

Public Comments regarding DEQ Pollution Abatement Permit # 00816 for land application of sewage sludge, Northumberland County

DEQ plans to permit 507 acres in Northumberland County to dispose of municipal sewage sludge for the next ten years. Setting aside issues regarding human health, or the dissemination of fecal coliform bacteria into the watersheds of tidal creeks already restricted for the harvesting of shellfish because of high fecal coliform bacterial levels, or the dissemination of potentially harmful substances like pharmaceuticals into the environment, how much pollution will this “free fertilizer” cause?

Fertilization can never be 100% efficient, no matter how it is accomplished. It is widely accepted (e. g. the February 2010 Scientific American) that the efficiency of conventional agricultural chemical grain fertilization is between about 50 and 75%. Using the higher figure, charitably, if 100 pounds of nitrogen are applied per acre to grow corn or wheat, only 75 pounds (75% of 100) are removed from the field in the grain. The remainder (25 pounds) is released to the environment. Nitrogen left in the field for the next crop is balanced by residual nitrogen from the previous crop. No more than 20% of the nitrogen applied to fields but not sequestered in the grain ends up in the atmosphere as harmless nitrogen gas by a process known as denitrification. Therefore, at least 20 pounds (80% of 25) of nitrogen pollution is caused by conventional chemical fertilization at a rate of 100 pounds of nitrogen per acre. Bay-wide, conventional chemical crop fertilization causes about one-quarter of Bay nutrient pollution.

Sewage sludge is the least efficient “fertilizer” in common use and is applied on the basis that 30% of the nitrogen is available to the next crop. This is because microbes only slowly decompose the organic material in the sludge, releasing the nutrients whether or not the crop is growing. As a surrogate for the new acreage, here are numbers from a Nutrient Management Plan for sludge application in 2004 on fields west of Callao that I witnessed (VDHBUR 90). Only 100 pounds of “Plant Available Nitrogen” were required per acre due to carry-over from the previous bean crop. Given the chemical composition of the sludge (2.2% Nitrogen, 1.0% Phosphorus, 21% solids), 333 (30% of 333 = 100) pounds of nitrogen were disposed on each acre, or about 38 wet tons. If 75 pounds of nitrogen were removed from the field by harvesting the grain, that leaves 258 (333 – 75) pounds of nitrogen unaccounted for. If 20% of the 258 pounds of nitrogen was converted to harmless nitrogen gas by denitrification, that leaves about 200 pounds of nitrogen pollution from each acre. Bay-wide, fertilization using animal waste (poultry litter, sludge and manure) causes about one-quarter of Bay nutrient pollution, about the same as is caused by the discharge from all the wastewater treatment plants in the watershed.

In a “worst case” scenario, each application under the pending permit could allow as much as 100,000 pounds (507 * 200) of nitrogen pollution, equivalent to 20,000 50-pound bags of 10-10-10, or 12 tractor-trailer loads. Even if farmers reduce chemical nitrogen fertilization rates in succeeding years, as recommended but not required, no less

than about 60,000 pounds of nitrogen pollution will certainly take place from each application because so much nitrogen is released when crops are not growing.

To put these numbers in perspective, the local Reedville wastewater treatment plant is permitted to discharge 2,436 pounds of nitrogen annually and the Kilmarnock plant 6,019 pounds (9VAC25-720-70).

Sewage sludge is land applied based on the nitrogen needs of the crop. The 2004 land application disposed of 147 pounds of phosphorus on each acre. Soil tests from all the fields that received sludge in 2004 tested “Very High” in phosphorus, meaning that no phosphorus was required to grow the next crop. Yet more phosphorus was disposed (147 pounds per acre) than is recommended for fields having no phosphorus in the soil (120 pounds per acre)! The State justifies massive over-application (disposal) of phosphorus because if land application were limited by phosphorus, according to then-Secretary Tayloe Murphy (his letter is posted on the “My Education” page at www.VaBayBlues.org), fields could not “... accommodate the volumes of animal and human waste generated in the watershed ...” Obviously, State policy continues to favor the special interests that supply, spread and consume animal waste over environmental (water) quality concerns. Using the sludge analyses and application rate from the 2004 Nutrient Management Plan, about 74,000 pounds of phosphorus will likely be disposed on the 507 acres being permitted. Based on soil analyses that already exist, the crops will require no more than 35,000 pounds of phosphorus.

The Reedville wastewater treatment plant is now being modified to roughly quarter its phosphorus discharge to achieve a permitted discharge of 183 pounds of phosphorus each year and the Kilmarnock plant is permitted to discharge 457 pounds (9VAC25-720-70). At least 39,000 pounds of phosphorus will be disposed by each application, to no benefit of crops, on the 507 acres to be permitted by DEQ.

Please keep these numbers in mind as we move toward the long-promised “pollution diet” and the (quantitative) TMDL (Total Maximum Daily Load) process intended to reduce nitrogen and phosphorus pollution and improve Chesapeake Bay water quality, recognizing where EPA and the State place their priorities.

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