U.S. Environmental Protection Agency
FACT SHEET

Perfluorochemical (PFC) Contamination of Biosolids Near Decatur, Alabama

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Introduction:

The Region 4 Office of the U.S. Environmental Protection Agency (EPA) is distributing this fact sheet to provide information to the public regarding selected perfluorochemicals (PFCs) found in treated sewage sludge (biosolids) from the Decatur Utilities Dry Creek Waste Water Treatment Plant (Decatur Utilities) in Decatur, Alabama. For 12 years (1996 to 2008), biosolids from Decatur Utilities were used as a soil amendment on about 5000 acres of privately owned agricultural fields in Alabama's Lawrence, Morgan and Limestone counties. EPA is coordinating with the Alabama Department of Environmental Management (ADEM), U.S. Department of Agriculture (USDA), U.S. Food and Drug Administration (FDA), Agency for Toxic Substances and Disease Registry (ATSDR), Decatur Utilities and local industries to investigate the release of PFCs to the environment that may have resulted from the application of biosolids.

Background:

EPA regulations under the Clean Water Act allow biosolids to be land applied as a soil amendment and fertilizer as long as certain monitoring requirements for regulated chemicals are performed and standard operating regulations are followed. PFCs are a class of man-made chemicals that, in most cases, are not regulated by EPA. Therefore, the testing of biosolids for these chemicals is typically not required. In January 2009, EPA developed drinking water provisional health advisory levels for two PFCs: perfluorooctanoic acid (PFOA) and perfluorooctyl sulfonate (PFOS). The provisional health advisory level for PFOA is 0.4 parts per billion (ppb) [micrograms per liter] and the provisional advisory level for PFOS is 0.2 ppb.

PFCs are used in a variety of industrial and consumer applications and products, including fire-fighting foams; personal care and cleaning products; and oil, stain, grease, and water repellent coatings on carpet, textiles, leather, and paper. Several industries in the Decatur area manufacture PFCs or use them as part of their manufacturing processes.

Decatur Utilities receives wastewater from municipal (i.e., residential) as well as industrial sources, including local facilities that utilize PFCs in their manufacturing processes. In 2007, one of the Decatur PFC manufacturers notified EPA that it had unknowingly discharged PFCs to Decatur Utilities. This notification led EPA to initiate an investigation to determine if the biosolids from Decatur Utilities were contaminated, and if the land application of these biosolids had resulted in the potential release of PFCs to the environment.

In October 2008, EPA received analytical results from its Office of Research and Development (ORD) for a limited set of soil and sludge samples collected from two agricultural sites where biosolids from Decatur Utilities had been applied. The analytical results from biosolids samples collected from the Decatur Utilities facility were also reported. The results indicated relatively elevated levels of PFOA, PFOS and other PFCs when compared with other environmental sampling results from industrial and non-industrial (e.g., residential) sites. The limited screening data from the soil sampling sites showed PFOS ranging from 589 to1296 ppb and PFOA ranging from 55 to 2531 ppb in the nine soil samples analyzed by the EPA ORD.

After learning of these levels of PFCs in its biosolids, Decatur Utilities made the decision to cease land application of biosolids in November 2008.

Upon receiving the screening study results, EPA planned and conducted a series of follow-up targeted monitoring studies from November 2008 - February 2009. Three studies have been conducted to date by EPA to sample and analyze for PFCs in the area where biosolids were applied, specifically looking at: 1) public drinking water systems; 2) groundwater and surface waters; and 3) soils. In addition, a group of local industries (Decatur Utilities, 3M, Daikin, and Toray) completed a comprehensive private well survey in the areas surrounding the land application sites.

The first follow-up study was designed to see if PFCs were present in the Decatur area public drinking water systems. The analyses of samples collected by EPA and ADEM from the public water supply systems in Morgan and Lawrence counties in November 2008 found no detectable concentrations of PFCs in two of the three public water systems (Moulton and Decatur). The levels of PFCs detected in the West Morgan/East Lawrence system were below EPA's provisional health advisory levels of 0.4 ppb for PFOA and 0.2 ppb for PFOS in drinking water. In September 2009, EPA expanded its public water sampling event to include the public water systems of Limestone County and the Swann Creek Community. The sample results from the five public water systems sampled in September 2009 were below EPA's provisional health advisory levels.

The second study looked for PFCs in private water wells, ponds, and surface waters located near the land application areas. Between January and March 2009, EPA collected and analyzed samples from 18 private water wells adjacent to the land application sites. Water samples were also collected from 32 ponds and from one stream in or near the fields that received the highest applications of biosolids. The final report indicated the following results:

- None of the six private drinking water wells sampled had levels above the PFOS provisional health advisory levels, while two of the wells sampled had PFOA levels above EPA's provisional health advisory level. These two wells had PFOA levels of 2.2 ppb and 0.6 ppb respectively. Both of these residences with elevated PFOA levels were quickly provided with bottled water and connected to the public water supply system by Decatur Utilities and the group of local industries.
- The final ground water sampling results from the 12 other non-potable private wells for PFOA ranged from no detectable levels to 6.41 ppb and for PFOS ranged from no detectable levels to 0.15 ppb.
- The final surface water sampling results from 32 ponds and one stream for PFOA ranged from no detectable levels to 11.0 ppb, and for PFOS ranged from no detectable levels to 0.08 ppb.

The third study was designed to better understand if the land application of Decatur biosolids had resulted in the PFC contamination of the soils throughout the land application areas. In March 2009, 32 soil samples in or near the fields with the highest applications of biosolids were collected and analyzed. The final report indicated the following results:

- For PFOA, the results ranged from below the limit of quantization up to 317 ppb.
- For PFOS, the results ranged from below the limit of quantization up to 408 ppb.

In response to the detection of PFOA and PFOS in biosolids-applied soils, EPA released (in October 2009) residential soil screening guidance values for PFOA and PFOS that are protective of children who might incidentally ingest soils during play. These soil screening values are 16,000 ppb for PFOA and 6,000 ppb for PFOS. None of soil samples collected by EPA in 2007 or 2009 exceeded the soil screening values for protection of children's health (which are also protective of adult health).

In May 2009, USDA sampled blood and tissue from selected cows/steers from farms where Decatur Utilities biosolids were land applied in the past. Samples from seven animals associated with "high" application fields and two animals from "minimally" applied fields were collected. The final analytical results from these tests indicate the values are below USDA's minimum proficiency level (MPL) of 20 ppb for both PFOS and PFOA. Therefore, these samples are reported as not detectable for PFOS and PFOA. Based on USDA estimates for human health concerns using the MPL as an upper limit value and current Decatur area exposure patterns, this testing supports USDA's finding that there is no reason to believe there are human health concerns with consuming the meat processed from cattle grazed on lands receiving these biosolids.

Also in May 2009, FDA sampled and analyzed two milk samples for PFOA and PFOS. One sample was collected from a single cow and the other sample collected from a bulk milk tank from a dairy farm located in the Decatur area that received limited application of Decatur Utilities biosolids. FDA testing found no PFOA or PFOS in the milk sample from the single cow. A very low level (0.17 ppb) of PFOS was detected in the bulk tank milk sample. FDA is currently testing retail milk samples collected throughout the U.S. for PFOA and PFOS to obtain additional information on background levels for PFCs in milk. To date, FDA testing found no PFOA in any of the 18 retail milk samples tested. A very low level of PFOS (0.042 ppb) was detected in one retail milk sample.

In August 2009, at the request of EPA, Decatur Utilities and the group of local industries conducted a comprehensive survey to identify any additional private drinking water wells located up to one mile from the biosolids application sites. Twelve wells were identified and a sampling plan was developed. The sample results from this August 2009 study indicated that none of the wells have PFOA or PFOS levels above EPA's drinking water provisional health advisory. The final sampling report indicated the following results:

- For PFOA, the results ranged from no detectable levels up to 0.061 ppb.
- For PFOS, the results ranged from no detectable levels up 0.067 ppb.

In February and March 2010, the group of local industries continued their sampling protocol. In accordance with the sampling plan and, based on the results of the first sampling analyses, the industries sampled seven of the twelve initial drinking wells. The final sampling report from this second set of samples indicated that one of these seven drinking water wells had PFOS levels of 0.339 ppb and 0.365 ppb (duplicate sample) values above EPA's provisional health advisory. The residence with elevated PFOS levels was quickly provided with bottle water and connected to the public water supply system by Decatur Utilities and the group of local industries. The final sampling report indicated the following results:

- For PFOA, the results ranged from 0.0285 ppb up to 0.122 ppb.
- For PFOS, the results ranged from no detectable levels up to 0.365 ppb

In May 2010, the group of local industries conducted the third drinking water well sampling event in accordance with their sampling protocol. The final sampling report from this third set of samples indicated none of the six private drinking water wells sampled had PFOA or PFOS values above EPA's provisional health advisory. The final sampling report indicated the following results:

- For PFOA, the results ranged from no detectable levels up to 0.0398 ppb.
- For PFOS, the results ranged from 0.0100 ppb up to 0.0691 ppb.

In August 2010, the group of local industries conducted the fourth drinking water well sampling event in accordance with their sampling protocol. The final sampling report from this fourth set of samples indicated none of the six private drinking water wells sampled had PFOA or PFOS values above EPA's provisional health advisory. The final sampling report indicated the following results:

- For PFOA, the results ranged from no detectable levels up to 0.0524 ppb.
- For PFOS, the results ranged from no detectable levels up to 0.156 ppb.

Industries in the Decatur area have made significant progress over the last few years to reduce and prevent the release of PFCs to the environment. The industries have stopped manufacturing PFOS and are currently phasing out PFOA. Investigations have been ongoing to identify industrial and domestic sources of PFCs to the wastewater treatment plant. Ultimately, the goal is to eliminate or reduce the intake and output of these contaminants to levels that will not impact public health or the environment.

In April 2010, ATSDR, in collaboration with EPA, voluntarily sampled and tested the blood of 155 residents in the Decatur area to determine the concentration of PFOA, PFOS and other PFCs in their blood. The testing was free to qualified participants and the individual's results will be kept. Participants received no other medical tests, diagnosis, or treatment. The ATSDR investigation targeted residents who have potentially been exposed to PFCs released by the biosolids-applied soils or from water sources containing PFCs. Eligible residents received a letter from the ATSDR inviting them to participate in the investigation. In February 2011, each participant received the test results of their respective PFC blood levels and was invited to meet with an ATSDR toxicologist to discuss their individual blood test results. Participants were informed on whether their test results indicated PFC levels below or above the average of most people in the United States population as referenced in the Centers for Disease Control and Prevention (CDC) National Health and Nutritional Examination Survey (NHANES) for PFOA and PFOS. The ATSDR plans to publish the final summary report in 2011.

Scientists do not definitively know how PFC concentrations in the blood can affect a person's health, and until more research is completed, it is not possible to know:

- If the PFC levels in a person's blood will make the person sick now or later in life;
- If a person's current health problems are related to the PFC levels found in their body; or
- How or from where the PFCs entered their body.

Because of the wide spread use of PFCs, most people in the United States have some concentration of PFCs in their body. Once the PFCs are in a person's body, it takes several years for the level in the body to be reduced by one-half the initial level, even if no further exposures to PFCs occur. There is still much to learn about the health effects associated with PFCs. Some studies suggest that lower birth weight, increased cholesterol, and changes in liver function may be associated with exposures to PFCs. Yet, other studies have not shown the same associations. Therefore, there is still much debate about how exposures to PFCs may affect humans. Because many factors can contribute to health problems, it is difficult to link a person's health problem directly to any single measurement of PFCs in the blood. Testing of a person's PFC blood concentrations can be used to determine if exposures have occurred; however, these measurements do not tell the timing, magnitude, or duration of exposure.

Additional Information:

Information on PFC contamination of biosolids applied near Decatur, Alabama and other related topics are available at the EPA Region 4 website:
http://www.epa.gov/region4/water/PFCindex.html

The environmental samples associated with the Decatur Utilities biosolids contain other PFCs for which EPA has not issued drinking water and residential advisory levels. EPA is currently working to establish a threshold value for PFCs, including PFOA and PFOS, in biosolids to protect public health through all exposure pathways, but has not yet completed this ongoing work. Therefore, it is not currently known if the levels of PFOA, PFOS and other PFCs in Decatur Utilities biosolids are protective of public health. EPA has not established guidance levels for PFCs, including PFOA or PFOS, in wastewater effluent, sewage sludge, compost, groundwater or surface water as it has for drinking water and residential soil.

If persons are concerned about PFC compounds in their drinking water, some water filtration devices (point-of-use devices that are installed at an individual tap, faucet, or outlet) may remove some of these compounds from water, based on a study conducted by the Minnesota Department of Health. Individuals should contact the company that makes the water filtration device to determine whether the device is effective in removing PFC compounds, and ask for advice on how often they should change their filters.

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