McElmurray farms

Answer

EPA's representatives Bob Brobst and Bob Bastian never were able to gain access to fields owned or operated by Boyce or McElmurray.

Discussion

I thought it might be best to provide some background information on EPA's initial involvement so that the Georgia State Farm Service Agency (FSA) and Committee (STC) have a more complete picture.

On November 9, 1998, two dairy farming families, McElmurray & Sons, Inc. and Boyceland Dairy Farms, filed separate lawsuits against the City of Augusta in the United States District Court in the Southern District of Georgia. The lawsuits alleged that

sewage sludge, or biosolids, from the City of Augusta Messerly Wastewater Treatment Plant caused crop damage and cattle mortality on the two dairy farms.

On November 17, 1998, EPA Region 4 was made aware of an Internet site, which contained information and allegations regarding the death of cattle on both dairy farms.

EPA Region 4 contacted EPA Region 8 and Headquarters to help Region 4 assess the allegations about the death of dairy cattle in Burke and Richmond Counties. Robert Brobst (EPA Region 8 Denver, CO) and Robert Bastian (EPA Headquarters Washington, DC) had expertise in assessing the effect of biosolids on soil and livestock and therefore were to be EPA's representatives for this investigation.

In December 1998 Bob Bastian was called by Boyce and McElmurray's attorneys and invited to schedule a visit to the farms. Discussions occurred with both parties on several occasions prior to the visit and to confirm the farm visit. We met in late January 1999 (Super Bowl Sunday) at the offices of Newfields in Atlanta, GA with the farms consultants (Newfields) and farms' attorneys. After viewing the data we asked if the farm visit was still planned, we were asked to wait in an outer office. Then we were told by the attorney that the farmers (Boyce and McElmurray) were busy that day doing pregnancy checks and could we return at a later date. We also stated we would be available for the next several days and were again told by the farmers' attorneys that the owners would still be busy. We then went to the City of Augusta to review its records.

I traveled to Atlanta GA again to visit the farms. We first met in the farmer's attorney's offices, but again we were told by the farmers' attorneys that the farmers were busy and to return later.

We were unable to secure any more federal travel funds for a site visit to the farms because of our problems obtaining access on the previous occasions.

Which regulation applies 40 CFR 257 or 40 CFR 503?

Answer

The short answer is that since 1993 the criteria in 40 CFR 257 do not apply. The applicable regulations are 40 CFR 503.

Discussion

I based this answer on the review of several regulations and associated documents. Most of these documents were published years before the lawsuits were filed. I reviewed excerpts from regulation 40 CFR 503/40 CFR 257 published on February 19, 1993. I have attached the full text for your review. The regulation states in part 257.1(c) (11) that 40 CFR 257 no longer applies to use or disposal of sewage sludge and that 40 CFR 503 does apply.

40 CFR 257 Subpart A-Classification of Solids Waste Facilities and Practices
Scope and Purpose 257.1(c) (11) states;

“The Criteria [in this regulation] do not apply to the use or disposal [of] sewage sludge on land when the sewage sludge is used or disposed in accordance with 40 CFR 503.” {FR 9385, Feb. 19, 1993}

The paragraph below is an excerpt from the preamble to the 40 CFR 503 /modification of 40 CFR 257, which was published in 1993 reinforcing EPA’s intent the 40 CFR 503 was the applicable regulation and not 40 CFR 257.

“The second revision to 257.1(c) in today’s amendment adds a new provision at 257.1(c)(11). This provision indicates that the part 257 criteria do not apply to the use or disposal of sewage sludge, including domestic septage, on the land when the sewage sludge is used or disposed in accordance with 40 CFR 503. Note that domestic septage does not include pumpings from septic tanks that receive commercial or industry wastewater. As mentioned above, if those pumpings are disposed on the land, the part 257 criteria apply. The Agency decided to include this provision in 257.1(c) to make it clear that sewage sludge used or disposed in accordance with part 503 is not subject to the part 257 requirements.”

Now the question become was the sewage sludge used or disposed in “accordance” with Part 503. EPA believes that the record is also clear on this issue. EPA believes that 40 CFR 503 was the appropriate regulation to review the City of Augusta’s land application program. The City of Augusta was land applying in accordance with 40 CFR 503.

In December 1998, EPA Region 4 conducted a Compliance Evaluation Inspection (CEI) at the City of Augusta Wastewater Treatment Plant. The primary purpose of the CEI was to evaluate the City’s sewage sludge program, operated pursuant to 40 CFR 503.

Based on the preliminary findings of the EPA CEI, the Region 4 Enforcement and Investigations Branch (EIB) conducted a diagnostic evaluation (DE) of the City’s sewage sludge treatment processes on February 16-18, 1999. As part of the DE, sewage sludge samples were collected and analyzed to determine the compliance status. **EPA issued a City’s final inspection report in July 1999, with a 40 CFR 503 compliance rating of marginal to satisfactory.**

In addition, a November 2, 1999 Region 4 memo jointly signed by the Waste Management Division Director and the Water Management Division Director stated that **“Since 1993 the City of Augusta has been disposing of sewage sludge in accordance with these regulations”[40 CFR 503]**

The last question as to which regulation applies is the sewage sludge hazardous?

Georgia DEP and the City of Augusta analyzed samples in 1998 and 1999 pursuant to the TCLP test, a test that determines if the sewage sludge is hazardous. Both samples determined that the sewage sludge from the City of Augusta Waste Water Treatment plant was not hazardous.

After a review all readily available and pertinent environmental data, including data offered by legal counsel for the farmers, the RCRA Enforcement and Compliance Branch of Region 4 concluded that: there was no evidence that hazardous waste was generated at the City of Augusta Waste Water Treatment Plant; and no evidence of a hazardous waste currently existing at the Boyce or McElmurray farms; and no further action is recommended at this time. The sewage sludge was not hazardous based on the information provided and therefore 40 CFR 503 applies.

Therefore, the applicable regulation is 40 CFR 503 and not 40 CFR 257.

Can a Municipality receive industrial waste and 40 CFR 503 still apply?

Answer

The short answer is yes.

Discussion

In general this is a definitional discussion, however we must also look at the practical side to see how this regulation is applied across the 16,000 wastewater treatment plants that receive a mixture of domestic, commercial and industrial waste. Of those 16,000 treatment plants 8,650 are large enough to generate sewage sludge that is used or disposed of at least annually. The treated sewage sludge produced by these facilities is land applied to farm fields across the U.S. in compliance with 40 CFR 503.

The use of the definitions in 40 CFR 503 is as follows:

Sewage sludge is solid, semi-solid, or liquid residue generated during the **treatment of domestic sewage in a treatment works**. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works.

Domestic sewage is waste and wastewater from humans or household operations that is discharged to or otherwise enters a treatment works.

Treatment works is either a federally owned, publicly owned, or privately owned device or system used to treat (including recycle and reclaim) either domestic sewage or a combination of domestic sewage and industrial waste of a liquid nature.

Based on the above definitions it should be clear. Therefore; the City of Augusta Wastewater Treatment Plant receives domestic sewage and treats the wastewater in the treatment works in combination with industrial waste of a liquid nature. Along with the other wastewater treatment plants in the U.S., Augusta can land apply sewage sludge in compliance with 40 CFR 503.

EPA defines Food, Feed and Fiber Crops in 40 CFR 503 as follows;

Answer

- (j) Feed crops are crops produced primarily for consumption by animals.
- (k) Fiber crops are crops, such as flax and cotton.
- (l) Food crops are crops consumed by humans. These include, but are not limited to, fruits, vegetables, and tobacco.

Discussion

It should be noted that the metal limits in 40 CFR 503 were developed through the use of a risk assessment and based on more than 30 years of research conducted by universities across the U.S. The pollutant concentrations listed in 40 CFR 503 are risk based using 14 different pathways, including but not limited to animal pathways, both for animals consuming sewage sludge and consuming plant grown in sewage sludge. The risk assessment also contained pathways that looked at phytotoxicity. These risk based pollutants' concentrations were developed from research and have included many safety factors. If you would like additional information on the risk assessment I can send additional background material to you.

What about the analytical data for the farm fields?

Answer

The data available to me that is of sufficient quality and quantity indicate that the McElmurray fields are not contaminated.

Discussion

Before I review expert witness reports, professional papers, etc. I review the data that those reports are based on and draw my own conclusions. Data and expert witness reports were provided to me by both the city's and farms' attorneys. Both only provided data that was on file with the court, so EPA was only able to review that data which it had received. We did not go to the court for the data and relied on both sides to provide us with the data that they felt would best help our review. The City of Augusta provided EPA with the most complete set of data, and the farms through their attorneys were not as free with their data. I will discuss the data quality provided by each below and discuss my use of that data.

Data provided by Newfields through McElmurray lawyers

I wish to give you an example of the data provided to me by the farmers' attorneys and because of the quality of the data I was forced not to use it. For example, the data provided for Cadmium in soil on the McElmurray farm contained the lack of quality and quantity listed below;

Of the 369 referenced sampling and analytical events to McElmurray fields specifically for Cadmium;

- * 326 of those events listed no sampler
- * 255 of these events were without analytical results
- * 185 of those events listed no field
- * 92 of those event did not list an analytical method

in addition those that had analysis (114) used at least 6 different analytical methods making a comparison with other data sets impossible.

There were however, a few interesting samples provided by the farm's attorneys by a sampler Bill Craven that demonstrated that most if not all of the biosolids Cadmium remained in the upper 6 inches of the fields sampled. The disappointing part was that the fields sampled were not listed.

I was able to look at, but was not provided a complete set of the soil and plant results from the McElmurrays' attorney. The data that I did obtain contained limited method descriptions, limited location descriptions and no data validation information. This data when reviewed must take all of this information into account. The data provided many samples from many different parties from data collected from 1986 to 1999, and most

were for agronomic purposes, e.g. fertilizer needs. Samples and analysis were not provided that assess the chemical quality of the soil.

There are several ways to sample fields to assess chemical quality of a given field (e.g. grid, random etc.). No evidence was provided to me, even though requested, on how the samples were taken. The data provided me by the farm attorneys was neither complete nor could it be validated. I have had to discount this data because of the poor data quality and the data was not in a condition for reliable evaluation of the soil quality in the fields. The analytical data provided by the farm's attorneys for soil and plant quality appeared to be selective. No evidence that the samples were collected in a statistically valid manner, no quality assurance of the data was provided therefore I am forced to disregard this data from further evaluation.

A high percentage of the analysis listed by Newfields, was questionable. However, if we accept and if we look at those 29 samples taken by Wes Slade of Newfields and the 16 analyses and results (by the same analytical methods in the Williams report) and provided by the farmers' attorneys we find that the average soil concentrations are very close, 0.41 mg/Kg in the Newfields data as compared to 0.32 mg/Kg in the highest field results from the Williams report. These results in fact are also within the background range of Cadmium concentrations in uncontaminated soils.

The Data that was provided to EPA by the city was;

Sampling of the farm fields was completed by Williams Environmental Services, Inc. and Brown and Caldwell Environmental Engineering, and other miscellaneous samples were collected by Dr. Haaland; the analytical work was completed by Savannah Laboratories and Environmental Services, Inc. using the restrictive procedures CLP Level 4 criteria of EPA's Superfund program. The data was then reviewed and validated by yet another group Validata Chemical Services, Inc. The third party evaluation of the data Validata made sure that protocols specified by EPA (Blanks, Duplicates, etc.) were followed. The data provided by the City of Augusta's attorneys was of acceptable quality.

The sampling was completed in a systematic grid pattern, which was statistically representative of the chemical conditions of the fields. Each sample location was geospatially located allowing for re-sampling. Locational data and high quality chemical data, allowed for review on a field-by-field basis. Therefore, this data was usable for making estimates of the true conditions, with respect to Cadmium in the McElmurray fields

The data provided by the city was determined to be complete and representative of the fields sampled. I then reviewed this data on a field-by-field basis in an attempt find field differences. There were none. I reviewed hundreds of analyses for the McElmurray field and found that the average Cadmium concentrations in those fields were in the range of background (Holmgren et al 1993).

I reviewed the data from the Williams report on a field-by-field basis. Table 1 is a summary table of that review. I have included the numbers of samples in each fields as well as the arithmetic and geometric mean. The standard deviation also represented it will give you an idea of the data spread. I have highlighted the field with the highest field average Cadmium concentration. The field was identified as RD and the concentration of Cadmium is 0.32 mg/Kg.

Table 1: Mean Cadmium Concentration in McElmurray Fields Spring 1999

Field Name	Number of Samples	Arithmetic Mean Cd (mg/Kg)	Geometric Mean Cd (mg/Kg)	Standard Deviation Cd (mg/Kg)
Clark Place	34	0.11	0.09	0.09
Rhodes Place	16	0.13	0.12	0.07
Uncle John. N.	12	0.12	0.11	0.04
Uncle John. S.	4	0.18	0.18	0.01
Burchalter Pl.	21	0.12	0.10	0.06
Henderson Pl.	11	0.11	0.11	0.01
Russell Wright East	5	0.10	0.10	0.01
Russell Wright North	2	0.10	0.10	0
Handy Green	5	0.06	0.06	0
Red Field	10	0.06	0.06	0
Sandy Field	2	0.06	0.06	0
Triangle Field	3	0.06	0.06	0
Highway 88	2	0.07	0.07	0
P-Nut	2	0.06	0.06	0
Murphy	1	0.06	0.06	
Terrace	2	0.06	0.06	0
Front of Richards	3	0.07	0.07	0
Dyes	94	0.14	0.12	0.08
Boardman Place	11	0.06	0.06	0
RD	4	0.32	0.32	0.01
Wells Place	22	0.15	0.14	0.06
Park Place	13	0.14	0.12	0.07
Cane Break	4	0.07	0.07	0.05
Over Pasture	3	0.06	0.06	0

Footnotes

Field Names Provided by

Analytical note more than 90% of the results were qualified as less than detection and estimates for the concentrations were used. These estimates were assumed to be the limit of quantitation and therefore would bias the results high.

The average concentrations for Cadmium in the McElmurray farm fields are in the background range for uncontaminated soils in the U.S. (Holmgren et al 1993) see Table 2

Table 2: Summary statistics for concentrations of microelements in 3045 surface soil samples from major production areas of the U.S.A (from Holmgren et al 1993).

	Cd	Zn	Cu	Ni	Pb
	-----mg/Kg dry soil-----				
Geometric Mean	0.175	42.9	18.0	16.5	10.6
Arithmetic Mean	0.265	56.5	29.6	23.9	12.3
Median	0.20	53.0	18.5	18.2	11.0
90 th centile	0.56	105.0	62.3	39.6	20.0
95 th centile	0.78	126.0	94.9	56.8	23.0
99 th centile	1.3	170.0	216.0	154.0	36.0

The Soils selected for this study were selected to represent background agricultural soils in the US. This means that efforts were taken not to sample areas with known contamination sources near, or that the fields received contamination from other sources, including sewage sludge.

Holmgren, G.G.S.; Meyer, M.W.; Chaney, R.L.; Danials, R.B.; 1993; Cadmium, Lead, Zinc, Copper and Nickel in Agricultural Soils of the United States of America.; Journal of Environmental Quality 22:335-348 (1993).

Based on the review of the data presented and summerized in the tables above one must conclude that the fields are near background levels.

This review focused on Cadmium, however a quick review of the other information provided to me indicates that the other metals are in the "normal" background ranges.

Would EPA consider these farms for cleanup as a hazardous waste site?

Answer

Based on a review of all readily available and pertinent environmental data, including data offered by legal counsel for the farmers, it can be concluded that there was no evidence of the farm fields of containing hazardous waste on the McElmurray farms, and no further action is recommended.

Discussion

As you know EPA directs the cleanup of hazardous waste sites and other contaminated lands. EPA also is responsible to not cleaning up clean (non-contaminated) sites. To do

this EPA has set up standards or action levels for clean up of contaminated sites. If a site is above that action level in concentration then the site is to be cleaned up. If it is below the action level then EPA does not clean up the site.

EPA region 4 cleanup standard (action level) for Cadmium in residential areas is 39mg/Kg. I have attached a copy of the WEB page that discusses this further. This means that if the average concentration of Cadmium in the fields on McElmurray's fields were above 39 mg/Kg, then EPA would consider cleanup as necessary. Based on the information I have the average soil Cadmium concentration in a field 2 orders of magnitude below the action level and therefore would not be considered for cleanup.

Even if we accept the incorrect argument that only one sample was necessary and that sample result provided by the farm attorneys was accurate, indicating that a single sample location in an unidentified field was 27 mg/Kg in the soil EPA would not act. The soil concentration of 27mg/Kg is below the action level for an EPA cleanup. EPA would not act on a single sample result. EPA would review all of the data available and the result is still below the cleanup standard that would cause EPA to act on a clean up of the site.

In addition, EPA would review other references for Cadmium in uncontaminated fields, such as the one summarized above. In this case the fields are not greater than background for uncontaminated field across the U.S.

Does data exist the indicate the quality of feed stuffs in 1998/1999?

Although I was only able to fide a few samples of chemical quality of feed stuffs, I have attached Copies of those analysis for your review. It should be noted that the maximum tolerable level (NRC 1994) for Cadmium in feed is 0.5 mg/Kg.

Were the assertions about the UGA Burke County Study correct?

Answer

The conclusions were not as presented by the McElmurray.

Discussion

The assertion was made that the report "proved that contamination exists on lands where sludge has been applied in excess of six years in the Richmond County/Burke County area." I have reviewed the report as a whole and do not arrive at the same conclusion. The Gaskin report (2000) University of Georgia reported on the findings of analyses of trace metal levels in soils and forage that utilized Augusta biosolids in Burke County

only. This did not involve data from the Boyce and McElmurray farms. The conclusions were ... "toxic levels of metals have not accumulated in the soils due to long-term biosolids application. Overall forage quality from the biosolids-amended fields was similar to that of commercially fertilized fields; however, due to the relatively high S and potential for a low Cu to Mo ratio, Cu supplements should be used to ensure ruminant health." I have attached a copy of the report for your reference.

Additionally the report was submitted for separate publication and scientific peer review to the Journal of Environmental Quality. The article was selected for publication, and the conclusion remained the same, I have attached a copy of the article for your review Gaskin et al J. Environ Qual. 32:146-152(2003).

Overall Conclusion

It is my professional opinion that after reviewing all readily available and pertinent environmental data, including data offered by legal counsel for the farmers I conclude that there was no evidence that hazardous waste was generate at the Messerly Plant in Augusta Georgia, no evidence that the land application of sewage sludge caused any harm the soil, plants, or animals and no evidence of a hazardous waste currently existing on the Boyce or McElmurray farms.

Thank you for the opportunity for input. If you have any other questions feel free to contact me if you have additional questions at 303-312-6129 or at Brobst.bob@epa.gov.

Sincerely

Robert B. Brobst, P.E.
Environmental Engineer

