

**A FIRST-YEAR 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)**

**TO THE GOVERNOR AND  
THE GENERAL ASSEMBLY OF VIRGINIA**



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# *COMMONWEALTH of VIRGINIA*

*Office of the Governor*

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## Memorandum

To: The Honorable Timothy M. Kaine  
Governor, Commonwealth of Virginia  
  
and  
  
Members of the General Assembly of Virginia

From: L. Preston Bryant, Jr.  
Secretary of Natural Resources  
  
and  
  
Marilyn B. Tavenner  
Secretary of Health and Human Resources

Date: January 9, 2008

We are pleased to transmit to you the first-year report of the panel of experts convened pursuant to HJR 694 (2007) to study the Impact of the Land Application of Biosolids on Human Health and the Environment.

This report summarizes the panel's meetings and deliberations in 2007 and addresses its work plan for 2008. A final report including findings and recommendations will be submitted by the first day of the 2009 Session of the General Assembly as required by the resolution.

Please let either of us know if you have any questions.

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## Executive Summary

In 2007, the General Assembly adopted House Joint Resolution 694, which directed the Secretary of Natural Resources and the Secretary of Health and Human Resources to convene a panel of experts to conduct a two-year study of the impact of the land application of biosolids (treated sewage sludge) on human health and the environment. The panel was directed to consider and respond to a number of specific questions relating to the environmental and health impacts of the land application of biosolids in the Commonwealth and to report to the Governor and to the General Assembly by the first day of both the 2008 and 2009 Sessions.

The resolution directed the Secretaries to appoint individuals to the expert panel who, by training, education, or experience, are knowledgeable regarding the land application of biosolids. The panel members were drawn from the relevant state agencies, institutions of higher education, and the private sector. The individuals selected to serve on the expert panel are as follows:

- **Ralph O. Allen, Ph.D.**, Professor, Director, Office of Environmental Health and Safety, University of Virginia School of Medicine
- **Russ Baxter**, Deputy Director, Virginia Department of Conservation and Recreation
- **Robert Call, M.D.**, Medical practitioner
- **Jerre Creighton**, Research Program Manager, Virginia Department of Forestry
- **W. Lee Daniels, Ph.D.**, Professor, Department of Crop and Soil Environmental Sciences, Virginia Tech
- **Barry Dunkley**, Director of Utilities, City of Danville
- **Greg Evanylo, Ph.D.**, Professor, Department of Crop and Soil Environmental Sciences, Virginia Tech
- **Susan Fischer-Davis, M.D.**, Deputy Director, Office of Epidemiology, Virginia Department of Health
- **Tom Fox, Ph.D.**, Associate Professor, Department of Forestry, Virginia Tech
- **Rima B. Franklin, Ph.D.**, Assistant Professor, Department of Biology, Virginia Commonwealth University
- **James Golden**, Deputy Director for Program Coordination, Virginia Department of Environmental Quality
- **Robert Hale, Ph.D.**, Professor, School of Marine Science, Virginia Institute of Marine Science
- **Scott P. Johnson, M.P.A.**, Commissioner's Office, Virginia Department of Agriculture and Consumer Services
- **Howard Kator, Ph.D.**, Associate Professor, Chair, Department of Environmental and Aquatic Animal health, Virginia Institute of Marine Science
- **Mark Levine, M.D.**, MPH, Director, Henrico County Health Department, Virginia Department of Health
- **John T. Novak, Ph.D.**, Professor, Department of Civil and Environmental Engineering, Virginia Tech
- **Karen Pallansch**, CEO, Alexandria Sanitation Authority

- **Christopher Peot, P.E.**, Manager, Biosolids Management Division, DC Water and Sewer Authority
- **Alan B. Rubin, Ph.D.**, Consultant (Principal, Envirostrategies, LLC)
- **Jonathan Sleeman, VetMB, Dipl. ACZM, MRCVS**, Wildlife Veterinarian, Virginia Department of Game and Inland Fisheries
- **Henry Staudinger, JD**, Citizen representative
- **R. Leonard Vance, Ph.D., JD**, Associate Professor, Department of Epidemiology and Community Health, Virginia Commonwealth University School of Medicine

Secretaries Preston Bryant and Marilyn Tavenner serve as co-chairs of the panel.

The expert panel held its first meeting on September 18, 2007. At the Secretaries' request, the Virginia Department of Environmental Quality (DEQ) and Virginia Department of Health (VDH) provided facilitators and staff support to assist the panel with its work. The first meeting focused on panel member introductions and areas of expertise; interpretation of the panel's charge; and background on implementation of the permitting program for land application of biosolids in the Commonwealth. The panel decided to divide into two workgroups, one focusing on health issues and the other focusing on environmental issues. Several panel members have elected to participate in both workgroups. A public comment session was also held at the first meeting to allow the public to share their concerns with the panel.

The environmental workgroup met on October 16, 2007, and the health workgroup met on October 24, 2007. The full panel then met again on November 16, 2007 in Richmond. Each meeting enabled the panel to refine their strategies for addressing the tasks posed by the resolution, as well as to decide which working group would address specific questions in the resolution. Each workgroup is developing an initial work plan to address relevant topics.

The panel offered an opportunity at each meeting for the public to provide comment and will continue to allow for public comment at future meetings.

In addition to posting panel meeting notices on the Virginia Town Hall website, a website dedicated to the work of the expert panel was developed to provide additional information. The panel's website is housed on the Virginia Department of Environmental Quality's website, <http://www.deq.state.va.us/info/biosolidspanel.html>. The website includes meeting minutes, correspondence from panel members and the public, and links to related technical information. The panel is mindful of the sensitive nature of personal health information that may be obtained in the course of its study and will take appropriate measures to ensure that individual privacy is appropriately protected.

The charge of the panel is so broad that each work group initially focused on determining an achievable scope of work for the coming year. The workgroups and full panel plan to focus on the following topics in 2008:

### **Health Workgroup**

- Are citizen-reported health symptoms associated with the land application of biosolids?
- Do odors from biosolids impact human health and well-being and property values?
- To what degree do biosolids-associated contaminants accumulate in food (plant crops and livestock)?

In addition, the workgroup will attempt to document and evaluate citizen-reported health symptoms associated with the land application of biosolids. As a component of this exercise, the panel is reviewing recent research on this topic conducted by the University of North Carolina in association with the Water Environment Research Foundation. The workgroup also intends to catalogue specific health complaints made in the Commonwealth. In addition, the health workgroup will review the adequacy of buffers at land application sites for the protection of human health. The panel also plans to examine citizen involvement in the permitting process, and as time and resources permit, the health workgroup will examine other health questions, including transport of disease-causing agents via aerosols, the effect of endotoxins that may be present in biosolids, and health effects related to odors.

### **Environmental Workgroup**

- To what degree do biosolids-associated contaminants affect water quality?
- What are the effects of an accumulation of biosolids-associated contaminants in wildlife?

The environmental workgroup also intends to consider the chemical and biological composition of biosolids and evaluate the toxic potential of biosolids constituents derived from land application to humans, agricultural products, soil organisms, and wildlife. The environmental workgroup has requested staff from the Department of Environmental Quality and Department of Conservation and Recreation to brief them on the application requirements and water quality effects.

Since a lack of resources prevents the panel from performing its own detailed analysis of the chemical and biological composition of biosolids, the panel will (i) examine the latest research from the U.S. Environmental Protection Agency regarding the recent nationwide survey of sewage sludge, and (ii) will solicit biosolids testing and analysis data from wastewater treatment plants that generate biosolids for land application in Virginia.

### **Full Panel**

The full panel will encourage a collaborative exchange of information between the two workgroups to ensure that the workgroups work efficiently to address the tasks

outlined in the legislative resolution. The panel also plans to examine a number of issues that are neither exclusively health nor environmental issues, such as:

- the capacity of alternative technologies to facilitate the beneficial use of biosolids and their disposal;
- the availability, costs, and feasibility of technological alternatives to Class B land application;
- the availability, capital and operations costs, feasibility, environmental and human health impact, and public acceptance of alternative technologies for the beneficial use of biosolids; and
- institutional and financial mechanisms for assisting localities in implementing alternative technologies at the state, local, and regional levels.

The panel intends to invite guest experts to address several topics in 2008, such as the risk assessment used in development of the US Environmental Protection Agency's regulations concerning biosolids. Panel members also intend to visit an active biosolids land application site to observe the practice first hand.

Finally, at the full panel's request, a bibliography of recommended literature is being compiled, and is available for viewing on the panel's website:  
<http://www.deq.virginia.gov/info/panelcorrespondence.html>.



# Biosolids Expert Panel – 2007 Report

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## Introduction

The 2007 General Assembly, through House Joint Resolution 694, directed the Secretary of Natural Resources and the Secretary of Health and Human Resources to convene a panel of experts to study the impact of land application of biosolids (treated sewage sludge) on human health and the environment. The panel is to respond to several questions regarding the environmental and health impacts of the land application of biosolids in the Commonwealth. The panel is to complete its meetings for the first year by November 30, 2007, and for the second year by November 30, 2008, and to submit a report to the General Assembly by the first day of both the 2008 and 2009 Sessions.

## Panel Members

The resolution directs the Secretaries to appoint individuals to the expert panel who by their training, education, or experience are knowledgeable regarding the land application of biosolids. The resolution specifies that the panel shall include, but will not be limited to, representatives of the Department of Environmental Quality, the Department of Health, the Department of Agriculture and Consumer Services, the Department of Conservation and Recreation, Virginia Polytechnic Institute and State University, the Virginia Institute of Marine Science, the University of Virginia, and Virginia Commonwealth University. The Secretaries contacted the administrators of these agencies and academic institutions and requested nominees for the panel. In addition, several experts from the private sector were chosen based on their unique knowledge of the subject matter.

Secretaries Bryant and Tavenner serve as co-chairs of the panel.

Members selected are listed below:

- **Ralph O. Allen, Ph.D.**, Professor, Director, Office of Environmental Health and Safety, University of Virginia School of Medicine
- **Russ Baxter**, Deputy Director, Virginia Department of Conservation and Recreation
- **Robert Call, M.D.**, Medical practitioner
- **Jerre Creighton**, Research Program Manager, Virginia Department of Forestry
- **W. Lee Daniels, Ph.D.**, Professor, Department of Crop and Soil Environmental Sciences, Virginia Tech
- **Barry Dunkley**, Director of Utilities, City of Danville
- **Greg Evanylo, Ph.D.**, Professor, Department of Crop and Soil Environmental Sciences, Virginia Tech
- **Susan Fischer-Davis, M.D.**, Deputy Director, Office of Epidemiology, Virginia Department of Health
- **Tom Fox, Ph.D.**, Associate Professor, Department of Forestry, Virginia Tech

- **Rima B. Franklin, Ph.D.**, Assistant Professor, Department of Biology, Virginia Commonwealth University
- **James Golden**, Deputy Director for Program Coordination, Virginia Department of Environmental Quality
- **Robert Hale, Ph.D.**, Professor, School of Marine Science, Virginia Institute of Marine Science
- **Scott P. Johnson, M.P.A.**, Commissioner's Office, Virginia Department of Agriculture and Consumer Services
- **Howard Kator, Ph.D.**, Associate Professor, Chair, Department of Environmental and Aquatic Animal health, Virginia Institute of Marine Science
- **Mark Levine, M.D.**, MPH, Director, Henrico County Health Department, Virginia Department of Health
- **John T. Novak, Ph.D.**, Professor, Department of Civil and Environmental Engineering, Virginia Tech
- **Karen Pallansch**, CEO, Alexandria Sanitation Authority
- **Christopher Peot, P.E.**, Manager, Biosolids Management Division, DC Water and Sewer Authority
- **Alan B. Rubin, Ph.D.**, Consultant (Principal, Envirostrategies, LLC)
- **Jonathan Sleeman, VetMB, Dipl. ACZM, MRCVS**, Wildlife Veterinarian, Virginia Department of Game and Inland Fisheries
- **Henry Staudinger, JD**, Citizen representative
- **R. Leonard Vance, Ph.D., JD**, Associate Professor, Department of Epidemiology and Community Health, Virginia Commonwealth University School of Medicine

### **Meetings**

The first meeting of the expert panel was held on September 18, 2007 in Richmond. DEQ and VDH were asked by the Secretaries to provide facilitators, transcriptionists, and support staff to assist the panel with its work. The primary focus of the first meeting was to ensure that all panel members (i) became familiar with the expertise of their fellow panel members; (ii) clearly understood the charge of the panel, per the resolution; and (iii) were presented with information regarding how the permitting program for land application of biosolids has been implemented in Virginia under the Virginia Department of Health (VDH) and how the program will transition to DEQ supervision in January, 2008. The panel also engaged in a robust discussion of relevant issues, including determining the working structure that would best suit their needs. It was decided that the panel would divide into two workgroups, one focusing on health issues and the other focusing on environmental issues. While some environmental and human health issues overlap, the panel felt that establishment of two workgroups was an efficient way to utilize the expertise of panel members. A number of panel members have since chosen to attend meetings of both workgroups. A public comment session was also held at the first meeting to allow the public to share their concerns with the panel.

The environmental workgroup met on October 16, 2007, and the health workgroup met on October 24, 2007, each in Glen Allen in Henrico County. The full panel then met again on November 16, 2007 in Richmond. These meetings allowed the group to refine their strategies for addressing the tasks posed by the resolution, as well as to decide which working group would address specific questions in the resolution. Several questions were clearly distinguished as either health or environmental issues; however, others were more intertwined in both topics and the panel determined they would look at these issues either as a full group or in both workgroups. Each workgroup is developing a work plan to address the relevant topics.

### **Procedural Issues**

Several procedural issues were addressed at these first meetings. A representative from the Department of Environmental Quality gave a presentation to both working groups regarding how the panel must function as a public body, specifically the requirements of the Freedom of Information Act. This act requires public notice of all meetings, and clarification was provided that any gathering or conversation of three or more members of the panel to discuss panel business would require public notice.

In addition to the public notice for meetings posted on the Virginia Town Hall website, a website dedicated to the work of the expert panel was developed to provide additional information. The panel's website is located within the Virginia Department of Environmental Quality's website, <http://www.deq.state.va.us/info/biosolidspanel.html>. The website includes meeting minutes, correspondence from panel members, correspondence from the public, and links to related technical information. Due to the sensitive nature of personal health information that may be provided by the public, correspondence from the public is not posted unless a specific request is made by the subject of the personal information. Further, the panel recognized that privacy issues would require particular attention in future work of the group in order to protect citizens while also ensuring the panel has the information they need regarding health effects.

The panel has provided an opportunity at each meeting for the public to provide comment. On several occasions, citizens responded at the end of the meeting with their reaction to the discussions of the panel heard that day. The panel will continue to allow for public comment and will adjust meeting agenda based on the amount of interest the public exhibits at a particular meeting.

### **Strategy for 2008**

In the panel's estimation, the timeframe allotted for the panel's work and the lack of appropriated funding, make it highly unlikely that the intended scope and breadth of the panel's charge can be accomplished. The initial focus of each workgroup, therefore, was to determine an achievable scope of work for the coming year. Each workgroup has examined the resolution and chosen to focus their specialized expertise on specific items.

### **Health Workgroup**

The health workgroup will focus its efforts on the following questions posed in the resolution:

- Are citizen-reported health symptoms associated with the land application of biosolids?
- Do odors from biosolids impact human health and well-being and property values?
- To what degree do biosolids-associated contaminants accumulate in food (plant crops and livestock)?

At its first meeting, the health workgroup recommended prioritizing for study those issues that could have the most direct impact on human health. There also was general agreement among the members to place a priority on issues that, despite previous examination, continue to be the least understood and “settled.”

In addition, the workgroup agreed to attempt to document and evaluate systematically citizen-reported health symptoms associated with the land application of biosolids. As a component of this exercise, the panel is reviewing recent research on this topic conducted by the University of North Carolina in association with the Water Environment Research Foundation. The workgroup also intends to catalogue specific health complaints made in the Commonwealth.

Further, the health workgroup will review the question of adequate buffers at land application sites for the protection of human health. This is a significant issue, both in terms of the adequacy of buffers to protect highly sensitive individuals from initial exposure, as well how to address the issue of further exposure to individuals who may be experiencing health effects from past applications. The panel also plans to examine citizen involvement in the permitting process prior to permit development. Finally, as time and resources permit, the health workgroup is interested in examining other health questions about which there is significant public concern, including transport of disease-causing agents via aerosols, the effect of endotoxins that may be present in biosolids, and health effects related to odors.

### **Environmental Workgroup**

The environmental workgroup will focus its efforts on the following questions posed in the resolution:

- To what degree do biosolids-associated contaminants affect water quality?
- What are the effects of an accumulation of biosolids-associated contaminants in wildlife?

Further, the environmental workgroup will address the following directives included in the resolution:

- perform a detailed analysis of the chemical and biological composition of biosolids.

- evaluate the toxic potential of biosolids constituents derived from land application to humans, agricultural products, soil organisms, and wildlife.

Regarding water quality effects, the presumption that land application occurs in accordance with applicable laws and regulations was a key point of concern, as the effects on water quality are presumed to be controlled in large measure when these rules are followed. For this reason, the environmental workgroup has requested staff from the Department of Environmental Quality and Department of Conservation and Recreation to brief them on the existing requirements. In addition, the panel will take into consideration how regulatory compliance is addressed in the context of the effect on water quality.

The panel's ability to "perform a detailed analysis of the chemical and biological composition of biosolids" will be impossible without available funds. Accordingly, the panel proposes to address this directive in two ways. First, it will examine the latest research from the U.S. Environmental Protection Agency regarding the recent nationwide survey of sewage sludge – these data are expected to be released in early 2008 – and second, it will solicit biosolids testing and analysis data from wastewater treatment plants that generate biosolids for land application in Virginia.

### **Full Panel**

A primary role of the full panel will be to foster a collaborative exchange of information between the two workgroups to ensure that the workgroups work efficiently to address the tasks outlined in the legislative resolution to the fullest extent possible.

In addition, there are a number of issues that the panel felt do not lend themselves well to categorization as either an environmental or human health issue. The panel proposed that these issues be examined by the full panel rather than workgroups. The issues include the following directives posed in the resolution:

- i) evaluate the capacity of alternative technologies to facilitate the beneficial use of biosolids and their disposal
- ii) determine the availability, costs, and feasibility of technological alternatives to Class B land application
- iii) investigate the availability, capital and operations costs, feasibility, environmental and human health impact, and public acceptance of alternative technologies for the beneficial use of biosolids
- iv) identify and recommend institutional and financial mechanisms for assisting localities in implementing alternative technologies at the state, local, and regional levels

The full panel also recommended that a bibliography of recommended literature be compiled. This exercise has already commenced, with initial contributions of individual panel members available for viewing on the panel's website at <http://www.deq.virginia.gov/info/panelcorrespondence.html>.

The panel has also identified other initiatives that may aid their work. Several experts will be invited to address specialized topics, such as the risk assessment used in development of the US Environmental Protection Agency's regulations concerning biosolids. Panel members have also expressed interest in visiting an active biosolids land application site to observe the practice first hand. A field visit is being scheduled for the spring of 2008.

### **Future Meeting Schedule**

The panel has agreed to an ambitious meeting schedule for the coming year. Since several panel members wish to serve on both workgroups, both workgroups will meet on the same dates. The intended meeting schedule is as follows:

January 23, 2008 – Environmental Workgroup (9A–12PM) / Health Workgroup (1-4PM)  
April 23, 2008 – Environmental Workgroup (9A–12PM) / Health Workgroup (1-4PM)  
June 25, 2008 – Full Panel (1-4PM)  
July 23, 2008 – Environmental Workgroup (9A–12PM) / Health Workgroup (1-4PM)  
September 24, 2008 – Full Panel (1-4PM)  
October 22, 2008 – Environmental Workgroup (9A–12PM) / Health Workgroup (1-4PM)  
November 19, 2008 – Full Panel (1-4PM)

The workgroup meeting locations will be determined closer to the respective dates, while the full panel meetings will all be held in Richmond.



