FAQ v.3. 11/28/18

FAQ quick reference guide to the November 2018 EPA OIG report

Q: Why did the OIG write this report?

A: The OIG conducted an audit of the EPA's biosolids program, aiming to assess whether EPA's regulatory program "has and implements controls over the land application of sewage sludge [biosolids] that are protective of human health and the environment." However, this report was narrow in its scope, focusing only on one aspect of the EPA biosolids program: the chemical risk assessment process. EPA has many other controls in place that ensure the protection of public health and the environment with respect to biosolids recycling such as pathogen reduction standards, vector attraction reduction requirements, site and nutrient loading restrictions, crop harvesting restrictions and monitoring, record keeping and reporting requirements.

It is unclear why the OIG decided to audit EPA's biosolids program at this time. Typically, an OIG audit is triggered by concerns raised within EPA, among EPA staff, from congressional oversight, or by repeated requests by non-governmental organizations and/or members of the general public. In any case, in June 2017, the OIG alerted EPA's Office of Water and other stakeholders of the start of the audit process.

Q: What is the EPA OIG?

A: The Office of Inspector General (OIG) is an independent branch of the EPA that performs audits and investigations of the EPA to detect and prevent fraud, waste, and abuse. Although they are a part of the EPA, Congress provides them with funding separate from the agency to ensure their independence.

Q: What is the EPA's response to this report? What is EPA's stance on biosolids land application and the relative risks and benefits?

A: EPA remains supportive of biosolids land application and refers to this as "beneficial use" on their website. The OIG report does not represent the agency's official position. The environmental benefits of biosolids land application are well documented, and, as quoted on the EPA website, "there is no documented scientific evidence that the Part 503 rule has failed to protect public health" (2002 National Research Council of the National Academies report, "Biosolids Applied to Land: Advancing Standards and Practices").

The OIG made 13 recommendations; EPA has accepted eight of them but is disputing five. They have 30 days to come to a resolution on the remaining five recommendations. EPA's full response to the **draft** OIG report is included in Appendix D of the current final report, and there is a list of recommendations at the end of the report that shows which are accepted and which

are disputed. The five disputed recommendations are generally about phrasing regarding biosolids on EPA's website and product labeling that seems to advise the public to be more cautious about biosolids use. Certainly EPA and the regulated community support additional research and credible risk assessment. However, we believe the science and the practice of land applying biosolids show the risk from biosolids recycling remains extremely low.

Q: Is the EPA transparent with their information regarding biosolids?

A: Yes, the EPA is transparent with their information regarding biosolids. EPA's webpages dedicated to biosolids describe many aspects of biosolids treatment and use and describe in detail the regulations that govern them. The website also answers 20 "Frequently Asked Questions." The website expresses confidence in the EPA 40 CFR Part 503 Rule and describes biosolids used as a fertilizer as "beneficial use." Links from the EPA website lead to many additional details on the risks and benefits of biosolids use, including, for example, the extensive review and discussion by the 2002 National Academy of Sciences of all the potential concerns that have been raised regarding biosolids use. EPA is transparent about pointing to such documents. These resources and more can be found at https://www.epa.gov/biosolids. In 2017, EPA also released their electronic reporting tool for biosolids to replace the paper-intensive system as a result of the NPDES Electronic Reporting Rule. All data collected from biosolids generators is available through the Enforcement and Compliance History Online (ECHO) website: https://echo.epa.gov/. As part of the website, anyone can search a biosolids facility to review their annual report detail and the regulations compliance history.

Q: Should the EPA increase efforts and funding related to research and oversight of biosolids beyond what it is conducting today?

A: Over the last decade, EPA has disinvested staff, research, oversight, and funding for its biosolids program. EPA has disinvested resources from the biosolids program precisely because biosolids presently are such a relatively low risk to human and environmental health, and EPA has determined that its resources are better used elsewhere. While funding has been maintained to conduct valuable biennial reviews of the 40 CFR Part 503 rule, the overall disinvestment in the biosolids program does a disservice to many state regulatory agencies as well as wastewater utilities across the country who recognize the value of strong federal oversight, enforcement, and ongoing research. States and local agencies, including wastewater utilities, are committed to sound science and safe practices. Sound science has formed the basis for the current biosolids regulatory framework and is one of the reasons this program is a success.

Continued research assistance by EPA to conduct risk assessments, in addition to technical training to local agencies, are viewed as critical pieces to continued safe and effective biosolids management practices. A widely held sentiment of wastewater treatment professionals is that

EPA should have sufficient funding for staff to provide technical and compliance assistance as well as enforcement and oversight of its biosolids program. We recognize that a stronger EPA presence in the biosolids program creates greater public confidence.

Q: Why do we even need to produce biosolids? How are they a necessary part of protecting public health and the environment?

A: Biosolids are a non-optional product of the wastewater treatment process. Wastewater treatment is arguably one of the greatest protectors of human health and the environment in our modern age. Without it, human health and water bodies are at risk from disease-causing organisms, high nutrient levels, and pollutants found in raw sewage. Wastewater treatment accelerates the natural cleansing process of nature, commonly accomplished by wetlands. In both processes, pollutants transfer to the solids (peat or biosolids) where they remain tightly bound and generally non-reactive. Engineering and technological innovation has harnessed the "waste" generated by society and found reliable ways to quickly turn a potentially harmful material into clean water and biosolids, a sustainable fertilizer alternative.

Q: Why do so many farmers and landowners purchase and use biosolids products?

A: Biosolids are a highly effective fertilizer alternative and soil conditioner. They act like two products in one, providing great value to anyone trying to improve the nutrient, biological, and physical properties of their soil. Side by side, agricultural studies of biosolids compared to synthetic fertilizer or manure show equal or better yield from biosolids and an improvement in the soil's physical properties such as organic matter, bulk density, and water retention.

Q: How does applying biosolids to soils help fight climate change?

A: When biosolids are applied to soil instead of synthetic fertilizer, it helps to fight climate change in 3 primary ways:

1) Some of the carbon, or organic matter, in the biosolids will stay in the soil for a very long time, thus storing the carbon in the soil rather than in the atmosphere, where it can contribute to climate change.
2) Biosolids increase plant growth, which removes CO_2 from the atmosphere via photosynthesis and deposits the carbon-rich plant residues in the soil.
3) Biosolids offset the use of synthetic fertilizers, which are fossil fuel-intensive to produce. Therefore, using biosolids offsets the emissions associated with fertilizer production.

Q: Why are soils a solution for treating traces of chemicals from our daily lives?

A: Studies have shown that elemental pollutants such as metals bind very tightly to biosolids and soil particles, and they do not leach or get taken up by plants. Studies have also shown that

most organic, or carbon-based, pollutants are broken down by soil microorganisms and others are sequestered like metals.

No one denies that biosolids contain traces of organic chemicals from pharmaceuticals and personal care products, the majority of which have directly passed through the human body or are commonly used by the general population. The important information is that they are present in such small concentrations, that it would take many, many lifetimes of working with or playing around biosolids products to be exposed to the equivalent of one therapeutic dose of these pharmaceuticals and personal care products.

Q: How are biosolids currently regulated?

A: The federal biosolids rule is contained in 40 CFR Part 503. Biosolids that are to be land applied must meet these comprehensive regulations and quality standards. The Part 503 rule, governing the recycling of biosolids to land, contains risk-based numerical limits for metals in biosolids, pathogen reduction standards, vector attraction reduction requirements, site and nutrient loading restrictions, crop harvesting restrictions and monitoring, and requirements for record keeping and reporting. Part 503 includes similar requirements for biosolids that are surface disposed or incinerated. While the Part 503 regulations apply to all U. S. wastewater solids (sludges) and biosolids, they are not the only regulations that apply in many cases. Most states have additional regulations that are more stringent than Part 503, and additional best management practices recommended or imposed by state university cooperative extension programs, farm lenders, and federal cost-sharing programs create additional protections around biosolids beneficial use programs.

Q: Is current regulation sufficient?

A: Biosolids are regulated at the federal, state and, in some cases, at the local level, to ensure protection of public health and the environment. As stated in the 2002 National Research Council of the National Academies report, “Biosolids Applied to Land: Advancing Standards and Practices,” the Council concluded that, “there is no documented scientific evidence that the Part 503 rule has failed to protect public health.” Dedication to continued research and advancing the science is always strongly supported by the wastewater and biosolids community. But that support is because it is the proper course of action for any environmental and public health regulation, not because we expect unknown consequences to be discovered. Wastewater treatment plants generating biosolids are public environmental stewards providing essential public health protections and services. Indeed, the *British Medical Journal (BMJ)* reported that sanitation (wastewater treatment) was the most important public health advance since the 1850s, when the Journal was first published.

Q: What testing and treatment is currently required for biosolids?

A: EPA requires that biosolids are tested for pollutants and disease-causing organisms. Biosolids applied to the land must not exceed the risk-based pollutant limits specified in the EPA 40 CFR Part 503 rule. After reviewing hundreds of compounds, EPA has deemed that the constituents worthy of regulation based on risk are nine heavy metals: arsenic (As), cadmium (Cd) copper (Cu), lead (Pb), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), and zinc (Zn). In addition, operational standards to control pathogens and to reduce the attraction of vectors (e.g., flies and other potential disease-carrying organisms) to the biosolids must also be met. There are also general requirements, management practices, and frequency of monitoring, record keeping, and reporting requirements that must be fulfilled. The specific type of testing required for pathogen reduction and vector attraction reduction depends on the technology and operational practices used to meet these requirements. Many utilities provide additional monitoring through their pretreatment programs.

Q: What types of crops use biosolids as a fertilizer/Where are biosolids used?

A: Biosolids are used as a fertilizer alternative and soil conditioner for agricultural land, golf courses, commercial forests, parks and roadsides, reclamation sites (e.g. mines and other drastically disturbed areas), and home gardens/lawns. Exceptional Quality (EQ) biosolids (which have essentially no detectable pathogens, have been processed to reduce attraction to vectors, and meet highest quality standards for risk-based pollutant limits) can be used without restriction, just like any commercially available compost, soil conditioner, or fertilizer. EQ biosolids can also be used to fertilize agricultural crops without incurring harvest, grazing, and public access restrictions.

Class B biosolids (treated by a process designed to destroy at least 99% of the pathogen indicators) are used to amend soils with limited public access, such as commercial agriculture, forestry, and mine reclamation sites. When Class B biosolids are used, public access must be restricted from the site for 30 days for private sites such as farms, or 1 year for public sites such as parks, in order to allow UV light, desiccation, oxygen, and soil microorganisms to complete the pathogen kill that began during the wastewater treatment process. Moreover, animals are restricted from grazing on lands where Class B biosolids have been applied for 30 days.

In addition to site access and grazing restrictions, crop harvest waiting periods are also required when Class B biosolids are used as a fertilizer alternative. The length of the waiting period depends on the type of crop grown and its relative proximity to the soil matrix, as well as how long the biosolids were on the soil surface. The restrictions range from 30 days for crops whose harvested parts do not come into contact with the biosolids (e.g.: wheat, cherries, corn), to 14

months for above-ground crops whose harvested parts may contact the biosolids (e.g.: lettuce, cucumbers), all the way up to 38 months for root crops (e.g.: beets, potatoes, onions). The result of the restrictions is that there is virtually no chance that crops whose harvested parts may come into contact with biosolids (e.g., beets, potatoes, onions, lettuce, cucumbers) will be fertilized with Class B biosolids because the waiting period is too long in relation to the crops' growing cycle. However, any type of crop can be grown in Class A biosolids because they contain no detectable pathogens.

Q: If biosolids were not land applied, where would they go?

A: There are just three things that can happen to biosolids at this time. They can be burned, (incinerated); they can be landfilled, or they can be land applied (beneficially used). New incineration units are extremely difficult to site and permit, and in order to meet new emission control requirements, they can be very costly and energy intensive. Many states are now adopting mandates to divert organics, including biosolids, out of landfills in order to mitigate climate change impacts. Such realities mean that land application is the most viable and sustainable end use for biosolids, and land application utilizes biosolids' valuable nutrients and soil conditioning properties.

When biosolids are used as a fertilizer and soil conditioner, they help sustain crop production and enhance landscapes, improve soil health while conserving valuable topsoil, and fight climate change by sequestering carbon in soil. Growers using biosolids recognize them as a high value, relatively low-cost, sustainable fertilizer alternative. Use of biosolids as a soil amendment is generally the most economical management option for the wastewater utility, as biosolids provide great environmental and social benefit.

Q: What compounds are found in biosolids and where do they come from?

A: Biosolids are mostly comprised of organic matter, nutrients, and relatively inert sand-like materials such as silica and calcium. Trace amounts of pollutants can also be detected in biosolids. These pollutants generally fall into two categories: metals and organic (carbon based) compounds.

Metals in biosolids come primarily from a combination of what we excrete, other substances we dispose of through our drains, leaching from our plumbing, stormwater that enters a treatment plant, and industrial sources.

1. Metals concentrations in biosolids from industrial sources have significantly decreased and are now minimal due to the restrictions mandated in the 1970s through the Clean Water Act's Pretreatment Program. Pretreatment programs control discharges at the

source, thereby reducing the amounts of pollutants that reach the wastewater treatment plants and thus the biosolids.

2. Leaching from plumbing has been reduced significantly over the years by controlling the pH of our drinking waters and shifting to new plumbing fixtures.
3. Stormwater can be a significant contributor if a municipality's storm sewer is combined with its sanitary sewer system. Stormwater contains contaminants from roadways, sidewalks, roofs, and other impervious surfaces. Stormwater also contains contaminants from wood burning and combustion engines (like dioxins). These contaminants enter stormwater through air deposition that lands on impervious surfaces. Most stormwater is not discharged to wastewater treatment plants; however, combined storm and sanitary systems are common in older metropolitan areas.

Trace organic pollutants in biosolids typically come from pharmaceuticals, personal care products, and other domestic sources. Below are some quick facts about trace organic pollutants:

1. Academic institutions and environmental agencies have conducted research on the potential risks of trace organics in biosolids. Given the information currently available, we believe EPA's regulations adequately protect human health and the environment from any risks associated with trace organics in biosolids when biosolids are beneficial used on soils.
2. Studies have shown that biosolids contain many different chemicals at low concentrations. This isn't surprising since people buy, use, and consume thousands of chemicals every day. Because not all of these chemicals are fully processed by our bodies, they make their way into the sewer system.
3. Many of these chemicals are referred to as "trace organics" because they are carbon-based (i.e. "organic") and because they are at low concentrations in biosolids (often at concentrations in parts per billion or parts per trillion).
4. Advances in analytical technologies have resulted in the ability to detect trace organic chemicals in minute concentrations, whereas previously the presence of compounds was unknown. This does not mean that chemicals weren't present in the past or that the current concentrations pose a risk; it simply means that they can now be detected.
5. Most of the trace organics found in biosolids are a result of production and individual use of products containing chemicals. These products include shampoos, laundry detergents, plastics, hand sanitizers, toothpaste, clothing, soaps, furniture, anti-stick coatings, flame retardants, medications, etc. These chemicals enter sewage treatment systems because of their widespread uses. When any chemical enters a sewage system, there are primarily four things that can happen to it:

a. It can move through the system as-is and be discharged with the treated water to a waterbody.
b. It can bind to the solids as-is and become part of the biosolids.
c. It can volatilize into the air.
d. It can be changed into other chemical compounds during the wastewater treatment process that follow one of the other three routes. Most often, these chemical transformations yield smaller, innocuous chemicals like carbon dioxide (CO_2); water; and simple salts, sulfides, and other minerals.

Identifying chemicals in biosolids provides biosolids managers with valuable information. For instance, it shows that the chemical has properties that bind it to solids, that it is not readily water-soluble and, therefore, that it is unlikely to leach after land application. In addition, the strictly controlled application of biosolids to soils provides an additional opportunity for physical and chemical processes occurring within the soil to break the chemicals down further.

Phthalates are a good example of a class of chemicals that can be found in biosolids. Phthalates are organic chemicals that are mainly used to make plastics flexible. Phthalates are ubiquitous in the environment because they are used in countless products and processes. Compared to many other trace organics in biosolids, phthalates are found in relatively high concentrations; research suggests the concentration of phthalates in biosolids to be about 10 – 50 parts per million (ppm). The current research on phthalates in biosolids suggests that the chemicals are bound to the biosolids and break down quickly in soils with a half-life of 20 to 25 days. Thus, it is believed that phthalates in biosolids pose no significant risk to human health or the environment.

For perspective, compare the estimated 10 – 50 ppm phthalates in biosolids with the estimated concentration in some other materials that many of us use voluntarily or are exposed to on a daily basis.

Hairspray: 250 ppm.
Spray deodorant: 900 ppm.
Household dust: 1,000 ppm.
Fragrances: 12,000 ppm.
Nail polish: 40,000 ppm.
Some plastic products: 600,000 ppm.

Ultimately, it is important to acknowledge that most people come in contact with many of the trace organics found in biosolids in our everyday lives - not from biosolids, but

from other sources such as consumer products. Therefore, if there's any risk to human health from these chemicals, it is from our everyday activities.

Q: What is the relative risk of these compounds in comparison to other sources (e.g., drinking water, milk, household products, etc.)?

A: Humans come into contact with pollutants throughout our daily lives. Many of the pollutants we find and scrutinize in biosolids originate from household products such as non-stick cookware, perfumes, toothpaste, carpeting, or retail grade fertilizers and pesticides. Many of these pollutants can also be detected in household dust, drinking water, milk, fresh produce, manure, and compost.

Since 2000, there has been growing concern about the potential impacts of traces of chemicals in the environment. This has been driven by the ability of scientists to measure smaller and smaller amounts - parts per billion, parts per trillion, etc. Wherever scientists have looked - in surface waters, in soils, in mammals, even in the Arctic – they have found traces of contaminants. These traces get into the environment directly from homes and businesses, as well as the daily activities of societies around the globe.

Sometimes, microconstituents are called "chemicals of emerging concern," because they are now being detected and are causing new concern. A recent risk analysis conducted by Kennedy/Jenks Consultants and the University of Washington calculated the relative risk of biosolids exposure compared to everyday activities such as handwashing with antimicrobial soap or taking one tablet of ibuprofen. The analysis was extremely conservative in its assumptions and found no increased risk of using biosolids compared to the exposure of these potential pollutants in our everyday lives. For example, the most exposed individual in the analysis was the agricultural worker who applies biosolids for a living. The analysis calculated that this individual would have to apply biosolids for at least 11 years before being exposed to the equivalent amount of triclosan they would incur by washing hands once with antimicrobial soap. Similarly, they would have to apply biosolids for over 24,000 years before being exposed to the amount of ibuprofen found in a single over-the-counter ibuprofen pill (e.g., Motrin or Advil).

Q: If these compounds are in biosolids, are they also in compost or other soil amendments?

A: As stated above, wherever we look, we find trace organic pollutants, including in native topsoil, in compost from various origins, and in manures. Surveys comparing biosolids to yard waste compost and manures do not find that one type of material is necessarily "cleaner" than another; all these materials contain traces of chemical compounds, although biosolids often contain somewhat greater varieties and concentrations. However, there is no evidence that any of these soil and soil amendment materials are hazardous to human health or the environment.

On the contrary, biosolids, composts, and manures have repeatedly been shown to improve soil quality and plant growth without posing any significant risk.

Q: Should EPA require disclaimer labeling for pollutants that might be found in biosolids?

A: No. Such labeling requirements would be confusing and alarmist. Pollutants are routinely found in many consumer-grade products, including other soil amendments (e.g. animal manures and composts), and no such labeling requirements have been imposed on those products for the same reasons: the presence of traces of chemicals does not present significant risk. Requiring labels for products made with biosolids would be unfair and detrimental to the sustainable recycling of biosolids.

For more information or for clarification on any of the points in this document, please feel free to contact any of the following:

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