

14.0 RECOMMENDATIONS AND CONCLUSIONS

As was previously stated, the goal of this report was to characterize and quantify the municipal biosolids produced in Georgia and discuss the current and possible future disposal methods. In the generation of this report, Georgia Environmental Partnership personnel have developed various ideas and recommendations that would be of benefit to the wastewater industry as a whole. Recommendations are organized in the following manner; general, educational, policy related and research based.

General

- 1) *The establishment of a Georgia Office of Biosolids Resource Management.* Such an office should be developed within Georgia to act as a central location for industry support, research management and technology transfer related to proper handling and utilization of biosolids. Informational databases, both hard and electronic versions, would be developed, maintained and made available for distribution to the general public. One of the responsibilities of the Office of Biosolids Resource Management would be to develop a state supported systematic program to classify biosolids. This program's personnel would do the initial site assessments, biosolids sampling, laboratory testing and data reporting for all applications.

Education

- 2) *Training and educational courses taught to local government leaders.* As discussed in this report, the development and delivery of training courses for local government leaders is a prime opportunity to provide an education that is unbiased and scientifically based. These biosolids training courses will be provided in conjunction with the normal environmental classes presently offered by the University of Georgia's Carl Vinson Institute of Government to all newly elected city and county governmental leaders.

Policy

- 3) *Economic incentives to facilities that beneficially utilize biosolids.* Economics is a major driving force behind almost all decisions concerning biosolids disposal/utilization options. Many facilities choose to landfill over other methods of sludge processing since landfilling presents few regulatory hurdles and in most cases is less expensive. Changing an existing disposal/utilization method is difficult, especially when the economics are not in favor of beneficial reuse alternatives. Until beneficial reuse technologies develop further and become more economically competitive with landfilling, it is suggested that Georgia give economic incentives for facilities to beneficially utilize biosolids. These incentives may come in the form of tax breaks, low or no interest capital loans and may be given to biosolids generators and/or consumers.

- 4) *Investigation into the development of a centralized cogeneration facility in the Atlanta Region.* The Atlanta Region has the greatest need of disposal/utilization because it produces the largest amount of biosolids. The synergistic results of high biosolids production, low land availability, and high potential for public disapproval lead to the recommendation for a central large scale electric energy cogeneration system. The benefits of a self sustaining cogeneration system in which biosolids are incinerated to produce electric energy, are biosolids volume reduction rate of 90% and the ability to produce marketable energy, making this option a feasible alternative. Georgia's municipal wastewater treatment facilities landfill approximately 43% of the biosolids produced in Georgia. The Atlanta Region alone accounts for 75% of all landfilled biosolids within the state. A large cogeneration facility would generate all the energy needed to operate the cogeneration facility and provide excess energy that could be sold. The ash by-product could be incorporated into construction materials thus eliminating further waste going to landfill. An adequately designed centralized cogeneration facility located in the Atlanta Region would have the single largest impact on Georgia's landfill reduction goal.

- 5) *Establishment of a committee to review and streamline biosolids permitting processes.* Obtaining permitting and procedural information is sometimes laborious due to the difficulty in locating the right person in the correct state regulatory department that can and will answer questions. There is a great need to have all information, forms and requirements be easy to read and accessible. This can be accomplished using a central web based system where each disposal/utilization option's application and information can be accessed and downloaded.

- 6) *Increased training and resources made available to the Georgia EPD to adequately monitor and enforce regulations.* Public perception can and does affect biosolids disposal/utilization. As discussed earlier, education is a key that may help dispel many negative connotations that are commonly applied when sewage is mentioned. The lack of adequate information to provide better understanding among the public is causing high-level concern and rejection of beneficial reuse (EPA Audit Report, 2000). Some of the negative feelings are rooted in media coverage over poorly managed biosolids programs without any attention to programs that are performing well. This also contributes to a public perception that there is a lack of regulatory oversight associated with biosolids. Conversations with informed individuals across the state confirm that the public believes there is a major lack of oversight by the EPD. EPD provides oversight but does not have adequate personnel and resources necessary to pro-actively monitor each biosolids handling operation.

- 7) *Encouragement and economic incentives for short term contracts with landfill disposal firms.* In a few situations, beneficial reuse opportunities have been curtailed due to long term contracts that some municipalities have with waste management contractors, i.e. landfills. It is understood that the essential nature of business contracts is to ensure quality and consistent service, but encouragement for short term contracts with landfill disposal firms could have potential benefits. Not only do shorter contracts require companies to work harder in order to keep contracts, it also opens up "release"

opportunities for municipalities if they are unhappy with services or wish to change disposal/utilization methods. This “encouragement” would need to be facilitated in conjunction with the education of the decision making bodies of the municipalities.

Research

- 8) *Industrial biosolids production and disposal/utilization options need to be studied in future projects.* This report focused on the waste generation and disposal characteristics of municipal National Pollutant Discharge Elimination System (NPDES) permitted wastewater treatment facilities. It is recognized that the scope of the study of biosolids production was limited because industrial wastes/biosolids have not been included. In an effort to encompass the spectrum of biosolids going to landfills, it is recommended that industrial waste/sludge production and disposal/utilization be studied in future projects. This is a complicated task due to the wide variations of industrial wastes produced in the state.
- 9) *Fund the development of a large scale vermicomposting research and demonstration project.* This report has shown the potential opportunities and benefits associated with vermicomposting of biosolids. Presently, vermicomposting is only being done on a very small scale by a few companies in Georgia. Previous research shows the viability of vermicomposting to stabilize pathogens and produce a Class A product meeting all Part 503 regulations. One recommendation is for Biological & Agricultural Engineering Department personnel at the University of Georgia to set up a large scale vermicomposting research and demonstration project that will show the potential of this “new” bioconversion process and the effects it can have on Georgia’s biosolids utilization.
- 10) *Development of lab scale and later full scale research projects showing the feasibility of animal feed production utilizing biosolids.* As is discussed in detail in the New Strategies for Biosolids Utilization section, the idea of using biosolids as an ingredient in the

production of feed for animals seems to be a promising avenue of exploration. This report recommends that Biological & Agricultural Engineering Department personnel at the University of Georgia to do lab scale and later full scale research projects showing the feasibility of feed production utilizing biosolids that will have the potential to be incorporated into industrial processes.

- 11) *Fund research projects to investigate the off site environmental impacts of various biosolids utilization processes.* While literature and studies are available to document the long term impacts of land application, little is known on the impacts of composting or incineration facilities. This research would provide essential data to those developing streamlined regulations and provide a basis for local leaders to base disposal decisions.
- 12) *Funding be provided to establish public educational programs for the State of Georgia.* These programs can include workshops on the potential benefits that biosolids utilization can have on Georgia's agricultural community

While recognizing the high priority on the pollution prevention efforts to reduce waste throughout industries, it should be noted that pollution prevention in wastewater treatment facilities is in the preliminary research stage for biosolids source reduction. Until more research efforts are focused on biosolids source reduction in municipal wastewater treatment facilities, the next step in the pollution prevention hierarchy "reuse" will be the focus of biosolids disposal/utilization.

The need to reduce the waste flow to Georgia's landfills is a major concern for those who understand the ramifications that limited and reduced space in landfills have on the economies of industries and individuals. Long term goals of waste reduction and alternative reuse are realized when individual decision-makers make pro-active decisions, whether economically or environmentally based, to enact, change or modify operations that positively affect the waste stream to landfills.

Such reduction goals cannot be accomplished by simply addressing one area of the

problem; rather a collaborative effort is needed from each contributing factor. The Georgia Environmental Partnership is stepping forward by delivering informative reports and technical assistance that promote the adoption of pollution prevention, energy efficiency, and environmental compliance technologies throughout Georgia. The reduction of biosolids to Georgia's landfills through utilization of beneficial reuse technologies is one of the many avenues being traveled in the continuing effort for more environmentally sound by-product reduction methods.

The alternative disposal methods discussed in this report are viable options to landfilling. Although these alternatives when compared strictly on a disposal cost per ton basis are not as inexpensive as landfilling, the extraneous factors of producing marketable, beneficial products and increased positive public relations can offset the economic bias accredited to cost. An increasing percentage (presently at 43.23%) of biosolids produced in Georgia is routed to an ever-decreasing number of landfills. The rapidly expanding Atlanta Regional Commission alone accounts for 75% of all the biosolids landfilled. This fact is significant when considering the exponential growth and expansion the Atlanta region is experiencing as it incorporates the surrounding rural regions. The impending future trends of growth and accompanying factors of increased pollution, traffic, reduced land availability etc., mandates the need for implementation of alternative technological and/or techniques both in reducing biosolids production in wastewater treatment process and in expanding the use of alternate disposal methods.

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