

- Determine the risks posed by contaminants identified as potentially hazardous;
- Bring 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 sewage sludge;
- Better understand and characterize the odors, volatile chemicals, and bioaerosols that may be emitted from land application sites;
- Better understand the effectiveness of sewage sludge processes and management practices to control pathogens;
- Improve the Agency's inspection and compliance initiatives; and
- Improve stakeholders' involvement in EPA's sewage sludge program.

### C. Other Projects

Projects that are longer term in nature are those that EPA anticipates will be initiated after 2005. Initiation of longer-term projects will depend on the outcome of the research projects listed in section B, results of research being conducted by others outside the Agency, and availability of sufficient resources.

In addition to EPA directed research and activities, there is also considerable relevant work being conducted by others outside the Agency in academia, other State and Federal agencies, and trade groups, among others, that will address issues raised by the NRC recommendations. For example, WERF's sewage sludge research projects include identifying emergent trends in pathogen detection, assessing microbial health risks, identifying and controlling odors, and better understanding the fate, effects, and bioavailability of metals and certain chemicals in sewage sludge after land application. Two WERF Web sites that address relevant sewage sludge information and research are [http://www.werf.org/Collection/biosolids\\_chart.cfm#table1](http://www.werf.org/Collection/biosolids_chart.cfm#table1) and <http://www.werf.org/press/winter03/default.cfm>.

One WERF project involves "Biosolids Public Perception & Participation" (WERF, In Press). The project team included members from the New England Biosolids and Residuals Association, the Northwest Biosolids Management Association, the Center for Environmental Communication, and BioCycle, as well as two review panels consisting of biosolids stakeholders and academics. The study concludes that positive public relationships with stakeholders starts by developing public participation and thus earning public trust. Building success with

stakeholders involves two way communication with the public, not only through the use of brochures, fact sheets, television spots and radio talk shows, but also by having a complaint hotline, tours, open houses, door-to-door contact, and community advisory groups. The final report from this study should be available by the end of winter 2004.

The University of Arizona (UA), Department of Soil, Water and Environmental Science, investigates physical, chemical, and microbial processes that affect the quality of surface and subsurface waters. Some of the UA's research projects deal with sewage sludge land application and utilization (e.g., agricultural land application and mine tailing stabilization), sewage sludge management (e.g., pathogen reduction in solar drying beds), health protection (e.g., fate and transport of pathogens within sewage sludge, fate of *Staphylococcus aureus* in sewage sludge and evaluation of odors from land-applied sewage sludge), and rapid response to emerging issues (e.g., antibiotic-resistant bacteria and endotoxins in land-applied sewage sludge, endocrine-related effects, and fate and transport of SARS virus). In one recent study at the UA, scientists are studying *Staphylococcus aureus* in sewage sludge after it had been processed at full-scale treatment plants (Rusin *et al.*, 2003).

Much of the work being done outside of EPA, including the research described above, that relates directly to NRC recommendations is being used to improve the Agency's sewage sludge program. EPA plans to review and evaluate studies external to EPA to determine if they are useful for conducting risk assessments and improving the basis for the part 503 regulations or improving management practices. The Agency will review these studies in accordance with the Information Quality Guidelines (see "Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency" USEPA, 2002). These guidelines stress that information disseminated by EPA should adhere to a basic standard of quality, including objectivity, utility, and integrity.

### VIII. Process To Review Part 503 Regulations Under the CWA Section 405(d)(2)(C)

As previously described, section 405(d)(2)(C) of the CWA requires that EPA review the sewage sludge regulations for the purpose of

identifying additional toxic pollutants and promulgating regulations for such pollutants consistent with the requirements of section 405(d). In 1993, EPA promulgated regulations in 40 CFR part 503 setting numerical standards for certain toxic pollutants in sludge, requirements for pathogen and vector attraction reduction, and operational standards for emissions from sewage sludge incinerators.

As explained in section IV, EPA commissioned the NRC study of existing sewage sludge land application regulations to strengthen its scientific review under section 405(d)(2)(C). EPA agreed with the parties in *Gearhart v. Whitman* to publish a preliminary notice seeking public comment and a final notice, stating the results of its section 405(d)(2)(C) review.

In fulfilling this commitment, EPA first collected and conducted a preliminary review of publicly available information on the occurrence of chemicals in sewage sludge. This information consists of concentration data found in national and international literature sources published between 1990 and 2002 and the 1989 National Sewage Sludge Survey (NSSS); data on environmental properties such as mobility and persistence; and available human health benchmarks (HHBs). EPA compiled a list of 799 chemical pollutants for which such information was found and described this list of candidate pollutants for ongoing sewage sludge evaluation in the April 2003 **Federal Register** notice. EPA placed the full list of candidate pollutants in the docket for public review and comment (USEPA, 2003a). EPA made minor corrections to the list, which resulted in slightly revising the list from 799 candidate pollutants to 803 candidate pollutants. See Table 1 in Appendix O of the Technical Background Document (TBD) (USEPA, 2003b).

EPA then used a human health-based data evaluation and pollutant selection process to determine whether the existing data were sufficient for each of these 803 pollutants to proceed with an exposure and hazard screening assessment. This process involved identifying the pollutants for which EPA peer-reviewed final HHBs are available, and for which there are data on concentrations in U.S. sewage sludge for those pollutants with HHBs, either in the NSSS or reported in the literature.

In summary, a pollutant was selected from the list of 803 pollutants for an exposure and hazard screening assessment if it met two criteria: (1) It has measured concentrations in U.S. sewage sludge based on the literature, or it had been measured in the 1989 NSSS;