

Document Summary

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The Final Report of the Panel of Experts Convened by The Secretary of Natural Resources and The Secretary of Health and Human Resources to Study the Impact of the Land Application of Biosolids on Human Health and the Environment Pursuant to HJR 694 (2007)

Author

Division of Legislative Services

Enabling Authority

HJR 694 (Regular Session, 2007)

Executive Summary

Legislative Directive

In accordance with House Joint Resolution No. 694, the Secretary of Natural Resources and Secretary of Health and Human Resources convened a Panel of experts in 2007 to study the impact of land application of biosolids on human health and the environment. The General Assembly posed specific questions to the Panel and requested that they consider the typical contaminant concentrations and application rates of biosolids in their responses.

Panel Logistics

The Panel included stakeholders from a broad range of disciplines including medicine, higher education, forestry, agronomy, environmental science, ecology, veterinary medicine and law. Secretary of Natural Resources L. Preston Bryant, Jr., and Secretary of Health and Human Resources Marilyn Tavenner served as co-chairs of the panel. The Panel met a total of 12 times between September 18, 2007 and November 19, 2008. An informational website with pertinent information regarding its meetings, communications and resources was maintained at www.deq.state.va.us/info/biosolidspanel.html.

Report Content and Intended Use

This report is intended to provide the Virginia General Assembly with a document responsive to HJR 694, but also one that also captures the diverse viewpoints of panel members who invested valuable time, energy and resources to inform this process with their opinions. This report should be read with an understanding of that approach and intent. Although numerous scientific studies are referenced or summarized in this report, the report as a whole is not intended to represent an impartial scientific review of the HJR 694 issues. This report in its numerous statements and even in its "Panel Recommendations" reflects varying degrees of agreement or disagreement on individual points. Accordingly, the report contents should not be ascribed to individual panelists except where expressly noted as reflecting the viewpoints of a named individual.

Transfer of Regulatory Oversight from VDH to DEQ

Regulatory oversight of all land application of biosolids from the Virginia Department of Health (VDH) to the Virginia Department of Environmental Quality (DEQ) occurred on January 1, 2008. DEQ provided the Panel with information regarding the new regulatory structure, including compliance and enforcement procedures, and new statutory requirements for biosolids operations and permitting. In the first ten months of the program, DEQ conducted over 1000 inspections and issued six warning letters relating to compliance.

DEQ has formed a Technical Advisory Committee (TAC) to review DEQ regulations pertaining to the land application of biosolids. The Panel recommends that the TAC consider all of the issues and

recommendations in the Report that are within the purview of the current DEQ regulatory action.

Summary of responses to the questions raised in HJR 694

1. Are citizen-reported health symptoms associated with the land application of biosolids?

In early discussions, the Panel agreed that addressing the questions surrounding citizen-reported health symptoms should be its highest priority. In the past 18 months, the Panel uncovered no evidence or literature verifying a causal link between biosolids and illness, recognizing current gaps in the science and knowledge surrounding this issue. These gaps could be reduced through highly controlled epidemiological studies relating to health effects of land applied biosolids, and additional efforts to reduce the limitations in quantifying all the chemical and biological constituents in biosolids. While the current scientific evidence does not establish a specific chemical or biological agent cause-effect link between citizen health complaints and the land application of biosolids, the Panel does recognize that some individuals residing in close proximity to biosolids land application sites have reported varied adverse health impacts.

In response to its findings related to this question, the Panel recommends:

- a. DEQ formalize a process that clearly defines the roles and responsibilities of agencies in addressing concerns to land applications on the basis of individual health.
- b. Additional research should be conducted on the potential relationship between human health and exposure to biosolids.
- c. An incident response protocol should be used to systematically collect data regarding citizen complaints.
- d. A communication plan should be used to improve communication among all parties involved in or potentially affected by biosolids land application, especially those who believe that their health has been or may be affected by biosolids land application.

2. Do odors from biosolids impact human health and well-being and property values?

Panel members agreed that there is a perceived relationship between odor and health issues and that reducing odor issues will likely reduce concerns about health impacts. The Panel recognizes that odors from biosolids could potentially impact human health, well being and property values, but could not confirm such an impact or the extent of such an impact based on the current body of scientific literature and information presented directly to this Panel.

In response to its findings related to this question, the Panel recommends:

- a. The TAC should examine the DEQ regulations pertaining to odor, including considering that municipal biosolids generators be required to have odor control plans.
- b. Municipal wastewater treatment facilities should voluntarily implement an Environmental Management System to address quality control issues such as odor.

3. To what degree do biosolids-associated contaminants accumulate in food (plant crops and livestock)?

The response to this question is closely aligned with the additional directive that the Panel “evaluate the toxic potential of biosolid constituents derived from land application to humans, agricultural products, soil organisms, and wildlife.” The Panel responses are summarized here simultaneously.

As long as biosolids are applied in conformance with all state and federal law and regulations, there is no scientific evidence of any toxic effect to soil organisms, plants grown in treated soils, or to humans (via acute effects or bio-accumulation pathways) from inorganic trace elements (including heavy metals) found at the current concentrations in biosolids.

Whether there are longer term chronic effects from bioaccumulation of pharmaceutical and personal care products and other persistent organic compounds that might be applied in biosolids is more difficult to measure, and has not been rigorously studied to date. There are gaps in the research to characterize the composition, fate, and effects of these constituents in biosolids, as well as in other products, materials and the environment. Furthermore, the relative importance and risk of these constituents, which have not been fully assessed, and their potential for bioaccumulation in plant crops and livestock are the subject of ongoing research.

In response to its findings related to these questions, the Panel recommends regular review of the research that pertains to biosolids and its fate and transport to livestock and plant crops, with summaries developed that would document any significant new findings.

4. To what degree do biosolids-associated contaminants affect water quality?

The effect of biosolids land application on water quality depends on the rate, timing and location of application and can be minimized or eliminated if applications are made using practices that are in conformance with all state and federal laws and regulations.

A certain amount of nutrient loss, whether through surface runoff or groundwater leaching, is inevitable in farming systems, including those that use biosolids. Nutrient management planning has developed as a means of minimizing potential nutrient losses while maintaining an economically viable farming operation. Virginia biosolids regulations require the use of a nutrient management plan (NMP) to determine the nitrogen (N) and phosphorus (P) applications. Some sites are considered more “environmentally sensitive” to N losses than other sites and have even more stringent timing requirements.

Much of the research to date has been focused on nutrients, pH, and metals, thus much is known regarding how to control the associated water quality effects. However, there is very little research to date on other constituents, their transport mechanisms, and how they might affect water quality. While certain contaminants have been found in land applied biosolids, mere presence will not in itself cause water quality impacts without a means to reach ground and surface waters. Additionally, presence does not indicate danger without a toxic concentration. Transport mechanisms of inorganic nutrients have been studied extensively, but transport of other constituents have not.

In response to its findings related to this question, the Panel recommends:

- a. The TAC should examine the DEQ regulations regarding environmentally sensitive sites, mined and disturbed land reclamation, and the methods used to determine the phosphorus application rate.
- b. Review and consolidation of recent information on water quality impacts other than those from nutrients. The Panel notes there is ongoing research on this topic.

5. What are the effects of an accumulation of biosolids-associated contaminants in wildlife?

The evidence concerning the impact of biosolids on wildlife is mixed, with some studies indicating a positive effect on wildlife populations as a result of the use of biosolids to restore wildlife habitat, as well as minimal impact on forest small mammal populations due to heavy metal contamination from the application of biosolids for silvicultural purposes. However, other studies have suggested potential long-term negative health, reproductive, behavioral and population viability impacts from the exposure to compounds and contaminants that are ubiquitous in multiple environmental media including biosolids. There are few studies or field trials that have investigated the above listed impacts of these contaminants on wildlife from biosolids land application.

In response to its findings related to this question, the Panel recommends research to investigate potential acute and chronic health impacts of biosolids on wildlife. Additionally, research should be regularly reviewed that pertains to biosolids and its effects on wildlife, with summaries developed that would document any significant new findings.

HJR 694 also directed the Panel to take the following additional steps in conducting their study:

Perform a detailed analysis of the chemical and biological composition of biosolids. The Panel was limited in the performance of this task considering no funding was available to conduct new analyses. The vast number of constituents in biosolids combined with the specialized analytical methodologies to detect and quantify these constituents involves significant cost. Thus the Panel relied on existing data.

In an effort to gather information on the biosolids material being land applied in Virginia, the expert panel sent a request to wastewater treatment plants that generate biosolids land applied in Virginia. The results of this survey demonstrate that an extensive history of the compliance regarding levels of regulated parameters is available. Information on non-regulated parameters is limited, although it was noted that in the small data set obtained by the Panel, the levels of most of these other parameters were non-detectable based on the sensitivity of the analytical methodology.

The complete results of the latest US EPA limited biosolids survey are expected to be released by the end of calendar year 2008. This survey will report on the concentrations of 145 chemical constituents in biosolids.

To support research being conducted in response to questions regarding biosolids effects on human health, wildlife, or water quality, the panel suggests that DEQ inspectors could be utilized to gather samples.

Alternative Technology

HJR 694 also directed the Panel to investigate the capacity of alternative technologies to facilitate the beneficial use of biosolids and their disposal. The Panel discussed many different technologies and the benefits and detractors of each. The Panel noted that adoption of alternative technologies is often hindered by cost and lack of performance history.

The Virginia Biosolids Council held a Biosolids Technology Forum in September, 2008 to explore new technology. The notes from that forum are attached as an attachment to this report.

The Panel recommends that additional research and engineering analyses of alternative technologies is needed to fully evaluate the risk-benefit and cost-benefit. The institutional and financial mechanisms that should be considered when implementing or investigating alternative technologies include federal government agencies, state financial incentives in cooperation with local governments, partnering with private companies, and research foundations. Incentives for conducting pilot studies of alternative technology also should be investigated. Public-private partnerships and development of a state or regional project should be explored.

Additional Panel Considerations

The Panel recommends that the fees collected from municipal wastewater treatment plants to fund the biosolids permitting, compliance and enforcement program should be continued in order to provide assurance that the regulations that protect human health and the environment are followed.



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