

B. Rationale for the Proposed Rule Option

DBP concentrations can be highly variable throughout a distribution system and over time at the same location in a distribution system (USEPA 2003o). The determination of compliance with an RAA under the Stage 1 DBPR requires a system to average all of their spatially-distributed samples collected in one quarter of the year and to combine this average concentration with the three prior quarterly averages determined by the system. Thus, the RAA-based standard allows utilities to average spatial and temporal variability in TTHM and HAA5 samples to determine compliance, as shown in figure VII-1. This allows lower results found, perhaps, nearer a water treatment plant to offset higher results that might be found at the ends of the distribution system. In addition, systems with multiple plants of differing water quality (either multiple surface water plants or surface and ground water plants) may have particular plant distribution system sampling locations with high DBPs that are offset by lower measurements observed in the portion of the distribution network served by other plants.

Under the Stage 2 DBPR proposed today, TTHM and HAA5 MCLs will remain the same, but compliance will be based on a locational running annual average (LRAA) for each of the sampling sites in the distribution system. In addition, the IDSE requirement will increase the probability that the compliance sampling sites will capture the highest DBP levels in the distribution system. Thus, the reduction in DBP exposure from the Stage 1 DBPR to the proposed Stage 2 DBPR results from the revised requirements for compliance calculations combined with new compliance monitoring sites.

EPA expects the Stage 2 DBPR, as proposed, will result in health benefits by reducing the estimated health risks associated with the following exposures:

- Individual TTHM/HAA5 occurrences significantly exceeding 0.080 mg/L and 0.060 mg/L;
- Chronic exposures at individual distribution system locations that

average more than 0.080 mg/L and 0.060 mg/L;

- Chronic exposures at all locations in the distribution system by reducing overall system average DBP concentrations; and
- Chronic and peak exposures in consecutive systems (systems that purchase treated water from another system).

Under the Stage 1 DBPR, high DBP concentrations at specific locations in the distribution system could be masked by spatial and temporal averaging. As discussed in subsection VII.C, short term exposures resulting from these high concentrations may be of concern in regard to potential adverse reproductive and developmental health effects. Chronic exposures at locations having repeated high DBP concentrations may be of concern for cancer endpoints as well. The remainder of this subsection will illustrate how today's proposed rule is expected to reduce "peak" and average exposures to address these health concerns.

1. Reducing Peak Exposure

EPA used Information Collection Rule data to estimate the reduction in exposure to DBP peaks resulting from the Stage 2 DBPR. Because the Information Collection Rule data represent pre-Stage 1 DBPR conditions, subsets of those plants already in compliance with the Stage 1 DBPR and Stage 2 DBPR were used to estimate pre-Stage 2 and post-Stage 2 occurrence respectively. By comparing these subsets of data, EPA estimated that approximately 69% of plant locations having TTHM peaks greater than 0.080 mg/L remaining after the Stage 1 DBPR could be reduced through implementation of the Stage 2 DBPR. EPA conducted this additional peak reduction analysis only for TTHMs and not HAA5s because current epidemiological data only considers the association between TTHM exposure and adverse health impacts (see subsection VII.C). Additional information on reduction of peak exposures can be found in section 5.4.1 of the Economic Analysis (USEPA 2003i). EPA recognizes that temporal and spatial variability in systems that

need to install treatment to comply with the Stage 1 DBPR may be different than in those that do not, perhaps due to low source water TOC concentrations. However, EPA does not have data representing DBP levels post-Stage 1. EPA requests comment on its approach of using data from plants in compliance with Stage 1 DBPR requirements without implementing additional treatment as a proxy for post-Stage 1 DBP levels.

2. Reducing Average Exposure

To quantify the benefits of today's proposed rule, EPA compared predicted post-Stage 2 DBPR occurrence and compared this to the predicted baseline concentrations after the Stage 1 DBPR to determine reductions in exposure resulting from the Stage 2 DBPR. The SWAT model was the main tool used in this analysis. SWAT results were used directly for medium and large surface water systems and all ground water systems. Adjustments were made to the SWAT results to account for different percentages of plants changing technology to meet Stage 2 DBPR requirements. The Economic Analysis for today's proposed rule (USEPA 2003i) provides an in-depth discussion of this analysis.

Table VII-2 shows the reduction in average plant-level TTHM and HAA5 concentrations estimated to result from the Stage 2 DBPR. EPA expects average DBP levels to decline by 4.7 percent for all surface water systems. DBP averages are expected to decline by 2.2 percent for all large ground water systems and 1.7 percent for all small ground water systems. These estimates include both systems already in compliance with the Stage 2 DBPR and systems making treatment changes to comply with the rule. The Agency uses these national average reductions to quantify the primary benefit of this rule which is the estimated range of reduction in bladder cancer cases nationally. Systems making treatment changes to comply with the rule will experience significantly greater estimated average reductions than the national average for all systems. Chapter 5 of the EA (USEPA 2003i) includes a more detailed discussion of this analysis.

TABLE VII-2.—REDUCTION IN AVERAGE DBP LEVELS FROM PRE-STAGE 2 TO POST-STAGE 2 (ALL PLANTS)

Source water	System size (population served)	Average plant-level TTHM concentrations (µg/L)			Average plant-level HAA5 concentrations (µg/L)		
		Pre-stage 2	Post-stage 2	Percent reduction	Pre-stage 2	Post-stage 2	Percent reduction
SW	≤ 10,000	35.5	33.8	4.7	25.0	23.8	4.7