7-21-2004

The Societal Costs and Benefits of Misallocating Water and Gasoline Additives in California

Whitelaw

This is the abstract of a presentation given on Wednesday, 21 July 2004, in session 28 of the UCOWR conference.

The Societal Costs and Benefits of Misallocating Water and Gasoline Additives in California

Ed Whitelaw, John Tapogna, and Thomas Guardino

In November 1998 the South Tahoe Public Utility District sued a group of gasoline refiners, gasoline-station owners and operators, and manufacturers of methyl tertiary butyl ether (MTBE), seeking damages from contamination of STPUD's public drinking-water wells. Used as an octane booster, MTBE became prevalent in gasoline in California after the federal Clean Air Act Amendments of 1990 and similar state laws required gasoline to contain oxygen at certain levels, during certain times of the year, and in certain areas. Testimony and the literature suggested that the oil industry knew of MTBE's propensity to contaminate groundwater when refiners committed to using MTBE in California gasoline. STPUD's lawsuit claimed that MTBE, and gasoline containing MTBE, were defective products. The relative societal risks and benefits of MTBE as an oxygenate was an issue at trial. ECONorthwest examined the defendants' testimony that MTBE's benefits greatly exceeded its risks to California groundwater.

We examined the decision by the oil industry in the late 1980s and early 1990s to adopt MTBE instead of alternative oxygenates (such as ethanol), given the information available to the industry when it chose MTBE. We examined economic costs and benefits of the effects on air quality, fuel cost, and groundwater quality. Air-quality effects include the social health benefits of reduced emissions of air toxics and particulates from MTBE and alternative oxygenates. Fuel-cost effects capture differences in regional crude oil and gasoline markets resulting from MTBE and alternative oxygenates. The groundwater-quality effects include those from cleaning contaminated retail-gasoline sites and public and private drinking-water wells.

The economic framework includes additional environmental and societal effects considered in the litigation, but not quantified at trial:

1. Cumulative Effects. Little attention has been paid to the implications of multiple intersecting MTBE plumes. Given MTBE's well-documented ability to migrate, two or more individual plumes—which independently may not warrant active remediation—could combine to damage the groundwater resource extensively.

2. Intrinsic Values. The diminution in the intrinsic value of the groundwater caused by MTBE contamination has not been quantified. Pristine natural resources often have values not reflected by markets. Ignoring this effect underestimates MTBE's costs.

3. Impacts on Property Values. Experts have estimated the effects of underground gasoline storage tanks on residential properties though not in California. Ignoring these potential effects underestimates MTBE's costs.

4. Monitoring and Enforcement Costs. Without continual monitoring, enforcement of regulations, and installation inspections, leaking USTs will continue to present problems for society. Ignoring these costs would underestimate MTBE's costs.

We anticipate that sufficient information is available in the literature and other sources to quantify these effects and perhaps others, e.g. monitoring and enforcement costs, in subsequent analyses.

Because MTBE's air-quality benefits in car exhaust resemble ethanol's, the issue turned on the lower fuel costs from MTBE as an oxygenate relative to the higher risks of groundwater contamination from MTBE. We obtained results under three sets of assumptions, reflecting low, expected and high societal (net) costs, assuming the industry would have adopted ethanol instead of MTBE in 1996. Under the expected scenario, the lower fuel costs of MTBE roughly offset higher groundwater clean-up costs, resulting in a net societal cost of ethanol relative to MTBE of about $90 million (2001 dollars). Under the low scenario, adopting ethanol would have yielded a net benefit of about $1.2 billion, reflecting the high costs of MTBE groundwater effects. In short, our analysis highlighted the tradeoff implicit in the choice of a gasoline oxygenate. That is, using MTBE would produce savings in fuel costs in exchange for water-quality-related losses. In obtaining these results, we did not consider the effects on real-estate and natural-asset values, and we did not account for the cumulative effects of MTBE-leaking storage tanks or for the monitoring and enforcement costs.

The parties ultimately settled out of court with total compensation of more than $69 million to the South Tahoe Public Utility District.

Author Information:

Ed Whitelaw
Professor of Economics at the University of Oregon
President of ECONorthwest
541-687-0051
whitelaw@eugene.econw.com

John Tapogna
Project Manager at ECONorthwest
503-222-6060
tapogna@portland.econw.com

Thomas Guardino
Project Manager at ECONorthwest
541-687-0051
guardino@eugene.econw.com