

coplanar polychlorinated biphenyls (PCBs).

Many of the original 411 pollutants were eventually eliminated for consideration in Round One or Round Two rulemakings; 254 were eliminated because they were not detected in any or in fewer than one percent of the sewage sludge samples surveyed in the NSSS, and others were dropped because of a lack of sufficient information on their toxicity and environmental properties. In particular, 44 of the 411 pollutants, though detected at a frequency of greater than one percent, were dropped from further consideration because of lack of data on human health benchmarks and/or environmental properties. For a more detailed description of the process for Round One and Two, see USEPA, 2002c.

For the current review, EPA again started with the 411 pollutants initially identified for Round One consideration; As mentioned above, 254 of these pollutants were detected at a frequency rate of less than one percent in the 1988–89 NSSS and therefore were dropped from further consideration in both the Round One and Round Two rulemakings. Because the low detection rates for these 254 pollutants could have been due to the limits of the analytical and sampling methodology employed in 1988–89, EPA included these pollutants in the current review for potential addition to the Part 503 Standards. A literature search was performed on these pollutants to identify (1) human health benchmarks, (2) environmental properties, and (3) their presence or concentrations in sewage sludge.

As previously mentioned, 44 of the 411 pollutants considered in the Round One and Round Two rulemaking processes were detected at a frequency of greater than one percent, but were dropped from further consideration because of lack of data on human toxicity and/or environmental properties. EPA has preliminarily determined that 23 of the 44 are either non-toxic or non-persistent in the environment, but is continuing to evaluate them.

Next, EPA conducted a literature search of publicly available information to identify information on pollutants in sewage sludge since 1990, including information on pollutants that were not among the 411 originally identified pollutants. EPA has collected 459 scientific papers from national and international government entities, universities, non-profit and other private entities for the time period of 1990–2002, the date of the last NSSS to the present (USEPA, 2002d). Of these

459 papers, 216 papers concern either the Round One or Round Two pollutants only. The balance of these papers, 243, concern or potentially concern pollutants that were not the subjects of Rounds One or Two. Subsequently, these 243 papers were reviewed to verify which of the papers do in fact concern pollutants which were not the subjects of Rounds One and Two. In addition, these papers were reviewed for human health benchmarks, environmental properties, and presence or concentrations of these pollutants in sewage sludge.

EPA also collected information from EPA databases and several other existing databases with respect to human health benchmarks, and found 170 pollutants with some human health benchmarks among these databases (USEPA, 2002e). These databases include: EPA's Integrated Risk Information System, EPA's Superfund Technical Support Center Provisional Toxicity Values, EPA Health Assessment Documents, California Environmental Protection Agency Chronic Inhalation Reference Exposure Levels and Cancer Potency Factors, Agency for Toxic Substances and Disease Registry Minimal Risk Levels, and Health Effects Assessment Summary Tables.

The next step in this process was to ascertain whether analytical methods exist for detecting and quantifying each of these pollutants in sewage sludge (USEPA, 2002f, USEPA, 2002g, USEPA, 2002h). Although the accuracy, precision, and limits of detection of analytical methodologies for chemical pollutants in the sewage sludge matrix have significantly improved since the 1988–89 NSSS, there are still many pollutants for which no validated analytical methods exist.

In summary, EPA evaluated publicly available information with respect to presence in sewage sludge, toxicity (including human health benchmarks), persistence, mobility and potential for exposure for the pollutants contained in each of the four groups of pollutants described above: (1) The 254 pollutants with a low frequency of detection in the 1988–89 NSSS, (2) the 44 toxic pollutants that were detected at a frequency of greater than one percent in the 1988–1989 NSSS, but that had insufficient information to be able to perform subsequent evaluation, (3) the pollutants that were not the subject of Rounds One or Two but are covered in the 243 papers that turned up in the literature search, and (4) the 170 pollutants for which some health benchmark exists in the literature. These four groups of pollutants as

described above were compared to eliminate any duplicates. Finally, EPA evaluated all of these pollutants to determine whether there are sufficiently accurate and precise analytical methodologies with adequate detection limits for these pollutants in the sewage sludge matrix. These results are available in detail in the docket for this notice (USEPA, 2003b).

These preliminary results will be further analyzed, leading to a risk-based screening analysis. The criteria for determining whether to proceed to a screening analysis for any pollutant are whether there are: (1) Adequate and reliable data regarding concentration of the pollutant in sewage sludge, (2) a current human health benchmark, (3) adequate information on environmental properties, such as persistence and mobility, and (4) an appropriate analytical method for the pollutant. In evaluating item 2 above, EPA will focus initially on chemicals for which there is a current peer-reviewed human health benchmark developed by EPA. EPA will next determine the adequacy of the available environmental properties data for use in the risk-based screening analysis.

The results of this screening analysis will serve as a basis for determining whether additional toxic pollutants should be considered for regulation in sewage sludge under section 405(d) of the Clean Water Act. As noted above, EPA has not yet identified any additional pollutants for regulation. Inclusion in the results presented today does not mean that a pollutant has been determined to be present in sewage sludge in concentrations that may adversely affect human health or the environment. Some, or even all, of these chemicals that have been detected in sewage sludge may only be present infrequently or in trace amounts, and may not present a risk of adverse effects to human health or the environment. Also, the properties or degree of toxicity of such chemicals may make their presence, even in higher amounts, of little risk to human health or the environment. As noted above, the NRC concluded that while there are significant data gaps, there is currently no documented scientific evidence that the existing Part 503 regulations have failed to protect public health. These results, however, are an important step forward in that they identify chemicals for which sufficient new information exists to proceed to a risk-based screening analysis, as well as data gaps that must be filled for other chemicals before such a screening analysis can be conducted.