EPA bulletin

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3-Year Study Seeks to Save 1,100 Lakes

EPA has launched an intensive study of some 1,100 lakes throughout the country in an effort to assist States in pinpointing water bodies most in danger of pollution damage and to provide assistance in developing control strategies.

Called the National Eutrophication Survey, the project is scheduled to take three years and is expected to cost about $5 million, according to Dr. Stanley M. Greenfield, Assistant Administrator for Research and Monitoring.

In the largest field sampling program ever undertaken by EPA, lakes are being sampled by scientists in three jet helicopters and one fixed-wing aircraft several times over the spring and summer months. Major tributaries to the lakes are being sampled monthly by thousands of National Guardsmen. Sewage plant operators also take samples from their outfalls for EPA analysis.

The survey is concentrating on lakes and reservoirs that receive waste water from municipal sewage treatment plants and are, therefore, likely to be threatened with eutrophication (premature aging).

After careful and complex measurements over a year's time, the survey scientists will attempt to determine:

- The present status of each lake (its trophic condition)
- The extent of nutrient loading from natural sources, from sewage plant sources and from other identifiable sources.
- The tolerance of each water body for various levels of specific nutrients that control plant growth.
- The probable effects of present or planned phosphorus removal at the treatment plants and the ability to control excess nutrients from other sources.

—photo by Mike Gordon

Tom Beaver, aircraft mechanic, lowers the contact sensor and sampling package (called "the fish") from the helicopter into Lake Mead, Nev., during tryouts of equipment for EPA's National Eutrophication Survey.

A preliminary survey using the STORET computer system has indicated that of the nation's 12,500 sewage treatment plants, about ,3-800 contribute their effluent to some 1,100 lakes.

Lakes smaller than 100 acres and those having average retention times of less than a week are eliminated. Rivers (including "run-of-the-river" impoundments), coastal bays and estuaries are not included because they are relatively free of threat of eutrophication.

Lakes in the survey were chosen after detailed discussion with State water quality authorities and EPA regional offices. The field effort in each state is closely coordinated with State and local officials to assure that data collected will have maximum usefulness and because of the survey's commitment to assist State authorities.

Much initial background information on each lake's water characteristics and quality is obtained from detailed questionnaires sent to State and municipal agencies, independent scientists and conservationists.

In this first year of the survey, about 240 lakes are being studied in 10 northeastern and north central states: Maine, New Hampshire,

LAKES Continued

Vermont, Massachusetts, Connecticut, Rhode Island, New York, Michigan, Wisconsin and Minnesota.

Next year about 450 lakes in the remaining states east of the Mississippi will be surveyed and in 1974 about 400 lakes in other states.

After sampling and analysis in each state, the survey team will report on the condition and prospects for each of its lakes. These reports will be reviewed by appropriate State officials and EPA regional personnel to make the proper recommendations for the implementation of control strategies.

Sampling by Air

Much of the field work is being performed with helicopters specially equipped for the National Eutrophication Survey. Three Army Huey jet helicopters have been lent by the Department of Defense for the survey. Early this year, they were fitted at the National Environmental Research Center—Las Vegas with pontoons for water landings and with sophisticiated water sampling and analysis equipment.

A team of 13 persons does the field sampling, initially working seven days a week. The team includes three complete air crews—each with a pilot, limnologist (lake scientist) and a sampling technician—and mobile laboratory personnel. The crews rotate between two of the aircraft while the third is held in reserve.

On sampling flights, the fourth aircraft, a DeHavilland Otter, also supplied by DOD, flies over a target lake and makes measurements of its chlorophyll content and surface temperature using remote sensing radiometers.

Then one of the helicopters, dubbed "Mr. Clean" by the NERC-Las Vegas mechanics who fitted them out, descends to the lake surface to make further measurements and to take water samples at an average of four stations and at several depths.

An extendable boom lowers a contact sensor package into the water to gather information on depth, temperature, acidity, dissolved oxygen content, electrical conductivity and turbidity. Then samples are taken at depths selected by the limnologist on the basis of the contact sensor data. Some of these samples are immediately analyzed in the mobile laboratory and others are airmailed to EPA laboratories at Las Vegas or Corvallis for chemical analysis.

—photo by Mike Gordon

Workers at NERC-Las Vegas attach pontoons to one of the helicopters to permit it to "land" on lakes. The helicopters were lent to EPA by the Department of Defense and modifications were made at the EPA hanger.

Half-meter cores of lake sediment are planned to be taken once each year. Other samples will be taken for algal analysis—one for identification of types present in the water and another for analysis of algal growth rates and response to various nutrient levels.

On some lakes with special recreational use, water samples will be sent to NERC-Cincinnati to determine if those waters contain a pathogenic amoeba, Naegleria.

Tributary Sampling

The airborne sampling program, which identifies a lake's condition and its tolerance for nutrients, is complemented by extensive sampling of the major streams entering and leaving each lake to determine the amount of nutrient loading and the sources of excess nutrients. This entails taking periodic samples from the lake's main tributaries at points above and below sewage treatment plants and at the stream's mouth. When combined with stream information from the U.S. Geological Survey, these data will permit the calculation of nutrient inflow, retention and outflow for each lake.

An enormous number of tributary samples is involved: about 20,000 for the 240 lakes being surveyed this year and an estimated 180,000 for the entire survey. National Guardsmen have been collecting all tributary samples in the 10 states programmed for this year, and EPA Administrator Ruckelshaus has asked Defense Secretary Laird to authorize Guard involvement in the survey for the rest of the country. The entire military aid to the Agency has been cost-free, an effort that Assistant Administrator Greenfield calls "exceptional public-mindedness" by Laird and the Guard. In addition, samples of effluent from sewage treatment plants are being taken by the plant operators, with collection and dispatch being coordinated through state water quality officials. These effluent samples are analyzed thoroughly for phosphorus, nitrogen and carbon.

Managing the survey from Wash-

Dump-Closing Drive Nears 2,200

State and local officials throughout the country closed 2,175 open dumps during the first 24 months of the Office of Solid Waste Management's "Mission 5000" campaign.

A July report listing 1,666 closings was widely used by news media with statistics and details of local performance highlighted.

The result was a spurt of belated reporting or new activity or a combination of both. Now the Solid Waste office is preparing a revised press release which will include more recent data.

"Although we failed (by July) to reach our goal of closing 5,000 dumps," said Samuel Hale Jr., Deputy Assistant Administrator for Solid Waste Management programs, "Our batting average was a respectable 333. We are very pleased with the signs that the effort is continuing."

The Mission 5000 campaign was started July 1, 1970, and was to run for 20 months. Previous surveys had indicated a total of approximately 16,000 open dumps in the country. Judged on this basis, about 10 percent of these dumps had been eliminated by the deadline.

New Jersey leads the latest list of 50 states and four territories with 168 dumps closed—75 percent of the number it had at the start of the campaign.

Seven States and one territory listed in the earlier report showed no dumps closed during the 20-month period. They included Alaska, Hawaii, Maine, North and South Dakota, Utah, Wyoming and the Virgin Islands.

Two territories on the list, the District of Columbia and Guam, had no dumps to begin with.

EPA's work to encourage the closing of dumps will go on, Hale said, although the Agency has no authority to order such closings. Working through regional representatives, the Agency assists States and local governments with technical standards, model legislation, problem-solving aid, and special training for solid-waste disposal planning and operating. EPA also will assist citizens' and volunteer organizations with information on good waste disposal practices.

The recent publication "Mission 5000—A Citizens' Solid Waste Management Project," 20 pages, publication SW-115ts, is available to all interested persons from EPA's regional Public Affairs offices (single copies are free). Multiple copies are available at 50 cents each from the Superintendent of Documents, Washington, D.C. 20402.

Administrator William D. Ruckelshaus said the Mission 5000 campaign had helped in the passage of many new State and local laws banning open dumping and burning of garbage and trash. More progress could be made, he said, if greater resources and manpower were provided to local and State waste-management agencies and if more aggressive enforcement programs were initiated.

"The number of dumps eliminated is not the sole criterion for judging a State or community program," he said. "Many dumps were closed before Mission 5000 began . . . and the closing of a dump serving a large population takes more effort than closing a small rural dump.

"Moreover, a community cannot close a dump until it has developed an alternative, better system, such as a well engineered sanitary landfill, a modern incinerator, or both."

LAKES Continued

ington is Robert R. Payne, Special Assistant to the Deputy Assistant Administrator for Monitoring. The co-directors of the field activities are Dr. Jack H. Gakstatter, of NERC-Corvallis, and Donald Wruble, NERC-Las Vegas. The conception and design of the survey was the responsibility of the Special Projects Staff in the Office of Research and Monitoring, including Dr. Eric D. Schneider, Dr. Norman Glass and Dr. Al Lefohn.

The staff is hopeful that one aspect of the survey, new techniques of interpreting aerial photographs, may eventually reduce the labor and cost of determining nutrient loadings for any drainage basin. The determination of land use by aerial photo analysis, plus data on rainfall and runoff may some day permit accurate calculation of nutrient transfer without the necessity of taking thousands of water samples and analyzing them separately. Survey planners forecast the development of the aerial reconnaissance program during the 1973-1974 period.

New Jersey Leads in Percent Closed

Here are the 10 states which were reported to have closed the greatest percentage of their open dumps during the first 24 months of the Mission 5000 campaign. These figures are as of July 1.

State	Number of Dumps	Dumps Closed	Percent
New Jersey	220	168	76.4
Illinois	606	416	68.7
Ohio	582	197	33.9
Idaho	45	13	28.9
Virginia	201	51	25.4
Maryland	132	30	22.7
Delaware	19	4	21.0
Pennsylvania	547	112	20.5
Florida	427	87	20.4
Massachusetts	285	57	20.0
National total	16,166	2,175	

New Waste System Tested On a Delaware Bay Ferryboat

A recirculating waste water treatment system now being tested on a Delaware Bay ferry may help solve the problem of marine waste disposal.

The system has been operating since Sept. 1 on the "Delaware," one of the ships that ferries passengers and automobiles on the 16-mile run between Cape May, N.J. and Lewes, Del. An EPA demonstration grant of $140,000 to the Delaware River and Bay Authority helped to pay for installing the system, after extensive testing in EPA's Edison, N.J., Water Laboratory.

The project officer, Bill Librizzi, said the system receives all the ship's sanitary and food-handling waste water, separates the solids, and recirculates the clarified and disinfected water for toilet flushing.

The system includes a vibrating screen for removing most of the solids, followed by treatment in a high-speed centrifuge to remove solids small enough to pass through the screen. The waste water then passes through a series of column filters containing activated carbon. Disinfecting and deodorizing agents are added before the water is ready for recirculation.

Librizzi said laboratory tests showed the system removed more than 90% of solids and more than 84% of the biological oxygen demand (BOD). He hopes that the full-scale tests on the "Delaware" will match the lab results and provide information on day-to-day operating characteristics and costs.

Staten Island Ferry Tests

Meanwhile, New York City officials have announced plans to test a somewhat similar self-contained, no-discharge system on a Staten Island ferry this fall.

After conferring with Edison Water Laboratory scientists, the New York officials accepted an industrial firm's plan for the pilot installation. This system will filter out solids, disinfect and deodorize the water, and recirculate it. The filtered out solids will be evaporated into an inert ash in a retort heated to 1,700° F, and some of the liquid wastes will also be evaporated on board the ferry.

CONFERENCE SET ON TOXIC METALS

An Environmental Resources Conference on the Cycling and Control of Metals will be held Oct. 31 to Nov. 2 in Columbus, Ohio, sponsored jointly by EPA, the National Science Foundation, and the Battelle Memorial Institute.

Dr. Andrew W. Breidenbach, Director of EPA's National Environmental Research Center at Cincinnati, is a cochairman of the conference. The planning committee includes three NERC-Cincinnati personnel John J. Convery, Director of the Advanced Waste Treatment Laboratory; Leland J. McCabe Jr. of the Water Supply Research Laboratory; and Ira Wilder of the Edison, N.J., Water Quality Research Division.

Metallic elements, usually in trace amounts, are important environmental pollutants because many are toxic. The conference will discuss the natural and man-caused sources of trace metal pollutants, how the metals are transported through the food chain, methods of control and monitoring, and the economics of recovery and reclamation.

Greenfield Shares Lake Study Post

Dr. Stanley M. Greenfield, EPA's Assistant Administrator for Research and Monitoring, has been named cochairman of the Research Advisory Board for the International Joint Commission of the United States and Canada.

With James P. Bruce, director of Canada's Centre for Inland Waters, Greenfield will coordinate the Great Lakes water quality research programs now under way and being planned by both countries.

The Commission is responsible for implementing the Great Lakes Water Quality Agreement signed by the United States and Canada on April 15.

Training Pays Off, 91 to 1!

For a dollar invested, the return is $91.

This is not an old prospector talking about the Lost Dutchman gold mine, but a sober calculation of the benefits of training sewage treatment-plant operators.

A study of waste water treatment in Texas showed that training operators at 19 plants was mainly responsible for improved performance in reducing basic oxygen demand and total suspended solids so that the plant effluents met or bettered the State water quality board standards.

Performance improvement valued at $5 million, in capital dissipation avoided, resulted from an operator training expenditure of $62,715. This is a ratio of 91 to 1.

Engineers of Harbridge House, the Boston-based firm which made the study for EPA's Office of Research and Monitoring, said they had anticipated that operator training would have "a positive effect," but "the measurable value of such training . . . astounded us."

Untrained or inadequately trained operators involve a substantial risk of capital dissipation, they noted. "Based on Texas data, a conservative estimate of average plant value entrusted to each operator is about $64,000 —more than six times the average industrial investment per production worker—and, because of understaffing, individual operators are actually entrusted with capital plant of up to $160,000," on the average.

Lead in Boston's Drinking Water; New Hazard Laid to Old Piping

A new potential source of environmental poisoning, lead in drinking water, is being closely watched by EPA scientists and public health officials in Boston, Mass.

Tests last spring by the State's Department of Public Health found unsuspected quantities of lead in water samples taken from nearly half of 52 households in the city's old and affluent Beacon Hill section.

Dr. Dorothy Worth, then Department Director of Family Services, said the amounts were well below the level considered toxic, but that they exceeded the maximum recommended by the U.S. Public Health Service: 0.05 milligrams per liter.

The lead is believed to come from the lead "service lines" still in use in older sections to convey water from the city's mains to the houses, and, in a few cases, from lead piping in the houses.

Lead is no longer used for water piping, not because it is a health hazard, but, because other materials are cheaper.

Boston gets its drinking water from the Quabbin Reservoir, a large artificial lake about 60 miles from the city in central Massachusetts. Some experts feel that the reservoir water may be getting slightly acid from acid-forming sulfur and nitrogen oxide air pollutants washed out of the air by rains. Such acidity, they say, could increase the rate of lead-ion pickup as the water flows through the old pipes.

Floyd Taylor, acting chief of EPA's Northeast Water Supply Branch where the Beacon Hill's samples were assayed, said it would be relatively easy to control such acidity by adding alkaline compounds during routine water treatment, as is done in many city systems, including New York's.

"Corrosion control would be more practical than ripping up all the lead pipes in Boston," he said, explaining that such control might be achieved by adding chemicals that would coat the pipes, as well as keep a neutral acid-alkali balance. But first more tests should be made to ascertain if acidity is indeed the problem, and if lead compounds are present in water from other parts of the city.

Metropolitan District Commissioner John Sears, whose State agency operates the Quabbin Reservoir, said he favored more research before trying to alter the quality of the reservoir water. The Quabbin system, built nearly 50 years ago, also regularly supplies water for Chicopee and a number of other communities, and it is tapped occasionally by Cambridge and other cities when their supplies run low.

Sears ordered an engineering firm, now studying proposals to fluoridate the Quabbin system, to expand its study to include the lead problem.

Meanwhile, residents who have lead service lines have been advised to let their household water run for a few minutes each morning to flush out water that has been standing overnight in the lead piping.

EPA HELPS INDIANS RAISE OYSTERS

Raising oysters artificially for market is a new project designed to help the Lummi Indians in northern Washington to help themselves.

The tribe this summer unveiled a $3.5 million Aquacenter on the Lummi Reservation on Puget Sound, where it expects to provide jobs for some 200 of its people and repay the Federal investment in the Aquacenter in about two years.

The project has been several years in the making. EPA cooperated with the loan of bayshore land at Manchester, Wash., for pilot studies and tests in shellfish culture.

The Lummis are raising oysters in tanks, where temperature, salinity, and nutrient materials can be carefully controlled to assure the maximum fertilization of the free-floating oyster eggs. When the tiny, young animals are ready to settle down and grow shells, they are transferred to larger vats in the Aquacenter building and to diked pools in the Sound.

States Get Three-in-One Grants For Environmental Management

A new three-in-one type of grant to States for environmental planning and management has been alunched by EPA.

These "comprehensive grants" include in one package funds authorized under three different acts of Congress: the Water Pollution Control Act, the Clean Air Act, and the Solid Waste Disposal Act.

Four grants totalling more than $3.5 million were announced Aug. 23 for States in four regions. The States and the grant amounts for Fiscal 1973 were: Hawaii, $288,600; New York, $2,300,000; Utah, $297,000; and Washington, $679.400.

Benefits to the States from combining the three types of grant into one include:

- Faster processing and reduction of paperwork, compared with separate applications.
- Encouragement for considering environmental planning and management on a unified, rather than piecemeal, basis.
- Comprehensive grants apply to the overall management function of a State's environmental programs, not to particular construction projects like sewage treatment facilities or demonstrations of new pollution control technology.

The three-in-one approach fits in with the State's trend toward centralized agencies that deal with all environmental problems. Last year 22 States had unified environmental agencies. As of last July the number had risen to 37. The comprehensive grants are given only to States with such central agencies.

CONFERENCE SET ON POLLUTANT 'FINGERPRINTING'

Advanced methods of "fingerprinting" pollutants will be discussed at a conference sponsored by EPA's Southeast Water Laboratory and the University of Georgia's Chemistry Department at Athens, Ga., Nov. 6 and 7.

The symposium, "Applications of Mass Spectrometry to Environmental Problems," will deal with techniques for identifying atoms and molecules by their individual masses. Because chemical compounds, including pollutants, may have mass spectra as unique as fingerprints, mass spectrometry is a powerful tool for the measurement of air and water contaminants, including very complex hydrocarbons compounds, pesticides, and pesticide residues. The relation of mass spectrometry to other analytical methods including gas and liquid chromatography will also be discussed.

On the program will be speakers from SWL and the Perrine Primate Laboratory; the National Institutes of Health; M.I.T., Cornell, and the University of Georgia; Battelle Columbus Laboratory, Naval Research Laboratory, and the Bureau of Mines Research Center.

Persons wishing reservations or more information should contact Mrs. Ann Alford, Southeast Water Laboratory, College Station Road, Athens, Ga. 30601, tel. (404) 546-3186.

The EPA Bulletin is published monthly by the Office of Public Affairs to inform State and local environmental officials of EPA's research, standard-setting, and enforcement activities.

The Bulletin will welcome letters, contributed articles, and photos suitable to its purpose and audience.

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Anchorage Dedicates Plant

Anchorage, Alaska, recently dedicated a new sewage system that, when completed, will serve more than one third of the State's population.

The fast-growing Anchorage area had more than 124,000 residents in 1970, about four times its 1950 population. Until the Greater Anchorage Area Borough was formed in 1964, there was no local government agency to deal with sewerage problems on an areawide basis. In 1967, the voters approved a $20-million bond issue to begin construction, which was started the next year.

Current estimates of "eligible costs" for which Federal aid applies —interceptor lines, treatment plant, and sludge and effluent disposal— total $23 million, and the Federal Government is providing 55 percent.

Many unusual engineering problems were encountered because of the area's cold climate, high groundwater table, and mammoth tides in Cooke Inlet where the treated wastewater must be discharged.

Some 27 miles of concrete pipe, ranging in size from 24 to 96 inches in diameter, were manufactured at Anchorage at a specially built plant, rather than being imported from the "lower 48" states.

The area, dotted with lakes, is used for recreation, water supply, and seaplane anchorages. To prevent sewer construction from lowering the water table or draining the lakes required special sheathing of the trenches. One stretch of 84-inch line was bedded in concrete and covered with clay to the level of a nearby lake, creating an impermeable underground dike.

The waste water outfall from the treatment plant extends 800 feet into Cooke Inlet, whose waters ebb and flow in the second highest tides in the world. In winter, these tides carry ice floes that can grind and crush any shore-based installation in their path. The outfall pipe is designed to withstand these forces and yet remain sufficiently flexible.

The incinerator to burn the sewage sludge is equipped not only with devices to prevent air pollution, but also with equipment to reduce fog-generating emissions because the plant is near the Anchorage airport.

EPA officials at the dedication praised the people of Anchorage, and especially the borough chairman, John H. Asplund, for their foresight in deciding to build such an advanced sewage system and for their courage and determination in carrying out the plans.

SAFETY NOTE:

Perchloric Acid Is Explosive

Perchloric acid, a reagent frequently used in environmental laboratories, can cause death and destruction if improperly used, according to Karl Spence, EPA safety officer.

At elevated temperatures perchloric acid becomes a strong oxidizing agent and may react explosively with reducing agents and organic materials, causing fires that burn with great intensity and are nearly impossible to extinguish. Perchloric acid spilled on combustible material and dried can be ignited by impact, friction, or moderate heat.

Spence recommends these precautions when using perchloric acid:

- Wear goggles, masks, and protective clothing.
- Don't breathe the acid fumes or allow skin or eye contact.
- Conduct tests only in a fume hood.
- Wash away any spilled acid immediately with large quantities of water.
- Don't store the acid in wooden cabinets, on wooden shelves, or with oxidizable materials.

3 Communities Get $11.3 Million To Extract Valuables From Waste

Three large grants totaling $11.3 million to demonstrate the recovery of resources from municipal garbage and trash were announced Sept. 8 by EPA Administrator William D. Ruckelshaus.

These are the first grants under Section 208 of the Resource Recovery Act, to help municipalities build and operate full-scale systems to recover valuable products from waste using new technology.

"We hope to demonstrate systems that can be put to use some day in other cities and towns across the country," Ruckelshaus said. "We realize that this will take time. The major problem in resource recovery from municipal waste is the absence of stable and large markets for the kinds of commodities that can be produced. Developing new markets will take some effort and will probably call for new incentives for industry. These demonstrations are one step in that process."

Three different techniques, hitherto tested only on a laboratory scale, will be used: gasification of combustible waste, conversion to fuel oil, and mechanical sorting of incinerator residues.

Baltimore, Md., will use a grant of $6 million to help build a $14-million gasification system to handle 1,000 tons of waste per day, half the city's output. After ferrous metals and crushed glass are extracted from the waste, the combustible portions will be heated to produce a fuel gas, that will be burned to maintain the process and to make steam for sale to an electric utility company. Revenues from sale of the steam and scrap materials are expected to exceed $1.5 million per year. The system is to be completed about June, 1974.

San Diego County, Calif., will receive $2.9 million toward the construction of a $4-million facility to convert combustible waste to fuel oil by a similar process—heating in the absence of oxygen. The oil will be sold as utility or industrial fuel and ferrous metals and glass extracted. Annual revenues of $200,000 to $300,000 are expected. The plant is to be ready in November 1974.

Lowell, Mass., will get a $2.4 million grant to build a $3.2-million facility to sort ferrous metals, nonferrous metals, and glass from incinerator ashes, using a series of ore-treatment processes developed by the Interior Department's Bureau of Mines. The plant will process about 250 tons per day of residue from Lowell and also from Somerville and Newton, Mass. Annual income from the sale of scrap metals and glass is estimated at $500,000. The plant is to start operation in September 1974.

ERRATUM

We erred in our August issue in stating that boatowners who install approved waste treatment devices within five years from the date of Coast Guard regulations would be exempt from further cleanup for the life of the vessel.

Owners of existing boats may install treatment devices within three years after promulgation of Coast Guard regulations, and operate such devices for the life of the device, not for the life of the boat. A device installed between three and five years after promulgation of the Coast Guard regulations may be operated for three years after the effective date of the regulations—provided the device remains operable. Otherwise, the device must comply with the no-discharge standard.

The article also erred in stating that the EPA standard specifically provides that States may pass tougher rules if they wish. The standard, in fact, provides that a State may request the EPA Administrator to issue a regulation "completely prohibiting discharge from a vessel of any sewage." After the effective date of the Federal regulations, no State may adopt or enforce regulations with respect to the design, manufacture, or installation or use of any marine sanitation device on any vessel subject to the Federal standards.

Recent EPA Publications

The Quality of Life Concept. 154 p., August 1972. An anthology of readings and study material assembled for an EPA symposium held at Warrenton, Va., Aug. 29-31, on ways to define and quantify the "quality of life." The symposium sought to help decision makers at all levels of government and in many areas of private enterprise include quality-of-life considerations in their assessment of environmental policies and actions. Single copies available from EPA Office of Research and Monitoring, Washington, D.C. 20460.

Guide to Engineering Permit Processing, 384 p., July 1972. A manual on designing and administering systems to regulate air pollution emissions from stationary sources. Limited copies available from EPA Air Pollution Technical Information Center, Research Triangle Park, N.C. 27711.

Estimates of Ionizing Radiation Doses in the United States, 1960-2000, 171 p., August 1972. Joint study with the Atomic Energy Commission and the Departments of Defense and Health, Education and Welfare of the average radiation dose to the U.S. population expected over the next 30 years from environmental, medical, and occupational sources. Office of Radiation Programs, EPA, Rockville, Md. 20852. Available also for $1.50 per copy from Superintendent of Documents, Washington, D.C. 20402.

Guide for Compiling a Comprehensive Emission Inventory, 196 p., June 1972. A manual to assist State and local air pollution control agencies. Limited copies available from the EPA Air Pollution Technical Information Center, Research Triangle Park, N.C. 27711.

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EPA Publications Continued

Air Pollution Aspects of Emission Sources. Three new compilations of abstracts of technical articles on pollution by particular industries are available from the EPA Air Pollution Technical Information Center, Research Triangle Park, N.C. 27711. They include:

Boilers, 125 p., May 1972

Iron and Steel Mills, 84 p., May 1972

Petroleum Refineries, 68 p., July 1972

Previously published in the same series and still available are:

Electric Power Production
Cement Manufacturing
Sulfuric Acid Manufacturing
Nitric Acid Manufacturing
Municipal Incineration.

Noise Facts Digest, 202 p., June 1972. Pilot issue of a new publication containing articles and selected abstracts on noise control, with subject and author indexes, glossary, and list of sources. Sample copies available from EPA Office of Noise Control and Abatement, Washington, D. C. 20640.

Evaluation of DDT and Dieldrin in Lake Michigan, 149 p., August 1972. Reports on a three-year study, supported by EPA grants to the four participating States of the Lake Michigan Enforcement Conference, of pesticide residues and metabolates in lake and tributary water, invertebrates, and fish. Observed levels "warrant concern from both a public health and wildlife preservation standpoint," the study finds, and the presence of such industrial wastes as PCBs and phthalates greatly complicates the analysis. Available for $1.25 per copy from Superintendent of Documents, Washington, D.C. 20402.

Surface Pollution Problems in the United States, 29 p., May 1972. Brief review of groundwater contamination from waste injection wells, percolation and runoff from surface sources, and saline intrusion. EPA Office of Water Programs, Washington, D.C. 20460.

Forest Fertilization, 57 p., August 1972. Reviews the use of inorganic fertilizers on commercial forests in the U.S. and several foreign countries and discusses probable trends and effects on the water and soil environment. By William A. Groman, NERC, Corvallis. Office of Research and Monitoring, EPA, Washington, D.C. 20460. Also available for 65 cents per copy from Superintendent of Documents, Washington, D.C. 20402.

Lime/Limestone Wet-Scrubbing Symposium, Proceedings, Vol. II, 556 p., June 1972. Concluding volume of papers on sulfur removal processes for utility and industrial plants burning fossil fuels. Papers were given at an EPA conference in New Orleans in November 1971. Limited copies available from EPA Air Pollution Technical Information Center, Research Triangle Park, N.C. 27711.

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