



## **Economic Impact Analysis Virginia Department of Planning and Budget**

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### **12 VAC 5-585 – Amendment to the Biosolids Use Regulation to Provide Standards for the Field Storage of Biosolids**

#### **Virginia Department of Health**

September 19, 2004

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The Department of Planning and Budget (DPB) has analyzed the economic impact of this proposed regulation in accordance with Section 2.2-4007.G of the Administrative Process Act and Executive Order Number 21 (02). Section 2.2-4007.G requires that such economic impact analyses include, but need not be limited to, the projected number of businesses or other entities to whom the regulation would apply, the identity of any localities and types of businesses or other entities particularly affected, the projected number of persons and employment positions to be affected, the projected costs to affected businesses or entities to implement or comply with the regulation, and the impact on the use and value of private property. The analysis presented below represents DPB's best estimate of these economic impacts.

### **Summary of the Proposed Regulation**

Section §32.1-164.5 of the Code of Virginia requires a current Virginia Pollution Abatement permit from the State Water Control Board or a current permit from the State Health Commissioner prior to the land application, marketing, or distribution of sewage sludge. Moreover, the Code of Virginia requires that the location(s) and terms and conditions of any land application, marketing, or distribution of sewage sludge in the state be specified in the permit. Specifically, the Code mandates that the State Board of Health, with the assistance of the Department of Environmental Quality (DEQ) and the Department of Conservation and Recreation (DCR), promulgate regulations that ensure that land application, marketing, and distribution of sewage sludge is performed in a manner that is protective of public health and the environment.

The proposed regulation amends the existing regulation to allow for field storage of biosolids. Under the existing regulation, temporary storage of biosolids in excess of the amount transported to a land application site on a given day and not applied to the site on that day is allowed through the granting of variances. Under the proposed regulation, biosolids in excess of the amount transported to a land application during a single day's operation can be stored without a variance. Field storage of biosolids is allowed as long as conditions and requirements specified in the proposed regulation are met. These include the circumstances under which biosolids may be put into field storage, the length of time and conditions under which biosolids may be stored, the types of biosolids that can be placed into field storage, design and operational requirements for field storage sites, best management practices, recordkeeping and reporting requirements, pre-approval, notification, and public participation requirements, and the conditions under which approval for a field storage site may be denied or revoked.

## **Estimated Economic Impact**

### *Description of the Regulation:*

The proposed regulation allows for temporary storage of biosolids in excess of the amount transported to a land application during a single day's operation without requiring a variance to the biosolids use regulations. Existing regulations restrict temporary storage to a maximum daily amount of 100 wet tons per site and require the stored material to be land applied or moved to a routine storage facility within 30 days. No additional temporary storage is allowed after the first day until the originally stored biosolids are land applied. In order to temporarily store biosolids in excess of the amount transported to a land application site on a given day and not applied to the site on that day, land applicators are required to apply for and be granted a variance. The proposed regulation allows temporary field storage of biosolids in excess of the amount currently allowed under the temporary storage provisions without a variance, as long as conditions and requirements specified in the regulation are met.

The proposed regulation specifies the circumstances under which field storage of biosolids may be utilized. Biosolids may be put in to field storage during (i) inclement weather, (ii) times when the soil at the land application site is frozen or its surface saturated, and (iii) winter months when there is limited or no nutrient uptake and land application of biosolids could physically alter the site surface or result in increased surface run-off of particulates. The

proposed regulation also establishes restrictions on the length of time and the conditions under which biosolids may be stored at field storage sites. Biosolids may be stored in approved field storage sites for up to 14 days. Biosolids stored for more than 14 days are required to have a liner base impervious to and able to support operational equipment. Biosolids stored for more than 30 days are required to have a cover equivalent to or better than that provided by a 10 mil plastic sheet. In addition to these restrictions, the proposed regulation also establishes seasonal restrictions on field storage. Between April and October, biosolids stored at field storage sites are to be removed for use or disposal within 30 days of being placed there. Between November and March, the maximum time in field storage is increased to 45 days for uncovered biosolids and to 120 days for covered biosolids. Finally, the proposed regulation specifies that only dewatered Class A or B pathogen control biosolids established as having minimum odor (i.e., a pH of 11 or more, digested with volatile solids level of 60% or less, etc.) can be placed in to field storage.

The proposed regulation also establishes *design requirements* for biosolids field storage facilities, including a minimum distance of 36 inches to the seasonal high water table and of 40 inches to bedrock (unless an approved site liner of sufficient strength to support operational equipment and with a minimum permeability of  $10^{-6}$  cm/sec is installed), adequate water diversion for sites with an average site slope of greater than 6%, a minimum buffer distance of 500 feet to property lines, occupied residences, potable wells, and surface water<sup>1</sup>, and any additional karst topography-specific design requirements deemed necessary by the Virginia Department of Health (VDH)<sup>2</sup>. The *operational requirements* for biosolids field storage facilities include the removal of the stored biosolids within 48 hours if objectionable odors are found, by VDH, to be interfering with the use of adjacent property, ensuring that biosolids placed into covered field storage are sufficiently cool and have minimum potential for heat build up<sup>3</sup>, ensuring at least once every 14 days and within 24 hours of a severe precipitation event that run-

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<sup>1</sup> Under certain circumstances, the minimum distance to property lines, occupied residences, and potable wells may be reduced by 250 feet.

<sup>2</sup> Karst topography describes a topography that indicates dissolution of underlying soluble rocks by surface water or ground water.

<sup>3</sup> In other words, the health and safety concerns arising out of the build-up of heat, ammonia, and other gases or odors are minimized.

off controls at field storage sites are working adequately<sup>4</sup>, testing all biosolids stored for more than 45 days for fecal coliform and nitrogen prior to land application, scraping and removing any residual biosolids at unlined field storage sites, tilling the soil to break up compaction, and cropping the site to take up nutrients following removal of stored material, and any other requirements deemed necessary by VDH. The *best management practices* include site requirements such as remoteness, no flooding potential (as identified by the County Soil Survey), and low hydraulic conductivity for unlined field storage sites (based on the Natural Resources Conservation Service permeability values), a limit on the quantity of biosolids stored at a site to the agronomic rate of application for nearby land application sites<sup>5</sup>, a requirement for biosolids to be sufficiently dewatered such that a stacking ability of at least four feet is maintained<sup>6</sup>, and requirements that minimize the accumulation of precipitation on the stored material or on material in contact with the stored material.

The proposed regulation also requires that either the treatment facility or the applicator maintain adequate daily records of the quantity of biosolids stored, document all biosolids stockpile field checks (including checking for runoffs and stacking ability), and report the information to VDH on a monthly basis. All field storage locations and biosolids sources are to be pre-approved by VDH prior to field storage. In addition, VDH is required to notify local governments of all proposed field storage sites and provide them with a minimum 30-day comment period. Finally, the proposed regulation allows field storage site approval to be denied or revoked due to odor, health, and water quality problems.

*Estimated Economic Impact:*

The proposed regulation is likely to produce economic benefits and impose economic costs. According to VDH, the standards being proposed for field storage are the same as those used by the agency in determining whether to grant a variance. VDH believes that the main differences between the granting of a variance and the proposed approval process are procedural and administrative in nature. Under existing regulations, land applicators are required to submit a variance request to VDH and go through several layers of administrative review before the

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<sup>4</sup> Any excessive slumping, erosion, or movement of the biosolids pile is to be corrected within 24 hours. The regulation also requires that ponding or odor problems at the site be corrected.

<sup>5</sup> As specified in 12 VAC 5-585-510 (Biosolids Utilization Methods)

variance can be granted. In many cases, they are required to appear at local government meetings and explain the need for a variance. In all, the process takes up to three months. Under the proposed regulation, some of the procedural and administrative requirements are eliminated and the approval process for field storage sites is streamlined. According to VDH, a field storage site will now be approved in much the same manner as permit amendments are approved, through an inspection by VDH to verify that the location meets the requirements of the regulation. The proposed regulation continues to provide for local government participation by requiring that local governments be notified in advance of all proposed field storage sites and be provided with a minimum 30-day comment period.

The *economic benefits* of the proposed regulation arise from a reduction in approval requirements for temporary field storage. The proposed regulation is likely to reduce the cost to land applicators, in terms of time and other resources, in applying for and being granted approval for a biosolids field storage site<sup>7</sup>. VDH believes that the approval process under the proposed regulation is likely to be shorter than the variance process under existing regulations: the approval process being proposed is likely to take around 30 days on average, compared to the three months on average it takes to grant a variance. The approval requirements are also being made less burdensome in other ways. For example, the applicants will no longer be required to appear at local government meetings and explain the need for a field storage site.

A less time consuming and costly approval process for temporary field storage sites is likely to produce additional economic benefits by reducing the dependence on routine storage facilities<sup>8</sup>. VDH estimates that routine storage of biosolids costs an additional \$8 to \$10 more per ton compared to transporting the biosolids directly to a land application site. The agency further estimates that field storage sites near land application sites can reduce storage costs by 50% or more. Thus, a less time-consuming and costly approval process for temporary field storage sites is likely to encourage land applicators to store biosolids at field storage sites than at routine storage facilities. According to VDH, temporary field storage sites pose less of a risk to public health and the environment than do routine storage facilities. Routine storage sites are

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<sup>6</sup> The treatment facility generating the biosolids is responsible for ensuring and documenting the ability of the biosolids to stay consolidated during storage.

<sup>7</sup> No fees are charged by VDH for the granting of variances. Under the proposed regulation, no fees are to be charged for approving temporary field storage sites.

generally used to store large amounts of biosolids and have led to odor and liquid management problems in the past. Ground water testing results from wells located at routine storage facilities across the state over the last 10 years have not verified that nitrogen contamination has occurred directly as result of the stored biosolids. However, the management of precipitation and other accumulated liquids in these storage lagoons has proved to be problematic. Disposal of accumulated liquids at routine storage sites has been especially problematic<sup>9</sup>. For example, the lagoon system once located at the Hanover industrial air park resulted in liquid management problems and odor concerns that eventually led to its closure. By the end of 2005, the agency expects only three storage facilities to be used on a routine basis in the state. Smaller temporary storage sites are not likely to have the same magnitude of odor and liquid management problems as larger routine storage facilities and are, thus, likely to pose less of a risk to public health and the environment. VDH is not aware of any instances when temporary field storage of biosolids has led to health or environmental problems in Virginia. Thus, any shift away from routine storage and towards temporary field storage of biosolids is likely to reduce the risk to public health and the environment from biosolids and produce economic benefits.

A less time consuming and costly approval procedure is also likely to reduce instances of biosolids being land applied inappropriately. Land application of biosolids during inclement weather and inappropriate soil conditions can cause nitrogen to be leached into surface and ground water, contaminating the water and reducing the plant-available nitrogen in the soil. Nitrogen can be lost to surface and ground water if biosolids are applied at rates that supply more nitrogen than crops can utilize or if biosolids are applied at times of low crop nitrogen uptake on soils subject to leaching losses. During winter months, many of the land application sites around the state are frozen and have limited or no nutrient uptake. During these months, land applicators tend to concentrate their activities in the coastal regions of the state, where the soils drain easily and are better able to support vehicular traffic and tilling without risk of soil compaction. However, these soils also pose the greatest risk for leaching loss of nitrogen. A study by Evanylo (2003)<sup>10</sup> looked at the effects of biosolids application timing and soil texture

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<sup>8</sup> Routine storage involves an engineered, permanent structure designed to retain up to 60 days of biosolids production volume.

<sup>9</sup> According to VDH, liquids removed from routine storage facilities due to odor concerns are generally applied to drainfields, increasing the risk of nitrogen contamination of surface and ground water.

<sup>10</sup> Evanylo, G. K., 2003. Effects of Biosolids Application Timing and Soil Texture on Nitrogen Availability for Corn. *Communications in Soil, Science, and Plant Analysis* 14: 125-143.

on the availability of nitrogen for corn. The study was based on field experiments conducted on coarse- and fine-textured soils from two farms in the coastal plains of Virginia between 1996 and 1998. The study concludes that, due to winter weather variability, the opportunities for mineralization of nitrogen from winter-applied anaerobically digested biosolids and subsequent transport into ground water can be high in the coastal plains of Virginia. The study goes on to recommend seasonal restrictions on the land application of biosolids. By reducing the costs associated with obtaining approval for field storage, the proposed regulation will make it easier for land applicators to store biosolids during unsuitable soil and weather conditions at sites that are convenient for subsequent land application. This, in turn, is likely to reduce instances of biosolids being land applied inappropriately and reduce the risk to public health and the environment from biosolids.

Finally, by instituting a uniform and consistent statewide policy regarding temporary field storage of biosolids, the proposed regulation is likely to produce some additional economic benefits. According to VDH, statewide requirements will eliminate the need for non-uniform locality-specific requirements and prevent litigation by land applicators and other permitted entities based on differences in temporary field storage requirements between localities. The agency believes that the language in most approved locality biosolids ordinances is general enough that it would not conflict with the use of a VDH-approved field storage site. However, some localities do place additional restrictions that might conflict with VDH-approved field storage. According to VDH, there have been several instances when land applicators have litigated, sometimes successfully and sometimes unsuccessfully, against localities that restrict temporary field storage of biosolids.

The proposed regulation could also impose additional *economic costs* on the state. By relaxing or eliminating some of the requirements for temporary field storage, the proposed regulation could increase the risk to public health and the environment. Fewer requirements could result in a higher risk of illness or contamination from biosolids stored at temporary field storage sites. In addition, by lowering the cost associated with obtaining approval, the proposed regulation is likely to lead to an increase in the number of temporary field storage sites across the state and this, in turn, could lead to an increased risk of public exposure and environmental contamination.

Biosolids refer to sewage sludge that has been treated for pathogens, disease vector attraction, and other pollutants such that it can be used for land application, marketing, and distribution. According to a study by the National Academy of Sciences<sup>11</sup>, approximately 5.6 million dry tons of sewage sludge are used or disposed of annually in the United States. Of this, approximately 60% or 3.36 million dry tons are used for land application. In Virginia, 200,000 dry tons of biosolids were land applied on 42,000 acres of land (across 20-30 counties) in 2002. Virginia's biosolids use regulations require the same chemical and pathogen standards required under federal regulations. However, VDH believes that the management practices established for land application of biosolids in Virginia are more stringent than those required by federal regulations.

There exist certain public health and environmental risks associated with unregulated exposure to biosolids. The 2002 National Academy of Sciences study evaluated 40 CFR 503 (Standards for the Use or Disposal of Sewage Sludge) and found that there was no documented scientific evidence that federal regulations governing the land application of biosolids had failed to protect public health. The study acknowledged that land application of biosolids is a practical, widely used option of managing the large volume of sewage sludge generated at wastewater treatment plants that otherwise would be disposed of at landfills or by incinerators. However, the study went on to state that additional scientific work was needed to reduce persistent uncertainty about the potential for adverse human health effects from exposure to biosolids. Based on anecdotal reports of adverse health effects, public concerns, and the lack of epidemiological investigation, the study recommended that the Environmental Protection Agency (EPA) conduct studies or promote and support studies that examine exposure and potential health risks to worker and residential populations.

In its preliminary strategy response, EPA identified three main objectives for achieving a better understanding of biosolids and reducing the potential for, or reducing the uncertainty related to, human health impact: (i) updating the scientific basis of 40 CFR 503 by conducting research in priority areas, (ii) strengthening the biosolids program by evaluating results of completed, ongoing, or planned studies both within and outside EPA, and (iii) continuing ongoing activities for enhancing communication with outside associations and with the public.

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<sup>11</sup> "Biosolids Applied to Land: Advancing Standards and Practices", National Academy of Sciences, 2002

In its final action plan, EPA identified 14 specific projects to be initiated over the next two to three years aimed at measuring pollutants of interest, determining the risks posed by contaminants identified as potentially hazardous, bringing various stakeholder groups together via a workshop to begin development of a national incidence tracking system to ultimately determine health effects following land application of biosolids, better understanding and characterizing the odors, volatile chemicals, and bioaerosols that may be emitted from land application sites, better understanding the effectiveness of biosolids processes and management practices to control pathogens, improving EPA's inspection and compliance initiatives, and improving stakeholders' involvement in EPA's biosolids program.

In the interim, pending the development of specific evidence to the contrary, EPA believes that existing federal regulations are protective of public health and the environment. To ensure ongoing review of the public health aspects of the land application of biosolids, VDH has established a biosolids workgroup comprised of eight district health directors who are preventive medicine specialists, an epidemiologist, and a toxicologist. In 2003, the workgroup concluded that a moratorium on the land application of biosolids was not necessary.

According to VDH, the standards being proposed for approval of field storage sites are the same as those used by the agency to determine whether or not to grant a variance under existing regulations. The agency believes that most of the differences between the proposed and existing regulations are procedural and administrative in nature. Applicants will no longer have to go through as many administrative steps and layers as currently required. Despite changes to the approval process, local government participation will continue to be solicited. Even though applicants may no longer be required to appear at local government meetings, the proposed regulation will continue to incorporate local government input into any decision on whether to approve the field storage site or not. According to VDH, under existing regulations local governments are notified of variance applications and, if they choose to request a denial of the variance, are requested to provide specific reasons for such a request. In the absence of any site-specific local concerns and as long as the site meets the required standards, VDH approves the variance. The proposed regulation also requires local government notification of all proposed field storage sites and provides them with a minimum 30-day comment period. VDH is required to consider all such comments in deciding whether to approve the field storage site or not.

Thus, the proposed regulation is unlikely to increase the risk of illness or contamination from biosolids stored at temporary field storage sites. Moreover, existing standards used for granting variances appear to be adequate for the protection of public health and the environment. VDH is not aware of any instances to-date when a temporary storage site authorized under a variance has created health or environmental problems in Virginia. All sites approved for field storage under the proposed regulation will have to continue to meet these standards. As the standards are site-specific and applied to individual field storage sites, an increase in the number of such sites, all meeting these standards, should not increase the risk to public health and the environment from existing levels.

In addition, field storage of biosolids appears to pose less of a risk to public health and the environment than some of the available alternatives. During inclement weather and inappropriate soil conditions, the alternatives to field storage include routine storage and inappropriate land application of biosolids. As discussed above, both these alternatives appear to pose a greater risk to public health and the environment than field storage. Thus, any increase in risk due to a reduction in approval requirements and an increase in the number of field storage sites, is likely to be counter-balanced by a reduction in risk from routine storage or inappropriate land application.

Overall, the proposed regulation is not likely to significantly increase the risk to the public and the environment from the storage and land application of biosolids, and may even lead to an overall reduction in risk.

The net economic impact of the proposed change will depend on whether the benefits of reducing the requirements for approval and streamlining the approval process for temporary field storage sites are outweighed by the costs of doing so. There are no precise estimates available at this time of the net economic impact of the proposed change. However, based on available information, the costs associated with the proposed change do appear to be very large. To the extent that the proposed regulation provides benefits in terms of cost savings to land applicators, a reduction in the use of routine storage and in the instances of inappropriate land application, and establishes a consistent statewide policy without significantly increasing the risk to public health and the environment, it is likely to produce a net positive economic impact.

Under the existing regulation, there have been 23 applications for variance since 1998, of which twelve were approved, seven were disapproved, and four are still pending. The amount of biosolids placed into storage each year depends on weather conditions. Under drier-than-normal conditions, as little as 5% of all biosolids handled may be put into storage. Under wetter-than-normal conditions, up to 30% of all biosolids handled may be put into storage. Of the over 120,000 wet tons stored by one applicator in 2003, approximately 70,000 wet tons were put into routine storage and a little less than 60,000 wet tons were put into temporary storage.

While a majority of the Biosolids Use Regulations Advisory Committee (BURAC) was in support of the proposed regulation, some members have expressed concerns about the regulation.

DCR has expressed concern that the proposed regulatory action is occurring without simultaneous changes to the timing of biosolids land application. As discussed above, inappropriate application of biosolids increases the risk of nitrogen leaching into surface and ground waters. DCR is concerned that the present practice of allowing land application during fall and winter months on sites without growing crops does not adequately protect ground water quality and believes that some restrictions should be placed limiting land application during these months. Since one of the primary reasons for providing storage is to allow land application to occur only when soil and weather conditions are suitable, DCR believes that any changes to the field storage provisions should go hand-in-hand with seasonal restrictions on the land application of biosolids. An earlier draft of the proposed regulation included provisions restricting the application of biosolids during the winter months. However, all changes relating to the timing of biosolids land application are now to be dealt with in a separate regulatory action. The proposed regulation, even without any seasonal restrictions on land application, is still likely to have a beneficial impact in terms of preventing inappropriate land application. By reducing some of the costs associated with getting approval for a temporary field storage site, the proposed regulation provides applicators with a lower cost alternative to land applying biosolids than currently available.

Public comments received by VDH from local governments indicate that they are against state approval of temporary field storage sites. They believe that local governments should have a greater say in the process due to the prevailing health and environmental concerns associated

with biosolids. Conversation with a BURAC member representing the Virginia Association of Counties indicated that there was a fear that the proposed changes would allow applicators to store biosolids at field storage sites without notifying VDH and without justifying the need for field storage. However, as described in the previous section, the proposed regulation specifies the circumstances under which biosolids may be put in to field storage, the length of time and conditions under which biosolids may be stored, the types of biosolids that can be placed into field storage, design and operational requirements for field storage sites, best management practices, recordkeeping and reporting requirements, pre-approval, notification, and public participation requirements for all field storage sites, and the conditions under which approval for a field storage site may be denied or revoked. Concerns were also expressed that the proposed regulation would encourage land applicators to store biosolids at sites around wastewater treatment facilities rather than land applying it, leading to an increased risk of nitrogen and phosphorous contamination and degradation in the nutrient content of the biosolids. However, the proposed regulation establishes restrictions on the type, quantity, and length of time biosolids can be stored at field storage sites. Moreover, according to VDH, the proposed regulation will favor the setting up of small field storage sites adjacent to land application sites rather than large sites around wastewater treatment facilities. Finally, VDH is not aware of any significant degradation in nutrient content of biosolids put into temporary storage. It should be noted that to the extent that the proposed regulation prevents inappropriate land application and reduces the dependence on large routine storage facilities, the proposed change is likely to produce economic benefits.

Concerns were also raised by a BURAC member about the lack of compliance with the proposed standards and the enforcement deficiencies in the proposed regulation (especially with regard to phosphorous content of biosolids). It was the opinion of this member that until these deficiencies were removed, protections currently afforded by local governments should not be stripped away. According to VDH, under the existing regulations local governments are notified of variance applications and, if they choose to request a denial of the variance, are requested to provide specific reasons for such a request. In the absence of any site-specific local concerns and as long as the site meets the required standards, VDH approves the variance (as was the case with the Lanier Farm temporary storage site in Goochland county). The proposed regulation will continue to provide for local government input, requiring local governments to be notified of all

proposed field storage sites and allowing them a minimum 30-day comment period. Moreover, the agency believes that the use of local monitors working with VDH staff should ensure that local government concerns are properly considered prior to the approval of a field storage site.

### **Businesses and Entities Affected**

The proposed regulation affects all land applicators of biosolids. Land applicators would now have to meet less burdensome requirements for approval of temporary biosolids field storage sites than under existing regulations. Under the existing regulation, temporary storage of biosolids in excess of the amount transported to the land application site on a given day and not applied to the site on that day is allowed only through the granting of variances. Under the proposed regulation, some of the procedural and administrative requirements required for a variance are eliminated and the approval process for temporary field storage sites is streamlined. This is likely to result in cost savings for land applicators.

According to VDH, there are nine contractors currently permitted to land apply biosolids in Virginia.

### **Localities Particularly Affected**

The proposed regulation applies to all localities in the Commonwealth.

### **Projected Impact on Employment**

The proposed regulation is not likely to have a significant impact on employment.

### **Effects on the Use and Value of Private Property**

To the extent that the proposed regulation provides cost savings and reduces the cost of operation for the producers, applicators, and users of biosolids, it is likely to raise asset values for these businesses and have a positive impact on the use and value of private property. Moreover, by clarifying and standardizing operating procedures the proposed regulation is likely to further lower operating costs and raise the asset values for companies and entities involved in biosolids land application.

An increase in the number of temporary field storage facilities around the state could have a negative impact on surrounding property values. However, as these sites are most likely to be located in the vicinity of land application sites, the impact is likely to be limited. In addition, to the extent that the proposed regulation provides a lower cost alternative to routine

storage and land application during unsuitable soil and weather conditions, it is likely to reduce the risk to public health and the environment in areas around routine storage facilities and biosolids land application sites. This, in turn, is likely to have a positive impact on property values in these areas.