

survey air emissions data and for air emissions estimated by the WATER7 model which estimates the maximum emissions.

*a. Human Health/Agricultural Benefits from Reductions in Emissions of Ozone Precursors.* The proposed effluent guidelines are expected to result in reductions in ambient ozone concentrations due to reductions in VOC emissions. Controlling VOC emissions is beneficial because VOCs are precursors to ozone, which negatively affects human health and the environment.

(1) Human Health Benefits.

The RIA estimates that the annual human health benefits resulting from reductions in VOC emissions due to the proposed rule range from \$31,000 to \$1.9 million (1994 \$). EPA monetizes these benefits using a benefits-transfer-based approach. Specifically, the estimated reductions in VOC emissions in nonattainment areas (1,396 Mg) are multiplied by an existing estimate of the range of the value of a unit reduction in VOC emissions (\$22/Mg to \$1,382/Mg, 1994 \$). This range is taken from an existing study that evaluated the human health benefits of ozone reductions in nonattainment areas.

(2) Welfare Benefits from Increased Agricultural Crop Yields.

Studies of the relationship between ambient ozone concentrations and greenhouse-controlled ozone concentrations and agricultural crop yields demonstrate that ozone negatively affects crop yields. Reductions in crop yields in turn affects agricultural production, crop prices, and incomes of agricultural producers, and thus affects social welfare. Thus, reductions in ozone concentrations that lead to improved crop yields will generate welfare benefits.

The RIA estimates that the annual agricultural-related economic welfare benefits from reductions in VOC emissions range from \$186,000 to \$315,000 (1994 \$). To generate these welfare benefit estimates, EPA applies an existing estimate of the benefits per unit reduction in VOC emissions (\$134/Mg to \$226/Mg, 1994 \$) to the total expected reduction in VOC emissions in nonattainment areas. The existing value estimates were developed using economic models that estimate the net change in social welfare resulting from higher crop yields as a result of lower ambient ozone levels in rural areas.

*b. Human Health Benefits Due To Cancer Risk Reduction.* The benefits from the proposed rule include human health benefits from reductions in excess cancer risk. EPA expects the proposed rule to reduce loadings of

toxic substances that otherwise would volatilize and pose a cancer risk to humans, resulting in reductions in excess cancer risk in exposed populations from inhalation of VOCs. In addition, EPA expects that reduced loadings to surface waters will improve water quality and thus reduce cancer risk to the exposed populations from consumption of contaminated drinking water and fish tissue.

Based on the cancer risk assessment conducted for the RIA, EPA estimates that the proposed guidelines will result in 0.02 to 0.35 excess cancer cases avoided per year nationwide. The estimated value of the human health benefits from these cancer risk reductions ranges from \$14,000 to \$5.4 million (1994 \$) annually. EPA developed these benefit estimates by applying an existing estimate of the value of a statistical life to the estimated number of excess cancer cases avoided. The estimated range of the value of a statistical life used in this analysis is \$0.7 million to \$15.4 million (1994 \$). This estimated range is based on a review of literature pertaining to the value of life.

*c. Human Health Benefits from Reductions in Noncarcinogenic Risk.*

Exposure to toxic substances poses risk of systemic and other effects to humans, including effects on the circulatory, respiratory or digestive systems and neurological and developmental effects. The proposed rule might generate human health benefits by reducing exposure to these substances, thus reducing the risks of these associated effects.

As in the case of the cancer risk assessment, systemic risks from exposure to air emissions and consumption of contaminated fish tissue and drinking water are evaluated. Modeled pollutant concentration levels are compared to human health criteria or estimated toxic effect levels. Based on this analysis, reductions in air emissions might result in reduced systemic risk, with benefits ranging from reduced risk to zero individuals (since estimated baseline risks are low) to reduced risk to 126,000 individuals due to reduced exposure to two toxic pollutants. No systemic risk reductions are expected to result from reduced exposure to contaminated fish tissue or drinking water. Sufficient data to quantify these benefits further are not available.

*d. Ecological and Recreational Benefits Due to Improved Water Quality.*

EPA expects the proposed effluent guidelines to generate environmental benefits by improving water quality. There are a wide range of benefits

associated with the maintenance and improvement of water quality. These benefits include use values (e.g., recreational fishing), ecological values (e.g., provision of habitat), and passive use values. For example, water pollution might affect the quality of the fish and wildlife habitat provided by water resources, thus affecting the species using these resources. This in turn might affect the quality of recreational experiences of users, such as anglers fishing in the affected streams. In the RIA, EPA considers the value of the recreational benefits resulting from the proposed rule, but does not evaluate the other types of ecological and environmental benefits due to data limitations.

To estimate the benefits from the improvements in water quality expected to result from this rule, instream concentration estimates are modeled and then compared to EPA's freshwater acute and chronic aquatic life criteria to evaluate whether these discharges pose risk to aquatic organisms. The projected reductions in toxic loadings to surface waters are significant. Pollutant loadings are estimated to decline by 57 percent, from 39.9 million pounds per year under current conditions to 17.1 million pounds per year under the proposed rule. The analysis comparing instream concentration levels to aquatic life water quality criteria estimates that current discharge loadings result in excursions of aquatic water quality criteria at two locations. The analysis also indicates that no excursions are expected to occur at these two sites under the proposed rule.

EPA estimates that the annual recreational benefits associated with the expected changes in water quality are on the order of thousands of dollars. EPA evaluates these recreational benefits, applying a simple model that considers the change in consumer welfare likely to result from improved catch rates by recreational anglers at these two sites. EPA assumes that catch rates improve due to larger fish populations that are assumed to result from improved water quality.

*e. Benefits from Reductions in Loadings Discharged to POTWs.* The RIA considers three potential sources of benefits to POTWs from the proposed regulation: Reductions in the likelihood of interference, pass through, and sewage sludge contamination problems, reductions in health and safety risks to POTW workers, and reductions in costs potentially incurred by POTWs in analyzing toxic pollutants and determining whether to, and the appropriate level at which to, set local limits. Although the benefits from