Chapter 10 – Non-Restricted Distribution

The non-restricted distribution of biosolids products is regulated under the land application provisions of the Part 503 Rule. The regulations establish criteria designed to protect public health and the environment when these products are made available in settings where no regulatory oversight or control over their use is imposed. This approach is predicated on the understanding that such products will be used in the same way as other similar non-biosolids products (e. g., fertilizers, soil amendments). The criteria for non-restricted distribution are contained in the Part 503 Rule and discussed in Federal and State Regulations, Chapter 3 of this manual. Biosolids products for non-restricted distribution must not exceed the pollutant concentration limits of 503.13 Table 3; meet one of the Class A pathogen reduction requirements; and one of the first eight vector attraction reduction requirements. The Part 503 Rule frequency of monitoring, record keeping and reporting requirements also must be met for non-restricted distribution.

States may have additional requirements for non-restricted distribution of biosolids products. Biosolids managers should check with state regulators to ensure they are complying and have any necessary distribution permits, which are usually less complex than those required for site-by-site land application permits.

The most common non-restricted distribution products result from one of three processes: composting, heat drying/pelletization; and alkaline stabilization. Simply meeting these process requirements, however, does not guarantee a product that will find acceptance in a particular market or for a particular use. This chapter discusses the operational controls that must be addressed for successful distribution of biosolids products. It also discusses market development strategies for different types of biosolids products, as well as ways of expanding market opportunities.

10.1 Critical Control Points / Operational Control Points

There are a number of controls associated with non-restricted distribution. They include:

- Regulatory requirements
- Product quality
- Wastewater/ solids treatment
- Meeting customer needs
- Maintaining product outlets

10.2 Regulatory Requirements

A biosolids facility's responsibility for ensuring that the product meets regulatory criteria ends as soon as the product is given away or sold. It can be land applied or mixed with other (non-biosolids) materials prior to land application, but the person or facility handling the material does not have to keep records or comply further with the Part 503 Rule land application general requirements and management practices. In other words, as long as the product has met all the applicable Part 503 Rule criteria before it went out the door, the producer has met all federal regulatory criteria.

Confusion has arisen, however, with regard to product that remains on site or is blended with other materials. In 1999, USEPA's Pathogen Equivalency Committee and its contractor revised the guidance document (USEPA 1999) that addresses the biosolids processors' responsibility for continued compliance with Part 503 Rule. It states that if the preparer still retains control over the product, perhaps storing the material on site or blending it with other materials, the product still falls under the Part 503 Rule requirements -- even if prior to storage or blending it met the Part 503 Rule criteria. The biosolids manager must keep records of the material and conduct microbial analyses as shortly before distribution as possible.

If the facility changes the characteristics of the material by mixing it with another product, possible changing its status, this constitutes a "sludge preparation" according to USEPA. This means that the mixing process must be monitored for compliance and the new material (e.g., a compost-soil blend) must comply with the Part 503 Rule. In other words, the *blend* would have to meet pathogen reduction requirements, pollutant limits, vector attraction reduction and microbial limits prior to distribution.

For product to be sold in the agricultural market, it is important to check any agricultural regulations that might apply. For example, most states require a guaranteed nutrient analysis to register a product as a fertilizer or nutrient source.

It is important to note that a biosolids product can meet the regulatory requirements for non-restricted distribution and still not be acceptable to consumers that are unfamiliar with biosolids and how they should be used. It is important to continued product acceptance that the consumer be satisfied with the product itself and with the results it achieves.

Programs that distribute biosolids products to the public should inform consumers about appropriate methods of use, by labeling or some other means. Many of the management practices discussed in other chapters of this Manual will be helpful in developing instructions for use of non-restricted biosolids products.

10.3 Product Quality

Ensuring that a biosolids product meets the regulatory requirements is the basic component of non-restricted distribution. Biosolids managers must be familiar with the pollutant content of the biosolids, as well as that of any amendments used in a composting process. This linkage also extends to the pretreatment component of the wastewater treatment system, in order to insure continued production of a material that meets regulatory requirements with respect to regulated pollutants.

Equally important is that the product meets customers' needs in terms of quality. This includes factors such as product appearance, odor and stability level -- and requires built- in controls throughout the process to insure that a quality product is being delivered on a consistent, reliable basis. There is no room for surprises, and having the proper controls in place minimizes the opportunity for unacceptable material leaving the facility.

10.3.1 General Product Quality Issues

Housekeeping. Overall facility appearance is important, especially if customers are coming to the facility to pick up the product. Moreover, good housekeeping is important to maximizing ability to comply with permit requirements, especially those related to pathogen control. For example, especially for smaller operations that share equipment for the whole process, equipment that has been used to handle unprocessed biosolids should not be used directly to handle finished product. Basic housekeeping steps should be spelled out in an employee manual and/or standard operating procedures (SOP's).

Storage. Due to seasonal demand for biosolids products, storage must be included in the overall management plan for a facility operation.

Record keeping: Part 503 Rule has its own set of record keeping requirements, but producers of non-restricted distribution products may want to go beyond the basic requirements, both for internal tracking purposes and for responding to customer or regulator questions.

Product appearance, consistency and odor: Agricultural producers, greenhouse growers, residents, golf course superintendents and anyone else using a biosolids product will be concerned about how it looks and whether it has an odor that falls out of the acceptable range for that particular application. End users also will be looking for a consistency that they can rely on. This is not just a customer "comfort" issue but also a practical one. If the biosolids product is being spread as topdressing, a certain particle size must be achieved consistently. As one example, particle size of heat dried biosolids pellets for various uses is determined by the mesh size of the screen through which the pellets pass.

When initially marketing the end product, work with the end users on their specifications, and then establish control points at the biosolids facility to ensure that those specifications are being met. Avoid sending out product that does not meet those specifications because word of a bad experience travels *very* quickly. Staff should be trained to determine when a product fails to meet specifications.

Product-Specific Quality Issues

Each type of biosolids product will have its own specific quality requirements in addition to the general ones described above. The quality issues related to the three most common types of biosolids products are described below.

10.3.2 Compost Product Quality

Product Maturity: The issue of maturity is critical with compost products. A product does not have to be mature to meet the Part 503 Rule pathogen or VAR requirements, as maturity relates more to the acceptability of the compost for a particular use. For that reason, biosolids managers should test products for maturity prior to distribution so that the end user knows what they are getting and whether further curing is necessary before using the product. For example, distributed compost that is not mature can actually be biologically reactivated when wetted. Further decomposition of the compost after it has been applied or mixed in a potting medium can have a detrimental effect on plant growth.

Reactivation and resultant nuisance conditions (odor) also can be an issue with product storage at a customer's site.

Amendment Consistency: Many end users rely on the total product being consistent, not just the biosolids portion. Therefore consistency in the types of bulking agent used is very important both in terms of product appearance and overall characteristics of the end product. If the facility is making changes, build in enough time for the end user to adjust to those changes, if feasible, or begin to develop different markets that can accommodate the altered compost product.

Product Screening: One sometimes overlooked aspect of compost screening is the ground surface where screening is taking place. Composting facilities that do not have all working surfaces paved should have a hard surface, versus gravel or packed clay, in the screening area to avoid mixing in items such as stones into the compost. A hard surface also is critical for all-weather access to the screening area. Some facilities also put screening operations under cover to have better control over the moisture content of the end product being screened.

Product Storage: To ensure compliance with Part 503 Rule requirements, it is important to have a systematic approach to storing compost so that sampling procedures and pile monitoring is efficient and effective.

10.3.3 Heat Drying/Pelletization Product Quality

Nutrient content: Since biosolids pellets are frequently marketed for their nutrient content, a reliable sampling program must be established to determine the nutrient content to provide to users. This is especially important if the pellets are marketed as a fertilizer, for which most states require documentation of a guaranteed nutrient analysis.

Odor: Because the heat drying process enables biosolids to meet pathogen and VAR requirements without biological digestion or chemical addition to reduce potential biological activity, heat-dried products have a greater potential for odor than do biosolids that are digested or chemically treated. This problem becomes more acute if condensation from cooling occurs or pellets are otherwise rewet. The best solution is to continue to digest or add digestion to the biosolids processing train before dewatering and heat drying.

Dust: Heat dried biosolids may become excessively dusty if subject to repeated handling during product storage and/or transport. Many potential users of pellets find excessive dust to be unacceptable, or at least characteristic of an inferior product. To some degree, dustiness is a reflection of the physical properties of the biosolids themselves. Reducing or modifying product handling can compensate for inherent lack of durability.

Moisture: As noted above in the discussion of odor, moisture levels in biosolids pellets that meet regulatory standards still may be high enough to create problems in terms of aesthetics and may even result in smoldering if the pellets become moist. Provisions for

adequate cooling before pellets are stored or transported should be implemented as part of the facility processes.

10.3.4 Alkaline Stabilization Product Quality

Liming potential: Regular sampling and analysis must be conducted to verify liming potential, usually in terms of calcium carbonate equivalency to conform to other common sources of lime materials used by growers, of alkaline stabilized biosolids. Addition of alkaline materials at the facility should be monitored to establish both the amount needed to meet regulatory requirements, and the product's liming equivalence so that users can base application on their specific soil requirements.

Odor: Alkaline treated biosolids that rely on the heat of reaction with biosolids to kill pathogens exhibit a high residual alkalinity to prevent odors. If alkaline additions are supplemented by a heat source to meet temperature requirements for pathogen kill, lower alkalinity levels may result in odors during storage or other circumstances if pH drops to levels that allow microbial decomposition to occur. This situation requires that enough alkaline material be used to maintain a pH that prevents microbial activity during storage, usually around 10 pH units.

Ease of handling/application: Alkaline treated biosolids typically exhibit higher moisture content than other biosolids products and are therefore denser to handle and apply. Some programs producing alkaline treated biosolids provide application as a service component of their marketing effort. In this way, users are not burdened with the need for new application equipment or having to use their own equipment to apply the material when needed. This option also helps to maintain the acceptability to the public for use of the product, since otherwise there could be piles of material in fields for some period of time before application.

10.4 Wastewater/solids Treatment

Chapter 5, Solids Thickening and Dewatering, discusses the impact of these processes on biosolids characteristics. Non-restricted distribution of biosolids products may be affected by these processes through the impact of chemical additions on the product’s use, especially with growing certain types of crops, greenhouse plants, trees, etc. Facility managers should be aware of the impacts of various chemical additions and establish a means to be informed when changes are to be made. This is another example of the linkages between wastewater/solids treatment and the ultimate use of a facility's product. By open communication and cooperation, modifications can be made that accommodate both the needs of the facility's treatment processes and the biosolids product market.

Anyone producing biosolids for non-restricted distribution must:

1) Know what the chemical additions are and account for them in the product’s usability; and
2) Establish communication links between the wastewater treatment plant operations, the biosolids facility, and the product users that makes everyone aware of any changes -- before any product is distributed.

More detailed information regarding the processing and properties of the most common non-restricted distribution may be found in reference (Girovich, M. J., Ed. 1996).

10.5 Meeting Customer Needs

One of the essential components of a non-restricted distribution program is communicating with end users about the product and its appropriate use to meet their needs and expectations. This applies to any marketer of fertilizers and soil amendments and for good reason: misuse of the product due to a lack of knowledge has a negative impact on a marketing program. In addition, this relationship with end users is a two way street -- they will know how to best use your product, and you will know what kind of product best meets their needs. That knowledge not only helps in product marketing, but also in knowing the necessary responses to product quality issues mentioned above, for example, understanding the impact of changing chemical additions.

Methods for meeting customer needs include:

- Having product utilization information and research data (from an independent third party) available
- Insuring accessibility of biosolids facility staff to customers, including scheduled contacts with primary customers
- Keeping an updated list of customers for referrals
- Having product available (and funding if necessary) to test new applications, especially those with environmental benefits (e.g. disturbed land reclamation).

10.6 Maintaining Product Outlets

High quality non-restricted distribution products should be viewed as ambassadors to the public—a vehicle for reaching out to various sectors of the public about biosolids and related issues such as industrial pretreatment programs. In this way, the biosolids product can serve the function of an educational and public relations tool.

Vehicles for establishing these connections include offering facility tours; educating politicians and other public officials; and working with community beautification and gardening groups, schools and organizations such as the Scouts, 4-H, colleges and universities, and trade associations, including lawn care and landscapers, groundskeepers and golf courses. It is also helpful to have booths at trade fairs, farm shows, community festivals, science fairs and more.

To effectively implement the approach described above, biosolids product managers should:

- Build key alliances. These should be established early on in the facility's development so that the public at large and specific constituencies understand and support the use of the high quality end product.
- Include funds in the facility budget for outreach and educational initiatives.
- Train an individual(s) whose role it is to build alliances and do outreach. This person develops positive relationships with the public, and becomes someone trusted and accessible if and when problems arise.

10.7 Market Development

Among the hats that wastewater treatment and biosolids facility managers wear -- especially those running non-restricted distribution programs -- is that of product marketer. Many of the larger programs have a staff position for an agronomist or someone with experience selling soil amendment products. Operators of smaller facilities have learned on the job, with many creating highly effective marketing programs.

10.7.1 Demonstrating Product Potential

The "proof is in the pudding" adage applies directly to developing markets for non-restricted distribution products. Demonstrating a product's potential can be accomplished on several fronts:

Work with universities, cooperative extension and other third parties who can conduct research and who have the trust of potential buyers, including turf growers, landscapers, nurseries. In addition, as biosolids products are increasingly used in environmental applications, other third parties include government agencies like the Bureau of Mines, highway departments, park departments and others. Work with these entities on pilot projects and have them do analyses of the product. If their research finds some shortcomings, this is a good opportunity to correct any problems and build your own confidence in your product.

Provide samples for trial by potential users. After data is available, or while it is being compiled, approach potential users -- including nurseries, golf courses, schools and universities (for athletic fields and landscaping) -- about trying the biosolids product. Help them determine the parameters that should be analyzed in determining the product's performance. While the biosolids facility can provide the product at no charge, it is important that the user at least pay for the cost of trucking so that they have invested something in the trial. Otherwise, the biosolids product may not make it further than the spot where it was unloaded.

Research product use results. Your facility may be able to take advantage of research done on similar products. Conduct a literature review of publications and conference proceedings. Focus on the publications from the industries being targeted as potential customers.

In addition, there is information available from other biosolids facilities with non-restricted distribution programs. Collect product analyses and examples of applications, and, if available, names of users potential customers could contact.

Gather testimonials and make satisfied users and researchers accessible. Ask customers for testimonials about your product. If they are willing, also ask them if their names and contact information can be made available to prospective end users. In addition, make the research findings available, and consider holding a seminar for potential end users with the researcher(s) and current customers.

Because this process can take a fair amount of time, and it is difficult to begin before the biosolids processing facility has started full-scale operations, it is critical that there is either adequate storage or that other markets and uses be tapped initially. For example, a composting facility may want use the compost for public works applications while it is developing paying markets. In addition, if a facility has the ability to run a pilot scale project while the full-scale facility is in development, that can provide a jump start to the product testing and analytical process.

Synergies may also exist between other beneficial use components of the wastewater treatment facility. Take, for example, a facility with a land application program that is installing a pellitizer. The heat dried product from the start-up operation could be applied—with concurrence of the state regulatory/permitting agency—to the sties permitted for land application, as long as the same biosolids source is being used.

10.7.2 Expanding and Maintaining Markets

Every biosolids product marketing program should continuously seek new and expanded markets to insure long-term viability. Examples of such techniques include:

Product literature, samples, demonstrations: Marketing a non-restricted distribution product, especially if the market is geared to retail customers, is really no different than marketing any other kind of product. Some biosolids facilities, both publicly and privately owned, have fairly sophisticated marketing tools, including four-color brochures, videos and promotional items such as hats and t-shirts. Others take a simpler approach, such as planting a flower garden in a public area with a lot of traffic (e.g. the town's post office) and letting people know the soil was amended or top dressed with compost or pellets. Whether sophisticated or simple, the consistent message is: this product has value.

Other marketing tools include distribution of samples and show-and-tell days, e.g., invite managers of sports facilities to a demonstration that involves application of a biosolids product to athletic fields, then show turf health, water penetration and so forth compared to conventional treatment.

Be ready with A's for the Q's. Getting anyone to switch brands is a challenge, especially if prize roses, cash crops or pampered golf greens are involved. Create opportunities for open dialogue; train a staff person to be out there listening, learning, and responding. Have balanced answers -- with data -- for questions that involve concerns about biosolids; responding with "it's not a problem" or some other dismissal type answer is not adequate.

Use all the educational tools in the book. Speak your potential customer's language and if you can't, hire someone who can. Use the established educational system to get the word out. Develop programs for schools, encourage science and biology teachers to engage students in research using a biosolids product, and work with local agricultural high schools, colleges and professionals in your community that service your potential customers.

10.7.3 Exploring Market Options

Markets for non-restricted distribution products vary with the processing method. Table 10.1 contains information about the three most common biosolids products with respect to their marketing potential.

Table 10.1 Factors affecting distribution of typical biosolids products

Product	Compost	Pellets	Alkaline treated
Characteristics	Relatively dry & easy to handle; aesthetically acceptable; high organic matter, relatively low nutrient content	Very dry, compressed; can be applied w/ fertilizer application equipment; nutrient content nearly as high as digested biosolids	Somewhat moist, heavy to handle; good liming source; low nutrient content
Typical uses	Landscapers; nurseries; parks and other public areas; homeowners	Agriculture; parks and other public areas; homeowners	Agriculture; reclamation sites; soil blending
Distribution	Bulk (generally local) or bagged (wider distribution range)	Bulk (as is or blended w/ other fertilizers); bagged ; wide distribution feasible	Bulk; relatively local distribution
Revenue potential*	Medium	High	Low

*Revenue potential relative to other biosolids products--ranges may overlap depending on specifics

Requirements for product labeling vary by state and should be investigated prior to establishing a distribution system.

Some emerging applications for non-restricted distribution products include erosion control, especially on highway projects and disturbed lands; manufactured soils specified by landscape architects; remediation of contaminated soils. Biosolids products used in highway projects or for major landscaping jobs typically have to comply with specifications set by the bidders.

Biosolids facilities have been marketing biosolids products for many years. There are volumes of information on establishing and running marketing programs, therefore any newcomers to non-restricted distribution products are not starting from zero in terms of resources. Nonetheless, biosolids marketing programs must be tailored to specific situations and customers to achieve long term success.

References

Girovich, M. J., (Ed.), (1996), Biosolids Treatment and Management: Processes for Beneficial Use, Marcel Dekker, Inc. New York, NY.

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Suggested Reading

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