

re-entrainment by wind action of historically contaminated soil. Automobile aerosols were characterized by a specific Br/Pb ratio of 0.32 ± 0.05 , and it was established that decreases in this ratio were a sensitive indicator of additional sources of airborne lead. Consequently, bromine was a useful quantitative tracer of automobile contributions to suspended lead, and it was further established that contributions from re-entrainment of contaminated soil could be evaluated by using aluminum as a tracer for soil.

The simultaneous collection of filterable particulates at indoor and outdoor sites suggested that indoor concentrations of most elements were 50-80% of outdoor concentrations, with even lower levels in poorly ventilated, air-conditioned rooms. Since this was also true for aluminum, these findings were not consistent with previous reports of elevated aluminum concentrations in the atmosphere of air-conditioned rooms.

CONCENTRATION AND DISTRIBUTION OF SUSPENDED PARTICULATE LEAD IN THE CITY OF JUAREZ, MEXICO
Order No. 7732888

QUEVEDO, Hector Adolf, Ph.D. The University of Oklahoma, 1977. 129pp. Major Professor: James M. Robertson

The purpose of this study was to investigate the concentration and distribution of suspended particulate lead, zinc, and cadmium in the area of Juarez, Chihuahua, Mexico. The sampling network utilized in the atmospheric study consisted of nine stationary receptors subjected to various weather and geographic conditions at distances varying from 6.21 to 21.58 kilometers from the local smelter in El Paso, Texas. The equipment used was high volume samplers and the analysis of the three metals was performed by the method of atomic absorption spectrophotometry. The study was designed to correlate lead and zinc in the atmosphere. The relationships between the metals and distance from the smelter were also performed. In addition, estimation of the concentration and distribution of atmospheric lead was also investigated.

It was concluded by statistical methods that lead and zinc in the atmosphere may have been emitted from the smelter. It was also observed that the concentration of the three metals in the atmosphere decreased exponentially with increasing distance from the emitting source. Although it was concluded that the ore smelter contributed substantially to the overall contamination of airborne lead, other sources, particularly automotive emissions, could have accounted for an increasing proportion of the total.

IMPLEMENTING COST-EFFECTIVE POLLUTION CONTROL BY MEANS OF EFFLUENT CHARGES: AN EXAMPLE APPLIED TO ELECTROPLATING DISCHARGES

Order No. 7800459

SALTZBERG, Edward Richard, Ph.D. University of Virginia, 1977. 205pp.

Current Federal pollution control policy, based on emission limitations, is expensive to comply with, easy to delay, difficult to enforce, and may not result in a clean environment. An alternative policy which can achieve environmental quality goals quickly and inexpensively is one which places a tax on the pollutants discharged.

However, ambient quality goals can only be met by using an effluent charge policy if the appropriate values of the charges can be determined. To do this, administering agencies must know the marginal abatement schedules of individual polluting firms. Until now no attempt has been made to provide agencies with well-defined procedures to determine these

cost schedules. This study presents a methodology which enables administering agencies to estimate these costs quickly, accurately, and inexpensively.

The methodology uses mathematical models which are designed to simulate standard abatement practices and to calculate the marginal abatement costs of individual firms, a data collection format which reflects the waste management constraints on each firm, and assess the validity of the marginal cost estimates by comparing calculated pollution loads with the corresponding sampled discharges. The methodology is effective because the processes and waste abatement practices of firms are standard in many industries.

To demonstrate the methodology's utility, it is applied to a major wastewater discharging industry, electroplating. An electroplating abatement model which simulates the abatement practices standard in the industry is developed and is used to estimate the marginal abatement cost schedules of three sizes of hypothetical electroplating firms. The input data used to describe each firm simulates actual operating conditions, and the estimated costs approximate those of real firms providing these processes. The difficulties that would be encountered in applying a charges policy to the electroplating industry and ways to overcome these difficulties are discussed. A possible effluent-charge program is devised which places a tax on cyanide, places a second tax on an index which characterized the dissolved metal content of the discharge, and which uses a fine to control pH. Although the taxes vary with specific variables, to obtain a maximum abatement response from electroplating firms, the cyanide tax would be about \$4.35 per pound of discharge and the tax on the dissolved metal index converts to about \$11 per pound of metal discharged.

Further investigation into the nature of the electroplating tax program and the sensitivity of the marginal cost schedule to certain process variables indicates the possibility of designing a national tax policy.

ENVIRONMENTAL NOISE MEASUREMENT METHODOLOGIES
Order No. 7801427

SHEKH, Riaz Munir, Ph.D. Southern Methodist University, 1977. 257pp. Adviser: Associate Professor Hal Watson, Jr.

Noise monitoring is an important tool for enforcing noise regulations and for gathering noise data for planning purposes. The present methodology involves either 24-hour manual, hand-held meter sampling for both quantitative and qualitative data or continuous automatic level sampling for only quantitative data. Analog tape microsampling which permits both types of data is the intermittent recording of subsamples of an analog acoustic signal on a magnetic tape. Microsampling takes advantage of the fact that noise levels are highly correlated over short intervals of time, and thus does away with redundant data at the expense of missing some events of low probability of occurrence. Considerable savings in the cost of data acquisition and of data reduction are accomplished. Also the cost of equipment needed to collect the data is reduced. In addition, the cost and the problems of placing an observer in the field for source identification are eliminated.

The various microsampling techniques analyzed, tested, and discussed with regard to their qualitative (source identification) and quantitative (level statistics) capabilities are: periodic, random, demand, demand-periodic, and demand-random. Two mathematical models, linear and exponential, have been developed to reduce the demand-periodic and demand-random data. It was observed during the course of the work that the demand sampling methodologies yielded an interspacing of loud subsamples with less loud subsamples and thus made the task of source identification easier and more accurate. It was found that using a demand sampler in parallel with either a periodic or a random sampler increases the data accuracy

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