

observations regarding changes in dioxins concentrations in sewage sludge based on a comparison of the data in the two surveys. As mentioned previously, the 94 POTWs participating in the EPA 2001 dioxin update survey also participated in the original 1988 NSSS. Samples from 14 of the POTWs showed dioxins concentrations (dioxins and furans only) equal to or greater than 93 ppt TEQ from at least one of the surveys. These same 14 POTWs exhibited the greatest differences in the dioxins and furans concentrations when comparing the results of the 1988 and 2001 EPA surveys. The other 80 POTWs participating in both surveys have substantially smaller differences, as well as lower dioxins levels measured in both surveys. Of the 14 POTWs with the greatest differences between the two surveys, four had large increases in sewage sludge dioxins concentrations and ten had large decreases in sewage sludge dioxins concentrations from 1988 to 2001.

No sampled POTW with high levels of dioxins in sewage sludge in the 1988 NSSS showed high levels in the 2001 update survey. Based on these data, EPA infers that POTWs with higher concentrations of dioxins in their sewage sludge may experience a greater variability in dioxins concentrations over time, and that higher dioxins levels may not remain high for a significant period of time. It is possible that POTWs with higher concentrations of dioxins in their sewage sludge intermittently receive dioxins from unidentified but specific sources via the sewer system. Likewise, POTWs with moderate or low levels of dioxins in their sewage sludge may experience much less variability in dioxins concentrations over time. This second group of POTWs appears to be experiencing typical environmental background variation of dioxins levels.

EPA requested comments on the significance of the differences in dioxins concentrations in sewage sludge measured in the EPA 2001 dioxin update survey compared to dioxins concentrations in sewage sludge measured in the 1988 NSSS. Several commenters noted that dioxin levels had decreased between the 1988 survey and the 2001 survey. One commenter was unsure of the implications of the finding, because analytical methods have improved and PCBs were not analyzed in earlier surveys, but felt that both dioxin and PCB levels have most likely declined because of changes in their use.

Three commenters said that the results indicated that attendant risks were also decreasing; one went on to say that EPA should use the findings to

promote public confidence in land application of sewage sludge and dioxins regulatory limits. Another respondent said that the decrease made stringent regulatory requirements for sewage sludge unnecessary and that existing dioxins controls are having a noticeable effect on environmental releases. One commenter said that the findings should give regulatory agencies and the public confidence that decisions based on current data sets will provide adequate protection under reasonably anticipated future conditions.

One commenter endorsed EPA's response to previous public comments by obtaining new data in the 2001 dioxins update survey to the 1988 NSSS, saying that the initiative demonstrated EPA's commitment to use reliable data to provide accurate risk assessments of sewage sludge. Another commenter felt that EPA had inappropriately weighted data from the NSSS by giving greater weight to samples from small-production POTWs and thereby understating risk estimates. Another commenter was unsure whether the study was designed to test the hypothesis that there might be differences in dioxins concentrations between small and large facilities. Finally, some commenters felt that the survey data support taking no action for dioxins in land-applied sewage sludge.

EPA believes that appropriate consideration of data from small POTWs was made in the design of the sample for the survey. A simple random sample of POTWs, without regard to the amount of influent wastewater, would not have provided adequate representation of the POTWs receiving the larger amounts of influent wastewater. In fact, a simple random sample, drawn without regard to size, would have been dominated by POTWs in the less than 1 million gallons per day (MGD) flow group.

Regarding indications from the data, EPA believes that the data suggest an overall decrease in dioxins. New or revised pretreatment requirements and pollution prevention measures adopted since 1988 would be expected to have reduced dioxins in the influent to POTWs. The decrease of dioxins in sewage sludge observed in the two surveys supports the Agency's conclusion that new regulatory requirements for dioxins in land-applied sewage sludge are unnecessary.

## VI. Environmental Justice

Environmental justice and equity concerns involve consideration of the potential for minorities and people of lower economic status to be impacted by dioxins exposures to a greater degree than the rest of the general population.

EPA believes the HEI analysis addresses reasonable high end exposures that could represent a subsistence low income farm family. The HEI analysis addresses exposure regardless of minority or economic status.

## VII. Discussion of Scientific Information Presented in the NODA

For the past 12 years, EPA has been conducting a reassessment of the human health risks associated with dioxin and dioxin-like compounds. This reassessment is not a final document. In this decision the Agency continued its practice of using the best available data published from a variety of sources that meet the Information Quality Guidelines. The Agency considered all such data and associated uncertainty to determine the strength of the evidence in finalizing this regulatory action related to dioxin and dioxin-like compounds.

### A. Assessing Cancer Risk

#### 1. Incremental Cancer Risk

As explained in section V.A. of this Notice, the revised risk assessment for dioxins in land-applied sewage sludge supporting today's final action uses the 1985 Q1\* of  $1.56 \times 10^{-4}$  (pg TEQ/kg-d)<sup>-1</sup>. The estimated upper bound lifetime risks for highly exposed farm family adults using this Q1\* range from  $2 \times 10^{-5}$  at the 95th percentile exposure to  $1 \times 10^{-6}$  at the 50th percentile exposure for multi-pathway exposure to dioxins through land-applied sewage sludge (see Table 1). There are two exposure scenarios for adults living in the farm family exposed to dioxins in land-applied sewage sludge: (1) Individuals whose exposure begins in adulthood referred to as "Adult" in Table 1, and (2) individuals whose exposure begins in childhood referred to as "Child" in Table 1. As explained in section V.A., the estimated lifetime cancer risks for the child are less than or equal to the estimated lifetime cancer risks for the adult. These risks correspond to estimated daily exposures for the latter group of adults ranging from 0.11 at the 95th exposure percentile to 0.0086 pg TEQ/kg-d at the 50th exposure percentile.

Use of the alternative Q1\* of  $1 \times 10^{-3}$  (pg TEQ/kg-d)<sup>-1</sup> that was considered in the NODA would result in estimated high-end multi-pathway excess lifetime cancer risks for the latter group of adults in the highly exposed farm family ranging from  $1 \times 10^{-4}$  at the 95th exposure percentile to  $6 \times 10^{-6}$  at the 50th exposure percentile. These estimated risks in the NODA are based on the same daily exposures indicated