Source Reduction of Toxic Waste: Implications for Western Water Policy

Carl Boronkay*

INTRODUCTION

It is somewhat ironical that source reduction of toxic chemicals has become imperative largely because of the tremendous success that the producers of these substances have enjoyed in revolutionizing our way of life. Over the past half century, the use of chlorinated chemicals has grown tremendously throughout the industrialized world. Virtually every stamped or forged metal part manufactured by industry requires some sort of solvent to clean it after fabrication. Products from airplanes to printed circuit boards are washed with these chemicals to improve their performance and to ease their production. The corner dry cleaner, not to mention his large industrial counterpart, needs these chemicals to remove stains and spots from clothing and other fabric products. In our economy, with its increasing high technology industrial base, microelectronic firms depend upon these chemicals to produce reliable and competitive products.

In the past decade, however, we have begun to discover the cloud within the silver lining. These days names like trichloroethylene, perchloroethylene, methylene chloride, trichloroethane, and others are commonplace in the news media, not because of the numerous ways in which these products improve our lives, but because they are increasingly showing up in our drinking water supplies. After decades of slow but steady progress in moving outward from disposal sites, these substances now threaten large volumes of water stored underground in the nation's groundwater basins. Places like Woburn, Massachusetts, Silicon Valley, and Stringfellow Acid Pits have added new perspectives to the risks inherent in modern society.[1]

* General Manager, Metropolitan Water District of Southern California.

1. In the Woburn, Massachusetts area, at least three industrial firms disposed of spent solvents, especially trichloroethylene and perchloroethylene, on the ground outside their manufacturing facilities. These chemicals were linked to a high incidence of childhood

The health affects of these chemicals taken in minute concentrations in drinking water are, of course, subject to considerable debate. But the fact is that these substances are certainly not doing anyone any good.

The water industry has a major stake in dealing with the problem of toxic wastes. It is an industry that tends to be far-sighted, with planning horizons measured in decades rather than years. Over the long run, it is simple common sense that source reduction — that is, efforts to significantly reduce the amount of toxic waste created in the first place — must be an important part of any comprehensive groundwater quality control strategy.

This paper defines the dimensions of the groundwater quality problem from the perspective of one of the largest suppliers of municipal and industrial water in the nation, the Metropolitan Water District of Southern California (Metropolitan). It also summarizes briefly an innovative joint effort with an old adversary, the Environmental Defense Fund (EDF), to improve the chances of implementing source reduction to deal with future contamination episodes before they get started.

DIMENSIONS OF THE PROBLEM

Metropolitan provides supplemental water to nearly 14 million people in the coastal region of Southern California.[2] These water supplies, imported from the Colorado River[3] and Northern California[4], augment local supplies, including groundwater which

leukemia in the surrounding communities. *See Nova: Toxic Trials* (public television broadcast, episode no. 1306, Feb. 25, 1986).

The "Silicon Valley" refers to a high-technology manufacturing area near Santa Clara, California. In the early 1980s, several major firms including IBM, Intel, and Fairchild Camera and Instrument, found that thirteen public and forty private wells had been contaminated. *See* Cal. Dept. of Health Serv., Groundwater and Drinking Water in the Sant Clara Valley: A White Paper (1984).

The Stringfellow Acid Pits, near the community of Glen Avon in Riverside County, California, were operated from 1956 to 1972 as a hazardous waste disposal site under permit by the State of California. The site was voluntarily closed in 1972, when it was discovered that the underlying bedrock was fractured and wastes were leaking out. Trichloroethylene and perchloroethylene were found in the waste water stream, along with mineral acid and metals wastes. The site is on the Superfund National Priority list, and cleanup efforts are now in progress, with extraction wells delivering contaminated groundwater to an advanced treatment plant. *See* G. J. Trezek, Engineering Case Study of the Stringfellow Superfund Site, Office of Technology Assessment, Cong., Aug. 1984.

2. Metro. Water Dist. of S. Cal., 1986 Annual Report xxxv, xxxviii.

3. *Id.* at 1.

4. *Id.* at 17.

provides about 1.2 million acre feet annually or nearly one-third of the water used in the region.[5] Before 1980, problems with chemicals in our water supplies were virtually unknown. Partly because of improved technologies for detecting the presence of contaminants[6], today there is a keen awareness about the presence of chlorinated chemicals and other contaminants in our groundwater supplies.

In Southern California, groundwater production has not been seriously affected to date by these chemicals. As of 1986, the net groundwater production loss in Metropolitan's service area due to chlorinated chemicals amounted to 6,500 acre feet, about one-half percent of total well production[7]. However, this relatively optimistic figure belies the potential magnitude of the problem in the future. Based on a recent study conducted by Metropolitan, 17 percent of the wells tested in the region showed concentrations of contaminants, primarily trichloroethylene and perchloroethylene, above California state "action levels[8]." Approximately another 33 percent of the wells tested showed trace amounts of the contaminants—that is concentrations were measurable but lower than state action levels[9]. In the past, impacts on groundwater production have been minimized by relocating production facilities and by blending well water with other supplies to bring concentrations down within acceptable levels. The future impact of toxic wastes on water supplies is highly uncertain and the subject of considerable concern to water suppliers.

In the future, toxic wastes will impact water supplies in ways that are not widely understood. One critical point is that in the future the health of water consumers is *not* likely to be among the primary impacts of toxic wastes. The water industry will supply only water that is healthful, based upon the best possible scientific information available. Future drinking water standards must somehow be established that consider the health consequences of

5. *See* Metro. Water Dist. of S. Cal., Groundwater Quality and Its Impact on Water Supply in the Metro. Dist. Service Area, Report No. 969, at 3 (1987).

6. *See generally* ORGANIC CARCINOGENS IN DRINKING WATER: DETECTION, TREATMENT, AND RISK ASSESSMENT 93-196 (N. Ram, E. Calabrese & R. Christman ed. 1986).

7. Report 969, *supra* note 5, at 3.

8. *Id.* at 3, 5. The State of California promulgates "action levels" for chemicals which are suspected to have health hazards, but for which no State or Federal maximum contaminant level (MCL) has been set. *Id.* app. at B-5. The action levels are established without formal hearings, based on available technical data.

9. *Id.* at 3.

exposure to particular substances in water and the costs and risk tradeoffs of achieving mandated standards. But whatever drinking water quality standards are established to protect human health, they will be met.

In the arid west, the primary impacts of water quality policies will be on the economics and politics of supplying water to a rapidly growing population. More stringent drinking water quality standards would require the installation of more sophisticated and costly water treatment facilities. In some cases, groundwater quality problems may seriously reduce the available production from a groundwater basin. Inevitably, this will increase the demand for more imported surface water. In effect, toxic waste problems in Southern California extend hundreds of miles eastward to the Colorado River and even farther northward to the Sacramento/San Joaquin River Delta.

Groundwater basins are valuable not only because of the water they provide, but also for their storage capacity and water management potential. Southern California's groundwater basins are an increasingly important component of conjunctive use programs designed to capture surface water when it is plentiful and store it underground until later dry years when it is needed. These programs can generate reliable dry year water supplies for western cities and farms. Moreover, they do so by allowing more water to be taken during high flow periods, when no adverse impacts occur on the environment. Consequently, groundwater contamination threatens one of the key management tools required to resolve the technical and political controversies that have plagued western water policy for decades.

SOURCE REDUCTION: LOOKING FORWARD TO A SOLUTION

It seems fair to say that groundwater quality regulations have so far necessarily concentrated, first, on cleaning up past contamination episodes and, second, on "command and control" strategies to regulate the practices of private firms. The cooperative effort of Metropolitan and EDF reflects a mutual conviction that, at least in part, the policies of the future must depart from past regulatory practice on both counts. Source reduction practices look not to the problems and conflicts of the past, but to the possibility of preventive policies and consensus in the future. That long time rivals such as the partners in this enterprise can work together on this topic bodes well for its consensus building potential. In addi-

tion, source reduction practices require a level of innovation and cooperation from industry that is not likely to be consistent with the highly detailed command and control approaches of the past.

In January, 1987, Metropolitan and EDF jointly created the Source Reduction Research Partnership (SRRP). SRRP is chartered to conduct the most comprehensive and practical study of source reduction ever. Although the concept of source reduction is hard to disagree with, the extent of its practical applicability is uncertain. In the face of the recent ban on the disposal of toxic wastes at landfill sites[10], and increasing regulatory pressures on the manufacture, use and disposal of toxic substances[11], industry has clear incentives to reduce the amount of hazardous chemicals that they use and the amount of toxic waste that they generate. However, like any major policy change, a significant move toward source reduction will confront technical, economic, institutional, and legal challenges. The purpose of SRRP is to assess the obstacles objectively and identify possible solutions to the problems identified.

When the project is complete, we expect to have a detailed set of data on chemical usage and disposal practices, and potential applications of source reduction for the industries overlying the major groundwater basins of Southern California. All information provided by industry will be protected by contractual commitments to preserve confidentiality. The study will inventory the technical and economic practicality of source reduction measures, concentrating on large and small firms alike in the industry sectors that use the vast majority of chlorinated chemicals. Eventually, the study should provide much more definitive information

10. In 1984, Congress passed the Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA), the legislation that governs the management of hazardous waste. These amendments effectively will ban the land disposal of virtually all untreated hazardous substances by the year 1992 at the latest. Chlorinated solvents were among the first substances so banned, on November 8, 1986. *See* Hazardous Waste Management System: Land Disposal Restriction: Final Rule, 51 Fed. Reg. 40573-74 (1986).

11. The five major chlorinated solvents [trichloroethylene (TCE), perchloroethylene (PERC), 1,1,1-trichloroethene (TCA), methylene chloride (METH), and 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113)] are under regulatory scrutiny for a variety of reasons. Three (TCE, PERC, and CFC113) are suspected carcinogens and may be regulated as toxic air contaminants. Two (TCA and CFC113) are suspected of depleting the ozone layer in the stratosphere or upper atmosphere. Two (TCE and PERC) have been regulated because they contribute to photochemical smog. All five have worker exposure levels. K. WOLF & F. CAMM, POLICIES FOR CHLORINATED SOLVENT WASTE—AN EXPLORATORY APPLICATION OF A MODEL OF CHEMICAL LIFE CYCLES AND INTERACTIONS 8-14 (1987).

than is now available on the possible future threat to our groundwater basins posed by toxic waste and on the technical and economic potential for reducing those risks through source reduction.

No less important, SRRP will explore the difficult institutional issues, both regulatory and private, that may complicate and delay the introduction of source reduction strategies. For example, in many firms on-site reclamation of toxic wastes may be both technically and economically feasible, but strongly discouraged by the land disposal ban implemented in 1986[12]—a consequence unintended by Congress.[13] Similarly, some source reduction strategies will require coordination among many firms involved with the manufacture and use of toxic chemicals as well as firms involved in the transportation, incineration, and disposal of hazardous wastes. We expect that many of the problems that must be worked out reflect not the economic and technical issues of primary concern in the past, but the institutional interactions among regulatory agencies and the firms involved in the highly complicated waste management chain.

CONCLUSION

Finding ways to protect groundwater basins from future contamination has implications not only for the health of people, but it may also play an important role in resolving long-lived controversies over the water resources of the west. The SRRP is intended to facilitate that process by looking hard and objectively at the practical issues involved in the application of the theoretically attractive idea of source reduction. The study is expected to produce an unprecedented data base that will facilitate decisionmaking by regulated firms and regulatory agencies and that will prove highly valuable in long range water planning. A project like the SRRP cannot be expected to determine whether source reduction will or will not occur. The regulatory pressure on industry and the common sense of source reduction would seem to make more

12. In promulgating the HSWA, which phased out the land disposal of virtually all untreated hazardous substances, Congress hoped to encourage source reduction. *See* 51 Fed. Reg., *supra* note 10, at 40573. In on-site reclamation of solvents, a contaminated sludge is generated that can no longer be disposed of on land. Other treatment technologies, like incineration, for instance, are much more costly. This discourages users from adopting on-site recycling.

13. *See id.* at 40572.

source reduction certain in the future. However, SRRP will hopefully make the transition faster and more effective — and in the end that could be extremely important.