Review of National Primary Drinking Water Regulations Occurrence of Regulated Contaminants

(This Issue Paper Is for Stakeholder Discussion and May Not Reflect Official EPA Policy)

BACKGROUND

The Safe Drinking Water Act (SDWA) requires that EPA shall, not less often than every 6 years, review and possibly revise each national primary drinking water regulation promulgated by the Agency. Whether EPA decides to revise the regulation for a given contaminant will depend in part on the Agency's evaluation of exposure to the contaminant, based on its occurrence in public water supplies.

In reviewing the existing occurrence data and other data as it becomes available, the Agency will formulate and use a screening mechanism to determine which contaminants appear to be occurring at "high" and at "low" frequencies. The Agency will thus be using the results of analyses of occurrence data in its decision making process to revise the regulation for a particular contaminant. While individual contaminant monitoring requirements may become the focus of EPA analysis based upon occurrence and/or other findings, it is not the intention of the Agency to revise the current standardized monitoring framework used for the many chemicals regulated under the phase II and phase IV regulations.

EPA has completed a draft study of contaminant occurrence, "A Review of Contaminant Occurrence in Public Water Systems"(see reference). This study is the Agency's most extensive analysis to date of the occurrence of contaminants in Public Water Systems (PWSs) regulated under SDWA. The study used data from standard SDWA compliance samples for 64 contaminants, including more than 10.7 million analytical results from nearly 26,000 PWSs in 12 States. Data from 8 States were selected as providing the best balanced cross-section, based on geographic coverage, relative rankings for pollution potential and data quality and completeness to develop a national cross-section of contaminant occurrence. Some of the report's major findings follow.

All 64 Phase II/V contaminants have been detected in drinking water systems, but the frequency and level of occurrence ranges widely. Five contaminants have been detected at concentrations greater than the Maximum Contaminant Level (MCL) in more than 1% of surface water systems: atrazine, ethylene dibromide (EDB), methylene chloride, perchloroethelyne (PCE), and trichlorethylene(TCE). Six contaminants have been detected above the MCL in more than 1% of ground water systems: dibromochloropropane (DBCP), fluoride, methylene chloride, PCE, TCE, and 1,1,1-trichloroethane.

On the low end of the scale, nine of the 64 contaminants, all Synthetic Organic Chemicals (SOCs), occur at detectable levels in less than 1% of PWS: alachlor, carbofuran, chlordane, glyphosphate, hexachlorobenzene, hexachloropentadiene, oxamyl, toxaphene, and PCBs (though PCBs have not been monitored as intensively as other SOCs).

For some contaminants occurrence varies widely by season and region. Twenty-nine of 30 regulated SOCs have not been detected at all in some States. The greatest range for any of the organic chemicals is for atrazine, which ranges from no systems with detections in some States to 97% of surface water systems showing detections in Midwestern States.

Reference is made to the issues section on the following page, which identifies data limitations and prospective analyses.

PROPOSED ACTIVITIES

Utilizing existing data, EPA proposes to apply a simple statistical screen to identify contaminants which occur at either "high" or "low" levels. These contaminants will then be the subject of further review, for example it must be determined whether the Agency has sufficient data on the contaminants to support a valid national occurrence and exposure assessment. If such data are available, it is possible EPA may (if significant improvements in health protection are predicted) consider NPDWR revisions. As an example, stricter monitoring or reporting standards may be appropriate for contaminants with high occurrence, while those with low occurrence may be considered for monitoring relief.

For each contaminant for which EPA has sufficient data, the proposed screen may work as follows:

- Based upon the statistical attributes of the available data set, EPA will estimate the percentage of all PWS with at least some occurrence at detectable levels, that is, greater than the Minimum Reporting Limit (MRL). A contaminant will be defined to have low occurrence if it is estimated to occur at detectable levels in less than X% (some determined percent) of all PWS.
- EPA will also estimate the fraction of all systems with at least some occurrence above the current MCL, and will compute an upper 95% confidence limit for this fraction. A contaminant will be considered to have high occurrence if this upper 95% confidence limit is greater than Y% (some determined percent) of all systems. For high occurrence, EPA considers the upper confidence limit instead of the estimated fraction, in order to build in a margin of safety.
- Once contaminants have been identified for review, from the health or other screens, EPA may analyze the occurrence of these contaminants in greater detail, with the aim of making the database more statistically representative of the nation's PWSs. At that point, EPA would estimate the number of people exposed to various mean and peak levels of each contaminant. Error bounds on the occurrence estimates would be introduced.
- Through the above-described process, the Agency would: (1) update and augment existing occurrence estimates, and use the best available statistical analytical techniques

to fill gaps where such data are missing; and, (2) re-evaluate the magnitude of exposures associated with the regulated contaminants in drinking water.
- The Agency plans to complete a draft occurrence analysis, i.e., the initial screening and selection of contaminants for detailed review and analysis.

ISSUES

The Agency will be developing decision making criteria for the revision of regulated contaminants. These criteria will include criteria for occurrence and human exposure distributions. The Agency believes that more detailed analyses are needed to develop statistically representative nationwide occurrence and exposure distribution profiles of regulated contaminants. Statistical difficulties in deriving the estimates will include: shortage of data for some contaminants; estimation of regional and temporal variations, made more difficult by sparse time sampling and lack of data in some regions; the need to incorporate information from non-detect samplings; and inconsistent data quality from diverse sources. Data quality assurance will be especially important in justifying the decisions resulting from this process.

In addition, since EPA currently receives only violations data, and must therefore depend upon voluntarily submitted data, Agency expects to propose by the Fall of 2000 an Information Collection Request that would supply needed occurrence data for the second 6-year regulatory review in 2008.

.**QUESTIONS**

- Is the proposed overall approach to obtaining, analyzing and interpreting the occurrence data sufficient to support EPA's decision making on revisions to a NPDWR?
- Given the limitations on available data, is the approach and sampling of States used to generate a national cross-section of contaminant occurrence reasonable?
- Is the proposed statistical screen reasonable? Are the criteria for high occurrence (Y% or more of systems with some occurrence above the MCL) and low occurrence (less than X% of systems with detectable occurrence) reasonable?
- What additional information is required for reliable, scientifically sound analysis of occurrence to support EPA's decision process to revise the regulation for a particular contaminant?
- What roles should the various components of occurrence (e.g. frequency and levels of occurrence, regional variability, data quality) play in the decision of whether to revise the regulation for a particular contaminant?

Reference:

"A Review of Contaminant Occurrence in Public Water Systems." EPA 816-R-99-006, Draft Report, April 1999

- Please address written comments on the discussion questions to the Office of Ground Water and Drinking Water

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