

RAISING THE BIOSOLIDS BAR: DEVELOPING AN ENVIRONMENTAL MANAGEMENT SYSTEM

**From BioCycle Journal of Composting & Organics Recycling, May 2001
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A California sanitation district's journey through the process of establishing an EMS for biosolids provides valuable insights, especially for agencies battling public acceptance challenges.

THE Orange County, California Sanitation District (District) provides wastewater treatment service for more than 2.2 million people. The facility treats approximately 250 million gallons/day of wastewater and produces about 200,000 wet tons/year of biosolids. The District has a history of progressive thinking in regards to its biosolids management program that has included the goal of 100 percent beneficial reuse of its biosolids. In 1971, the District entered into a long-term contract to have its biosolids composted off-site. From 1979 through 1981, an air drying/composting site was established and operated at a local landfill. Throughout most of the 1980s, the District's biosolids were landfilled however. In 1988, three new recycling initiatives were undertaken — two with composting contractors and one with a land application contractor. Under these contracts, 50 percent of the biosolids were recycled, and since 1991, 100 percent has gone to beneficial reuse.

Public acceptance is the most challenging issue facing the biosolids management program. Although the District is diligent with contractor oversight, with thorough site inspections and contractor reporting requirements, the public is still leery of the perceived impacts of biosolids reuse. The public is concerned about the effect biosolids has on the environment and human health, and concerned about odors, increased traffic and how land application close to residential development will impact property values. The situation is compounded by the fact that two of the four counties (Kern and Kings) where the District's biosolids are land applied have banned the application of Class B material starting in the year 2003. A third county (Riverside) has formed a review committee to evaluate adopting a ban on county owned land or implementing significant restrictions.

BACKDROP FOR EMS

The need to alleviate the public's concern was a significant motivating factor to develop an Environmental Management System (EMS) with the assistance of the National Biosolids Partnership (NBP). The District believes that an EMS for biosolids will improve public outreach, by providing a mechanism to build good relations between the District and the communities in which we land apply biosolids. The EMS process includes a public participation component that educates the public and engages them in discussion. An EMS is also valuable in that it should improve

efficiency in the production process and overall management of biosolids and further ensure environmental protection. The EMS sets standard procedures and steps that biosolids generators and appliers can voluntarily use to improve the effectiveness of their operations. The EMS serves both to meet and exceed regulatory requirements and to address other issues of concern to local citizens like odor and noise that regulations really don't cover. In essence, it provides a method where we can engage the public and regulators in a manner that holds ourselves accountable.

The NBP, a nonprofit coalition between the U.S. Environmental Protection Agency (EPA), the Association of Metropolitan Sewerage Agencies (AMSA), and the Water Environment Federation (WEF), has developed an EMS model as a tool to “institutionalize” environmentally sound biosolids management practices within wastewater agencies. The NBP’s draft EMS guidance for biosolids is based on the principles of the ISO 14001 standards, the most widely implemented EMS standards for business and industry worldwide.

On July 11, 2000, the District’s General Manager signed a Letter of Understanding with the NBP stating that the District would develop an EMS for its biosolids management program. This was the catalyst to begin the process of creating an EMS that would encompass all aspects related to biosolids — starting at the industrial pretreatment program, all the way to production, promotion, and beneficial reuse, as well as the overall management methods for the final product.

Upon signing the Letter of Understanding, the District became one of 27 agencies in the nation participating in the NBP’s EMS demonstration program. These agencies are using the various draft EMS documents — including the EMS guidance and the NBP’s national manual of good practice — and are receiving assistance from the partnership and its consultants as they work through developing an EMS. The goal is to have all 27 demonstration agencies’ EMS be certified by the NBP, which involves having each EMS program go through an independent third party audit. (The accompanying article, “National Biosolids Partnership EMS Update,” provides more details on the demonstration program as well as the auditing process).

The draft EMS guidance document lists the criteria for a biosolids EMS, and offers guidelines on how to develop an EMS manual. The five core elements of the biosolids EMS (based on the Deming quality management cycle) are Management Policy; Management Planning; Program Implementation and Planning; Checking and Corrective Action; and Management Review. These five core elements are subdivided into 17 individual management elements (Table 1). The development of the elements follows the biosolids value chain as depicted in Figure 1. The analysis of each component of the value chain is based on identifying the critical control points that can be measured, controlled and modified to obtain the best possible product.

THE DEVELOPMENT PROCESS

The District first established a biosolids management team (BMT) to spearhead the EMS development process. An internal Gap Analysis of the current management methods and biosolids practices was conducted and compared with the requirements and guidelines specified by the NBP EMS program. The main “gaps” centered around District-wide cross training of staff involved in the biosolids program, contractors, applicators, and haulers; and stronger public participation and more formalized external communication.

A project management schedule was created as a plan, designating deadlines, milestones, resources, and responsibilities for achieving the EMS goals and objectives. A presentation was given to internal staff to explain the EMS process and obtain support for its development. District staff, whose expertise was needed for the development process, were informed of their roles and responsibilities. Their input is critical to the success of an EMS.

DRAFTING THE ELEMENTS

Once this framework was in place, the actual drafting of the EMS manual began. BMT members divided up the assessment and writing of the elements according to expertise. The following briefly describes our process of working through the 17 elements:

1. Documentation of Environmental Management System for Biosolids: States our agency's commitment to developing an EMS and documenting it in a manual.
2. Biosolids Management Policy: This element states our agency's policy for the entire biosolids management program. In addition, the policy is what is needed to have as an agency like ours — its general manager and directors — provide its commitment to an EMS for biosolids.
3. Critical Control Points: Defining and managing the critical control points within the biosolids management process are necessary for understanding the potential weak points and are fundamental to the success of the EMS. The main critical control points match up directly to the biosolids value chain: Wastewater pretreatment and collection (pollution prevention and enforcement program); Wastewater treatment and solids generation (grit and screening removal, sedimentation basins); Solids stabilization, conditioning and handling (anaerobic digestion, time and temperature); Solids storage and transportation (temporary storage, biosolids loading, trucks and trailers); and Biosolids use and disposition alternatives (site location, soil type, land application and incorporation method). There are other significant points of impact that may be considered critical control points, which the District felt needed to be addressed in the EMS. These include property

value, odors, dust, crop and animal loss, liability, traffic and road deterioration, storage, program oversight and funding, economics, and “gypsy” applicators.

4. Legal and Other Requirements: These are all the rules and regulations — federal, state and local — that have to be met (but we have to go well beyond those to get public acceptance and that is our ultimate goal as well as the potential liability issues).

5. Goals and Objectives for Continual Improvement: These are the goals and objectives set for the biosolids management program that our agency will reach, including “stretch goals.” Our agency strives to go beyond those goals. An example of a stretch goal is the reduction of odor around our facility or around an application site. This goal is not one that we are required to do, but in order to gain public acceptance, we could take steps such as digesting the biosolids longer and at a higher temperature, or incorporating the applied biosolids within a shorter period of time. Another example could be to have a goal of reducing a pollutant that is already below the “EQ” (40CFR Part 503 - Table 3) level because it is possible, not because you are required to.

6. Public Participation in Planning: We want people to participate in the EMS planning process. We want to include all stakeholders, the neighbors by an application site, the farmers, and city and county officials to name a few. We need to engage them.

7. Roles and Responsibilities: This element defines the roles and responsibilities for everyone involved in the biosolids management process. Everybody needs to know what they are supposed to do and what they are responsible for.

8. Training: After everyone knows what they are supposed to do, the next step is to make sure they know how to do it. Provide the training all the people need — not just for the biosolids operators but for everyone who is part of the biosolids value chain and related control points.

9. Communication and Public Outreach: This element states how we are communicating our biosolids program to our staff, our stakeholders and the general public. It also includes our outreach efforts necessary for gaining public trust and support.

10. Operational Controls: These are the specific items within each of the critical control points that could cause a problem. Take digestion and odor, for example. Digestion and odor are linked in that if we do not digest biosolids long enough, there is a potential for odors. So instead of a retention time of 15 days at 95°F, our particular agency is committed to 21 days but we do 25 days at 99°F because we get much better gas production as well as better odor control. Digestion and odor are also linked when biosolids are digested at high temperatures.

11. Emergency Preparedness and Response: This element formalizes the process of responding to potential and existing problem situations. For example, in the event of a spill or an odor complaint, we want to make sure that everybody knows what to do.

12. Documentation, Document Control and Recordkeeping: Essentially, documentation means proof on paper. You can do everything right but if you haven't documented it correctly you are never going to be able to prove it. All our standard operating procedures (SOPs) are in place now. Unfortunately, this wasn't the case before we got involved in the EMS process. While working out in the plant with the operators, it was discovered that SOP manuals didn't exist. We told management that one of our concerns is that they have not provided the resources necessary to do the SOPs. The result was that a contractor was hired to write and/or modify our SOPs.

13. Monitoring and Measurement: This element provides the tools to monitor and measure whether the biosolids program is on track to meet its goals and objectives. For example, we have put the controls in place to make sure we create a quality biosolids product. If our contractor finds plastics in our material or it is highly odorous, our contractor knows not to apply it. We'll take it back and we'll pay him for the transportation both ways.

14. Nonconformances, Preventive and Corrective Action: This element is used to establish procedures for analyzing root causes and correcting noncompliance/nonconformances with the biosolids management program and the EMS. An example of one area we are developing under this element is specifying corrective and preventive action procedures for transportation or application related activities.

15. Biosolids Management Program Performance Report: We report to our management on an annual basis as to how well the biosolids program is doing. Our reporting extends to the stakeholders, our regulators as well as the general public.

16. Internal EMS Audit: This element states that an external audit team will review our biosolids program by touring the plant and reviewing the EMS manual.

17. Periodic Management Review of Performance: The final element commits management to review the EMS to ensure continual improvement to our biosolids program.

EMS ASSESSMENT BY AUDITORS

After the first draft EMS manual, containing the 17 elements, was completed, it was forwarded to NBP staff for review and comment. A second draft was created incorporating their comments, and sent out in January, 2001 to select stakeholders that included the U.S. EPA, other wastewater

treatment plants, and the NBP. The main comment by the NBP staff was that our current format was lengthy. In addition, they recommended that we verify that all items in the guidance manual were addressed in our EMS.

In late January, an EMS assessment was done by an NBP authorized auditor who reviewed the agency's biosolids management program for conformance with the NBP's EMS guidelines. Two individuals toured the plant and reviewed the EMS, going through element by element and evaluating what will be necessary for certification. Overall, the District has an excellent biosolids program that conforms with the EMS requirements, but there are several areas that will be improved upon based on the assessment findings. A summary table of their findings was provided to the BMT, with specific "example actions" to conform with the elements. For example, under Biosolids Management Policy (Element 2), the auditors suggest that language should be included in the service agreements that at a minimum obligates contractors to conform to the District's policy and the Code of Good Practice. One of the more general comments was that the format selected by the BMT for the EMS manual was too detailed. The assessors informed the District that our manual needed to be more of an outline. To meet this requirement, we have developed a new format based on policy and SOP forms already in use at the District.

The nonconformance issues identified during the assessment are being addressed and incorporated into the EMS. The District hopes to have a third-party verification of its EMS, and have a fully functional EMS for biosolids, by Fall 2001. For an agency our size, the third party audit probably will cost \$20,000 to \$30,000, but that is a worthwhile investment for the credibility that will be gained. As part of the EMS development process, our agency will publicize the results of the audit, regardless of its outcome. This is another reason to ensure the system is implemented properly and is fully functional.

WHAT WAS GAINED

The development of the EMS provided the BMT with a detailed protocol to review the District's biosolids management program in its entirety. The review required input and teamwork from staff in other divisions, District management, contractors, and external stakeholders. A much better understanding was gained of the enormity of the program, the amount of resources involved in its success, and the public concerns relating to the biosolids management program and the importance of open communication with all stakeholders. The value of involving the public in the planning process was made clear by the current controversy surrounding the beneficial reuse of biosolids in California. The most significant gain so far from the EMS development process is having all pertinent information on the biosolids management program available in a single manual.

The biggest concern resulting from the EMS development was the realization of how much staff time and resources are actually involved in the process. The BMT spent an enormous amount of time reviewing policies, procedures, SOPs, and corresponding with various stakeholders and staff in order to create the EMS manual. Identifying the different audiences and obtaining their input was also a challenge for the BMT. Concerns were raised regarding the lack of a formalized training and public participation program. As the focus in the wastewater industry has for many years been on operations, the communications and public participation areas are only now, thanks in part to the EMS, being formalized.

FUTURE OF THE BIOSOLIDS EMS

The EMS for biosolids will demonstrate that the District has a strong, solid, all-encompassing biosolids management program, which should help build trust in our biosolids product. The EMS will demonstrate the appropriate processing of the biosolids, the documentation and reporting requirements for the reuse of the product, and the agency's overall management of the program in an efficient and environmentally sound manner. One of the main goals of the EMS for biosolids is "continuous improvement," involving constant evaluation and betterment of the entire biosolids program. This goal will help to ensure that future issues and problems will be caught and addressed, thus giving our stakeholders further trust in the agency's biosolids management program.

A key goal of involving the public in the EMS development process is to give them a feeling of ownership in the biosolids program and increase confidence that their concerns are being addressed. Our agency has started implementing the public participation process by engaging the public at various association meetings to inform them of our biosolids program and EMS, and to solicit involvement in our upcoming informational sessions. In addition, the District is planning informational sessions for each county in which we manage our biosolids. These meetings are scheduled for the summer. Public participation in the EMS process will help us understand the public's concerns and result in suggested steps to take to reduce these concerns, thereby making our biosolids management program sustainable. Development of an EMS by itself will not address the public's cynicism toward land application of biosolids. An active public outreach program is essential to the success of the EMS.

If the District would have had an EMS, could the current public acceptance challenges been avoided in Kern and Kings county? Probably not, but if all of the agencies in southern California — including our contractors — would have had an EMS, we would have had a chance of changing the current "anti-biosolids" situation.

Our hope is that managing biosolids within an EMS structure will persuade agencies that are not following good management practices to develop their own EMS. We need to be able to go to our sister agencies and say you are adversely impacting biosolids reuse by not having and enforcing an EMS. Not every agency will have to be part of the National Biosolids Partnership but every agency has to start committing to do the right thing. The EMS for biosolids is an effective tool that can be adapted to fit any size agency and different management programs and biosolids processing techniques. The EMS also ensures that an agency has good practices, engages the public, goes above and beyond regulatory requirements, and that the program is continuously evaluated and improved upon.

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