Invest In The Social Aspects of Biosolids Management

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Abstract: Social factors, such as public outrage, commonly interfere with effective biosolids management. This is especially true with programs that involve recycling biosolids to soils. Obstacles to public support of biosolids recycling are understood by application of social science research regarding risk perception, outrage factors, and risk communication. This paper covers background, summarizes past research, and presents short case studies regarding utilizing understanding of such social factors in particular biosolids management programs. Evaluations of these efforts are presented, providing improved understanding of how biosolids managers can implement cost-effective strategies to more effectively address the social aspects of biosolids management.

Keywords: biosolids, public acceptance, public perception, public participation, sewage sludge

INTRODUCTION

Effective technical methods of biosolids management have been extensively researched and implemented around the world. However, far less research has focused on social aspects of managing biosolids. And yet, social factors, such as public outrage, commonly interfere with effective biosolids management. This is especially true with programs that involve recycling biosolids to soils.

For biosolids management programs to be effective, they must be technically sound, of high quality, and beneficial to the environment. At the same time, they must be publicly understood and supported. Inherent obstacles to public support of biosolids recycling are understood by application of social science research regarding risk perception, outrage factors, and risk communication.

This paper builds upon a study published by the Water Environment Research Foundation (WERF, Alexandria, VA, USA) in 2004 that emphasized the importance of developing two-way communications and relationships with key stakeholders involved in the various aspects of a biosolids management program. Key stakeholders can include neighbors to biosolids recycling sites, farmers and other agriculturists, local officials and other community leaders, environmental and conservation groups, and the academic community. The study concluded that biosolids management programs can benefit from paying attention to how decisions and actions will affect long-term relationships with such key, diverse stakeholders. It provides examples of engaging in dialogue and building long-term relationships with stakeholders, consciously applying the WERF research findings in particular biosolids management programs.

BACKGROUND

U. S. Federal Regulations Provide Scientific Basis for Recycling to Soils

In 1993, the U.S. Environmental Protection Agency (USEPA) promulgated federal regulations for the management of biosolids (treated municipal sewage sludge). This so-called “Part 503” rule was intended to be the culmination of a concerted effort, involving decades of research aimed at understanding potential impacts to public health and the environment from the disposal or use of biosolids. The Part 503 regulations set risk-based ceiling standards for certain trace elements (“heavy metals”) and further requirements for pathogen and vector attraction reduction treatments.
Part 503 was generally embraced by those managing sewage sludge and, initially, by some leading environmental groups (Natural Resources Defense Council and Environmental Defense), who viewed the Part 503 rule as guiding the end to ocean dumping of sewage sludge and creation of adequately protective programs for biosolids recycling. As the 1990s progressed, the percentage of U.S. municipal sewage sludge being recycled to land increased steadily. Out of an estimated 6.9 million dry tons of biosolids generated in 1998, a study by the USEPA determined that 60 percent were land applied, received advanced treatment and then land applied, or were otherwise beneficially used (USEPA, 1999).

The stable Part 503 regulations and USEPA’s encouragement of the recycling option were significant reasons for this trend. But even as Part 503 became the law of the land, scattered incidents occurred. Neighbors to some biosolids land application sites alleged negative environmental or public health impacts. Local controversies sprang up here and there. Small advocacy groups formed around the issue, questioning and opposing land application programs.

**Seeking Public Acceptance Through One-way Communications**

Confident of the scientific basis of the Part 503 rule and in the overall management practices that had developed around biosolids recycling, the Water Environment Federation – a leading organization in the wastewater profession — hired Powell-Tate, a national public relations firm, to develop a media and outreach campaign, known as the “National Biosolids Public Acceptance Campaign.” The public relations initiative was designed to address public concerns about biosolids recycling and, in general, build public acceptance of the practice. The campaign involved establishing a network of “gatekeepers” — biosolids program managers, consulting engineers and others — who were trained in how to respond to controversies that arose. The approach outlined by Powell-Tate was to highlight the positive aspects of biosolids recycling, providing information about the science and regulations. The public outreach theory was that if adequate technical information was provided to the public, the public would come to recognize the importance of biosolids recycling and provide support for local land application programs, (i.e., “Once they know all the facts we know, they will come around to our point of view.”) This essentially was the underpinning of the public acceptance strategy that has been long utilized by wastewater treatment plants and their contractors. Its major tools are glossy brochures, videos, fact sheets, technical reports, news releases, advertisements, and marketing strategies – one-way communications aimed at “educating the public.” In some cases, such approaches have been adequate and have enabled programs to continue uninterrupted.

**Public Outrage Increases**

In the mid-1990s, a few national media stories and a book on public relations titled *Toxic Sludge Is Good For You* (Stauber and Rampton, 1995) focused attention on biosolids recycling issues, including malodors and environmental impacts. *Toxic Sludge Is Good For You* derided the Powell-Tate/Water Environment Federation public relations campaign and the industry’s initiative to change the name of “treated sewage sludge” to “biosolids”. The standard response from the wastewater profession was defensive, discounting the veracity of the reports and in essence, challenging opponents to “show us the dead bodies.” With little scientific or epidemiological evidence to the contrary, the USEPA continued its support for the practice. The agency’s position was bolstered by a 1996 National Academy of Sciences report that had reviewed biosolids recycling and water reuse (National Research Council, 1996) and found biosolids recycling presents “negligible risk to public health and the environment.”

Throughout the late 1990s and into the beginning of the 21st century, local opposition to biosolids recycling projects increased. Opponents became organized, linked by email and the Internet. Communities in New England and Pennsylvania and counties in California, Florida and Virginia, began to severely restrict or ban biosolids land application — or at least certain forms of it (Class B). Several prominent legal battles ensued, including ones that alleged that biosolids caused the deaths of young men in New Hampshire and Pennsylvania and the deaths of cows in Georgia. Even as local, state, and national authorities reviewed these and other cases and found an absence of clear evidence that biosolids played a role in the unfortunate occurrences, the allegations stuck in the minds of interested citizens.
During this period, organizations opposed to biosolids recycling identified the few scientific studies and researchers who raised issues that could negatively impact people exposed to biosolids recycling practices, especially land application, including air emissions from biosolids land application events (bioaerosols or airborne pathogens, volatile chemicals, endotoxins) and various organic chemicals from pharmaceuticals to antibiotics to personal care products. In addition, opponents advocated adoption of a regulatory approach developed in Europe that is based on the “precautionary principle,” which essentially sets a strict standard of no net degradation of natural soil background levels when biosolids are applied to land. This is a different regulatory approach than the risk assessment method used to develop the Part 503 rules. Essentially what evolved during this period was “dueling science,” with each camp (pro-biosolids recycling and anti-biosolids) touting the findings of certain scientists who would appear at local public hearings or legislative sessions or be represented by copies of their research papers. This created an entrenched conflict; neither side was willing to back down from their positions.

In response to concerns, USEPA requested another, different review of the federal Part 503 biosolids program by the National Academy of Sciences (National Research Council, 2002). This second panel looked at allegations and found that, while there was no evidence that the Part 503 regulation had failed to protect public health and the environment, there remained uncertainties that needed to be addressed. These included a lack of oversight and monitoring of biosolids recycling practices, as well as a need to update the technical and scientific basis for the Part 503 rule.

RESEARCH ON PUBLIC PERCEPTIONS OF BIOSOLIDS

In 1999, the Water Environment Research Federation (WERF) issued a request for proposals to study public acceptance issues revolving around biosolids recycling. The research contract was awarded to the New England Biosolids and Residuals Association (NEBRA), which partnered with the Northwest Biosolids Management Association (NBMA), BioCycle, and others to complete the project. The final report, Public Perception of Biosolids Recycling: Developing Public Participation and Earning Trust (Beecher et al., 2004), was published in the fall of 2004. The report provided conceptual models for understanding current public perceptions of biosolids, including the influence of many factors — technical issues, typical human responses, communications, information, and politics. The WERF project included a biosolids public perception survey, utilizing a nationwide sample that totaled 1,069 individuals.

The initial component of the research project was a review of the literature on public acceptance of biosolids recycling and applicable social science research regarding risk perceptions, risk communication, conflict resolution, and public participation. The review found limited knowledge among biosolids management professionals and policy-makers regarding social science research on risk perception, risk communications, and the social context in which biosolids recycling programs operate. Another component was to develop short case studies that highlighted certain key common experiences of biosolids management programs. Examples included programs that failed because of public controversy, as well as ones that worked well, with community support.

The literature review and case studies found that biosolids management programs that worked well had a history of public acceptance had several elements in common: Well-run operations following best management practices; Viewed as beneficial to communities and the environment; Communicated well with — and often involved — stakeholders; Most were introduced to communities through a respectful, mutually-beneficial communication process; and Strong organizational commitment behind their public outreach efforts. Conversely, those projects that failed or were mired in continued controversy had most of the following elements in common: Minimal or no communication with the public they were potentially impacting (e.g., neighbors to land application sites); Some stakeholders’ first encounter with biosolids recycling was a malodor or unusual and unexpected truck traffic; Projects created nuisance issues (which have been rarely regulated, even at the state or local level) and led to interactions between concerned stakeholders and biosolids managers who were unprepared for how to respond; Little or no local knowledge or oversight; No apparent benefits to anyone but the farmer, wastewater utility, and the contracted land applier; Communications in response to the public outcry were inadequate, defensive, and/or misdirected. Emotion-charged conflicts developed.
As work on the WERF biosolids public perception project progressed, the investigators — some of whom had long been involved in the biosolids and waste management fields — began to understand the significant distinction between efforts aimed at gaining “public acceptance” and the kinds of efforts recommended by experts in risk perception and risk communication. Suddenly, the project was not about public acceptance; it was about developing public participation and earning trust. The new mantra became “it’s not just public relations; it’s public relationships.” Among the key social science factors learned through the collaborations of the WERF project were:

Risk Perceptions: Understanding how human biology, evolution, social context, and individual values and experiences work together to create the responses that biosolids managers often encounter when the public learns about their program. Fear of the unknown and odors related to fecal matter (which throughout human history has been associated with disease) can trigger increased health concerns and fear. The public’s perception of that danger — even if it is based on emotion instead of “sound science” — is the starting point for the dialogue.

Outrage Factors: Biosolids recycling projects that get started “under the radar” and which subsequently are discovered because of nuisances (e.g., odors, truck traffic) will appear to the public as involuntary, industrial, unknowable, memorable, uncontrollable — factors that social science research has clearly demonstrated as causing increased concern or fear amongst the public.

Risk Communication and Public Participation: Public outreach and relationship-building programs that address and reduce outrage factors, one by one, will reduce public fears. Increasing or reducing outrage by addressing outrage factors is the practice of risk communication. For example, engaging stakeholders in the beginning of the siting, permitting, or technology-selection process gives all parties a voice in decision-making, makes the unfamiliar become familiar, and provides a sense of control over the outcome.

Earning Trust: At the heart of the “trust” factor is credibility, not just of the wastewater agency staff and its consultants, but of the system (including regulations and enforcement), and the agency. A wastewater agency demonstrating a willingness to be open and transparent in its decision-making process; utilize or conduct research that is credible, legitimate, and salient; and develop (and fund if necessary) the infrastructure for independent oversight and monitoring of its projects all contribute to earning the public’s trust.

METHODS: PUTTING THEORY INTO ACTION

Based on what was learned during the WERF study, the authors of this paper have since provided workshops for wastewater, biosolids, and solid waste managers about building productive public relationships around facilities, sites, and projects. Each workshop includes examples of projects that have utilized the theories and practices identified in the WERF study. The following summarizes several of these case studies:

Schuylkill County, Pennsylvania

Schuylkill County has over 3,000 acres of barren minelands that essentially have no topsoil for vegetative growth. In 2001, Waste Management & Processors, Inc. (WMPI) responded to a Request For Proposals by the Philadelphia (PA) Water Department to manage Class B biosolids. WMPI is a sister company to Reading Anthracite and Gilberton Coal, owned by the Rich family. Its proposal involved using Philadelphia biosolids to reclaim strip-mined land in Schuylkill County. WMPI won the bid, and began the process of permitting its land application program. It hired Diane Garvey of Garvey Resources, Inc., a biosolids management consultant, to help with technical support and the public hearing process. A great deal of opposition was expressed at public meetings held across the county. Citizens quoted from the anti-biosolids recycling science literature (e.g., the Case For Caution published by the Cornell Waste Management Institute), noted the National Academy of Science study (2002) calling for more research, and cited the death of a young boy in Pennsylvania that allegedly had been exposed to biosolids. One woman whose husband was unemployed was fearful of possible health impacts and the family did not have health insurance. A public meeting run by the Pennsylvania Department of Environmental Protection was kept on such a tight schedule that people felt they were not being heard.
What backfired at these public meetings, said Garvey at a 2005 Building Productive Public Relationships workshop, was that the president of WMPI and the coal company was named Rich and was rich; the public meeting process did not offer a good setting to interact with and educate the public; a video on biosolids recycling produced by the industry trade group was a primary educational tool at the meetings; and vitamins were used as a prop to demonstrate that they have many of the same “heavy metals” found in sewage sludge, and therefore were not a risk. That project proceeded, but for the next round of public meetings to obtain additional permits, WMPI and Garvey incorporated public relationship building principles. These included: Apologizing for not providing information sooner to the communities that would be potentially impacted by the land application program; Honesty — even if it means saying “I don’t know”; Explaining research that is underway; One-on-one interactions with community members before and after meetings; and Testimonials from “gatekeepers” in the county, who evaluated the results of the initial reclamation sites. In addition, tours were offered of the Philadelphia Water Department’s wastewater treatment and biosolids handling facilities and reclaimed mineland. Officials from Philadelphia, WMPI, the DEP and others were on the tour bus, providing a more informal setting for two-way dialogue — listening to citizens’ concerns and answering questions. Reporters were invited to attend these events.

Area watershed groups became active in education and outreach about the reclamation program. A subsequent project involved revegetation of abandoned mineland that could be used for state game lands. With the efforts of 28 organizations — including the County Conservation District, the Game Commission, the District Mining Office, five of the six county watershed association, Pheasants Forever, Trout Unlimited and newspaper reporters — the area was reclaimed using biosolids. At the same time, passive treatment systems were installed to mitigate acid mine drainage. For the first time in 50 years, trout were found in the local creek. Lessons learned, concluded Garvey were: “1. We must develop personal relationships within the community. 2. Look for opportunities for shared experiences. 3. Constantly develop additional tools. 4. Information will be absorbed only when trust is earned.”

District of Columbia Water and Sewer Authority (DCWASA)

DCWASA in Washington, DC produces 320 dry tons/day of Class B biosolids. The agency has permits to land apply biosolids in close to 40 counties in two states. A typical month consists of land applying in 10 to 20 different counties, making interaction with the local community a challenge. In Virginia, some counties had taken legal action to ban land application of biosolids. Odor complaints in 2001 resulting from application of stored odorous material almost derailed the agency’s biosolids recycling program. Between organized local opposition and communities sensitized to odors and other nuisance issues, DCWASA decided to contract with Maryland Environmental Services (MES), an independent state environmental agency, to provide inspectors at fields where biosolids are being land applied. Inspectors’ scope of work includes: 1) Responding to any questions and ensuring standard operating procedures are being followed; 2) Use of field olfactometers to conduct odor monitoring; 3) Interact with local health department and biosolids monitors to address or identify geographic/geologic specific concerns; 4) Conduct meetings with local officials prior to the start of landspreading in new counties; 5) Assist with public outreach, providing analyses of biosolids produced at the sewage treatment facility, explaining quality assurance issues, and making available contractor contacts and details on biosolids delivery to application sites. This third party oversight, which also provides a local presence in the counties where land application is taking place at any given time, creates effective two-way communications and alerts DCWASA to problems with its program.

In 2003, the Water Environment Research Foundation organized the Biosolids Research Summit, as an extension of the Public Perception study (WERF 2003). The Summit brought together proponents and opponents of biosolids recycling to identify research needs to address the finding of the National Research Council’s 2002 study that the scientific and technical basis of the Part 503 rule should be updated. At the Summit, Chris Peet, DCWASA’s biosolids manager, had an opportunity to meet, at a lunch and in the hallways, several stakeholders from communities in Virginia where the agency’s biosolids were being land applied. One of the stakeholders, the Reverend Gayl Fowler from Lancaster County, Virginia, described her group’s concerns about
well contamination from biosolids land application. Peot visited Fowler, who showed him wells that were shallow, cracked and old on properties owned by people unable to afford repairs. The evidence showed, said Peot at a 2005 Building Productive Public Relationships workshop, that “not all wells are created equal, and that DCWASA decided it should consider her request to increase buffers in certain situations.” DCWASA staff and its contractor met with an independent, third party hydrogeologist to better understand the hydrogeology of the area, and agreed to consider buffer increases based on scientific principle or on a case-by-case evaluation by the state.

A state biosolids inspector met with Reverend Fowler’s group and examined two specific land application sites. One had five houses with wells at the property line across from a small field (7-acre site); the other had one well at a property line across from a large field with a sloping hill cresting 250-feet away. The state recommended taking the small field out of the land application program and increasing the buffer at the second site to 250 feet. DCWASA and its contractor agreed. “Reverend Fowler’s group was pleased with the cooperation, and she is now a defender of our program, speaking positively about it to the local press,” says Peot. “She feels we are trustworthy and willing to work with her.” His conclusions about the relationship-building process include: “1. Outreach to nontraditional stakeholders has led to a better understanding on both sides of the interests and motivation on both sides of the argument. 2. Prior to this outreach, both sides had preconceived notions about motives. 3. The cooperation has developed into trust and respect for each other’s cause. 4. Communications and availability of information was key to this success.”

The Denver, Colorado Metro-Gro Farm Land Application Program

With the leadership of public information officer Stephan D. Frank, the Denver, Colorado Metro wastewater treatment facility has developed improved relationships with diverse stakeholders who live near a large Metro-owned farm in eastern Colorado where Denver biosolids are land applied for range forage and wheat crops. Frank and Sigler (2004) detail Denver Metro’s difficult initial interactions with area farmers, neighbors, soil conservation district personnel, and county government officials. Over a period of more than ten years, the Metro operation has slowly developed greater trust and support from these diverse stakeholders. Most critical to their success has been development, with input from stakeholders, of a multi-year program of monitoring groundwater and surface water at the Metro farm. This research is conducted by the independent U. S. Geological Survey and produced a significant volume of data (Yager, Smith et al. 2004).

Based on preliminary results of surveys conducted in 2006, Frank noted “The biggest finding from the customer survey is we’re doing pretty well but we need to remain very aware of farmers’ needs for considerations such as not applying immediately after a rainstorm and compacting their ground with our equipment. With the neighbors, the biggest complaint was odors. Some might ask, ‘So what else is new?’ But I would ask, ‘So when are we, the industry, going to find a way to do something about odors?’ For now, I expect we will change our operating procedures so we never apply more material than we can incorporate the same day, whether the local county ordinance says we have to incorporate or not.”

Denver Metro routinely mails information, including its biosolids DVD, to neighbors of every active land application site, prior to delivery of biosolids, to inform them of the program. However, Frank notes “our neighbors’ survey showed us that, despite this affirmative effort to reach out to them, many people say they never got the packet of information…. I believe they probably got it but don’t remember it, but if they say they didn’t get it, that’s the perception we must deal with. So we will be looking for additional ways to continue to reach out affirmatively” (pers. comm., 2007).

Denver has documented the progress of its outreach and public participation efforts by conducting occasional surveys of interested parties. In 2000, an initial survey of 27 key public officials, neighbors, and citizens uncovered considerable distrust regarding Metro’s biosolids land application program. In 2003, a second survey found considerable improvement in trust as a result of improved farm management practices, regular newsletter mailings and other opportunities for interactions (e.g., an annual barbecue at the farm), and starting the independent monitoring program.
CONCLUSIONS

Research on risk perception, risk communications, and, more recently, research on public understanding of biosolids recycling have revealed the most important factors leading to public fear, distrust, and opposition to the use of biosolids and similar residuals as soil amendments and fertilizers. These factors include malodors, other nuisances, trust and credibility, and the often involuntary, industrial, unknowable, memorable, and uncontrollable nature of biosolids management programs as perceived by neighbors and others. While anecdotal evidence shows that particular biosolids management practices and particular social interactions can have significant positive or negative impacts on the level of public concern, identification of the most critical social factors has begun to allow some biosolids managers to focus their efforts on developing public outreach and participation programs that are as cost-efficient as possible.

Many biosolids management programs address the unfamiliarity and “unknowable” nature of biosolids with information in brochures, videos, and websites. The success of these traditional outreach tools depends on how well they communicate with and are distributed to the specific most important diverse stakeholders, such as site neighbors. Beyond these traditional educational efforts, most biosolids management programs still remain, “under the radar,” by intent or through lack of attention to the social context in which they operate.

But now, as described above, some agencies are addressing other critical outrage factors and the social context of their biosolids programs by being proactive in increasing regular interactions with diverse stakeholders and establishing relationships. Only through finding synergy between the technical and social aspects of biosolids management can biosolids recycling programs achieve long-term viability and sustainability. Failure to invest in addressing the social aspects of biosolids management can result in decreased opportunities to manage biosolids to maximum environmental and social benefit.

REFERENCES


