

Research and Development



# Research Reports of the Environmental Monitoring Systems Laboratory-Las Vegas

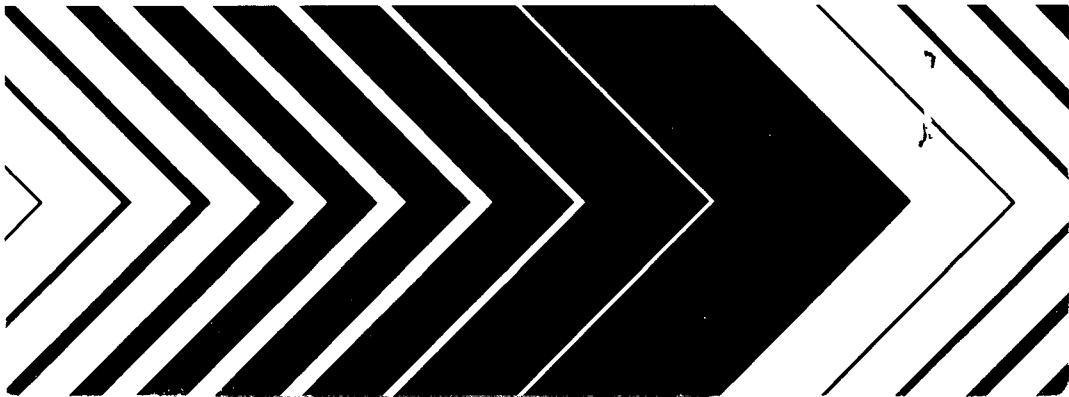
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### SECTION III, OTHER PUBLICATIONS

Reports published as papers in professional journals or in proceedings of scientific and technical meetings can usually be seen in most major libraries, particularly university libraries. Reprints of journal articles can sometimes be obtained from the author or from the journal publisher. Copies of proceedings documents may be requested of their publishers.

### SECTION IV, UNPUBLISHED PRESENTATIONS AT SCIENTIFIC AND PROFESSIONAL MEETINGS

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Also, the Printing Management Office (PM-215), U.S. Environmental Protection Agency, Washington, D.C. 20460, publishes "Publications, A Quarterly Guide," which lists new technical publications that are available from the NTIS, and general EPA publications that are available from various sources. This quarterly guide may be received regularly at no charge by writing to the EPA address above.

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RESEARCH REPORTS  
OF THE  
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS  
JANUARY-DECEMBER 1978

COMPILED BY  
PATRICIA J. WUNDER  
INFORMATION SERVICES  
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY  
LAS VEGAS, NEVADA 89114

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF RESEARCH AND DEVELOPMENT  
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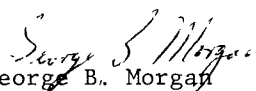
## FOREWORD

Protection of the environment requires effective regulatory actions which are based on sound technical and scientific information. This information must include the quantitative description and linking of pollutant sources, transport mechanisms, interactions, and resulting effects on man and his environment. Because of the complexities involved, assessment of specific pollutants in the environment requires a total systems approach that transcends the media of air, water, and land. The Environmental Monitoring Systems Laboratory-Las Vegas\* contributes to the formation and enhancement of a sound monitoring data base for exposure assessment through programs designed to:

- develop and optimize systems and strategies for monitoring pollutants and their impact on the environment
- demonstrate new monitoring systems and technologies by applying them to fulfill special monitoring needs of the Agency's operating programs

The EMSL-Las Vegas also conducts research and monitoring programs for the U.S. Department of Energy (DOE), Nevada Operations Office. These programs concern environmental radiation associated with the DOE's testing of nuclear explosives conducted at the Nevada Test Site and other sites.

"Research Reports" lists scientific and technical reports published or presented by EMSL-Las Vegas personnel. We hope this listing will prove useful to persons interested in environmental monitoring and the work of our Laboratory. We welcome any suggestions for improving the utility of future issues of this annual bibliography.

  
George B. Morgan

Director

Environmental Monitoring Systems Laboratory  
Las Vegas

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\*Until June 4, 1979, the Environmental Monitoring and Support Laboratory-Las Vegas.

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## I. PUBLICATIONS IN THE EPA SERIES

### ECOLOGICAL RESEARCH

#### DISTRIBUTION AND IMPORTANCE OF PHYTOPLANKTON IN THE ATCHAFALAYA BASIN

Hern, Stephen C., W. D. Taylor, L. R. Williams, V. W. Lambou, M. K. Morris, F. A. Morris, and J. W. Hilgert, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-001, January 1978. 202 pp.

Abstract: The species and abundance of phytoplankton in the Atchafalaya Basin are presented. From 86 phytoplankton samples examined, 107 genera and 287 species of algae were identified. Occurrence and dominant occurrence of phytoplankton genera and species are listed. The Nygaard's Trophic State Index, Palmer's Organic Pollution Index, as well as species diversity and abundance indices are included. Also, study areas inside and outside the Basin were compared and contrasted for chemical, physical and biological characteristics. From the above data the following conclusions were made: 1) phytoplankton play a minor role in the overall productivity of the Basin proper due to the high concentration of suspended sediments in the water, 2) phytoplankton production was nearly an order of magnitude greater in areas studied outside the Basin than within the Basin, and 3) diatoms and flagellates were the dominant algal groups within the Basin while flagellates and blue-green algae were the dominant algae groups outside the Basin proper.

Order from: NTIS, No. PB277544/AS  
Price: Paper copy \$9.25 (A10)  
Microfiche \$3.00 (A01)

#### RELATIONSHIPS OF PRODUCTIVITY AND PROBLEM CONDITIONS TO AMBIENT NUTRIENTS: NATIONAL EUTROPHICATION SURVEY FIND- INGS FOR 418 EASTERN LAKES

Williams, Llewellyn R., Victor W. Lambou, Stephen C. Hern, and Robert W. Thomas, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-002, January 1978. 28 pp.

Abstract: Data collected by the National Eutrophication Survey (NES) team for 418 eastern lakes were utilized to determine correlations between chlorophyll *a*, an indicator of lake productivity, and nutrient and other water quality parameters.

High linear correlations were determined between total phosphorus and mean chlorophyll *a* levels, especially in lakes with retention times of greater than 14 days. These basic relationships were compared for populations of lakes subdivided on the bases of stratification, vegetation dominance and fishery type. Significant regional differences were noted in the basic chlorophyll *a* phosphorus relationships. Correlations determined for chlorophyll *a* with phosphorus, Kjeldahl nitrogen, pH and total alkalinity were positive; those with Secchi disk transparency and nitrogen:phosphorus ratio were negative.

Relationships between lake "problems" and nutrient or other water quality parameters were established by comparing historical and observational data of general lake conditions with physical, chemical and biological values obtained from NES sample analyses. The distributions of lakes with algal blooms, aquatic macrophyte problems, low dissolved oxygen concentrations, and/or fishkills are presented as functions of mean total phosphorus and chlorophyll *a* concentrations.

Order from: NTIS, No. PB276987/AS  
Price: Paper copy \$4.50 (A03)  
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(Previously released in limited distribution as No. 725 in the Working Paper Series for the National Eutrophication Survey.)

#### DISTRIBUTION OF PHYTOPLANKTON IN GEORGIA LAKES

Morris, F. A., M. K. Morris, L. R. Williams, W. D. Taylor, F. A. Hiatt, S. C. Hern, J. W. Hilgert, and V. W. Lambou, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-011, January 1978. 72 pp.

Abstract: This is a data report presenting the species and abundance of phytoplankton in the 14 lakes sampled by the National Eutrophication Survey in the State of Georgia. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).



Order from: NTIS, No. PB279668/AS  
Price: Paper copy \$5.25 (A04)  
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(Previously released in limited distribution as No. 680 in the Working Paper Series for the National Eutrophication Survey.)

#### DISTRIBUTION OF PHYTOPLANKTON IN KENTUCKY LAKES

Taylor, W. D., F. A. Hiatt, S. C. Hern, J. W. Hilgert, V. W. Lambou, F. A. Morris, M. K. Morris, and L. R. Williams, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-013, January 1978. 36 pp.

Abstract: This is a data report presenting the species and abundance of phytoplankton in the five lakes sampled by the National Eutrophication Survey in the State of Kentucky. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

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(Previously released in limited distribution as No. 683 in the Working Paper Series for the National Eutrophication Survey.)

#### DISTRIBUTION OF PHYTOPLANKTON IN NEW JERSEY LAKES

Williams, L. R., W. D. Taylor, F. A. Hiatt, S. C. Hern, J. W. Hilgert, V. W. Lambou, F. A. Morris, and M. K. Morris, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-014, January 1978. 68 pp.

Abstract: This is a data report presenting the species and abundance of phytoplankton in the 13 lakes sampled by the National Eutrophication Survey in the State of New Jersey. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

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(Previously released in limited distribution as No. 686 in the

Working Paper Series for the National Eutrophication Survey.)

#### DISTRIBUTION OF PHYTOPLANKTON IN OHIO LAKES

Hilgert, J. W., V. W. Lambou, F. A. Morris, M. K. Morris,  
L. R. Williams, W. D. Taylor, F. A. Hiatt, and S. C. Hern,  
EMSL-Las Vegas, Office of Research and Development, EPA,  
Las Vegas, Nevada  
EPA-600/3-78-015, January 1978. 102 pp.

Abstract: This is a data report presenting the species  
and abundance of phytoplankton in the 20 lakes  
sampled by the National Eutrophication Survey in the State  
of Ohio. Results from the calculation of several water  
quality indices are also included (Nygaard's Trophic State  
Index, Palmer's Organic Pollution Index, and species  
diversity and abundance indices).

Order from: NTIS, No. PB280140/AS  
Price: Paper copy \$6.50 (A06)  
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(Previously released in limited distribution as No. 688 in the  
Working Paper Series for the National Eutrophication Survey.)

#### DISTRIBUTION OF PHYTOPLANKTON IN TENNESSEE LAKES

Hiatt, F. A., S. C. Hern, J. W. Hilgert, V. W. Lambou,  
F. A. Morris, M. K. Morris, L. R. Williams, and W. D.  
Taylor, EMSL-Las Vegas, Office of Research and Develop-  
ment, EPA, Las Vegas, Nevada  
EPA-600/3-78-016, January 1978. 76 pp.

Abstract: This is a data report presenting the species  
and abundance of phytoplankton in the 16 lakes  
sampled by the National Eutrophication Survey in the State  
of Tennessee. Results from the calculation of several  
water quality indices are also included (Nygaard's Trophic  
State Index, Palmer's Organic Pollution Index, and species  
diversity and abundance indices).

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(Previously released in limited distribution as No. 691 in the  
Working Paper Series for the National Eutrophication Survey.)

#### DISTRIBUTION OF PHYTOPLANKTON IN DELAWARE LAKES

Hern, S. C., J. W. Hilgert, V. W. Lambou, F. A. Morris, M. K. Morris, L. R. Williams, W. D. Taylor, and F. A. Hiatt, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-027, January 1978. 40 pp.

Abstract: This is a data report presenting the species and abundance of phytoplankton in the six lakes sampled by the National Eutrophication Survey in the State of Delaware. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

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(Previously released in limited distribution as No. 678 in the Working Paper Series for the National Eutrophication Survey.)

#### ETHYLMERCURY: FORMATION IN PLANT TISSUES AND RELATION TO METHYLMERCURY FORMATION

Fortmann, L. C., D. D. Gay, and K. O. Wirtz, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-037, April 1978. 12 pp.

Abstract: Seedlings of the common dwarf garden pea, *Pisum sativum*, cv. Little Marvel, exposed to elemental mercury vapor formed both methylmercury and ethylmercury in all parts of the plant. Concentrations of both organomercury compounds fluctuated considerably over a 48-hour exposure period, but the total of detectable forms of mercury continued to rise due to increased ethylmercury formation. Ethylmercury formation was greater in the light than in the dark, but methylmercury concentration did not differ significantly. The pattern of change in the concentrations of methylmercury and ethylmercury suggests both are metabolites of a single mercury pathway in peas.

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Price: Paper copy \$4.00 (A02)  
Microfiche \$3.00 (A01)

VOLATILITY OF MERCURY FROM SOILS AMENDED WITH VARIOUS  
MERCURY COMPOUNDS

Rogers, Robert D., EMSL-Las Vegas, Office of Research  
and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-046, April 1978. 16 pp.

Abstract: A study was conducted to determine the rate of  
mercury volatilization from soils freshly  
amended with mercury compounds. Mercuric nitrate, mer-  
curic chloride, mercuric acetate, mercuric oxide, and  
mercuric sulfide were used in conjunction with three soils:  
a loamy sand, a sand loam, and a clay loam. Mercury was  
evolved from all combinations and was shown to be dependent  
upon the solubility of the mercury compound and the texture  
of the soil.

Order from: NTIS, No. PB281370/AS  
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DISTRIBUTION OF PHYTOPLANKTON IN ILLINOIS LAKES

Morris, M. K., L. R. Williams, W. D. Taylor, F. A. Hiatt,  
S. C. Hern, J. W. Hilgert, V. W. Lambou, and F. A. Morris,  
EMSL-Las Vegas, Office of Research and Development, EPA,  
Las Vegas, Nevada  
EPA-600/3-78-050, May 1978. 136 pp.

Abstract: This is a data report presenting the species  
and abundance of phytoplankton in the 31 lakes  
sampled by the National Eutrophication Survey in the State  
of Illinois. Results from the calculation of several  
water quality indices are also included (Nygaard's Trophic  
State Index, Palmer's Organic Pollution Index, and species  
diversity and abundance indices).

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(Previously released in limited distribution as No. 681 in the  
Working Paper Series for the National Eutrophication Survey.)

DISTRIBUTION OF PHYTOPLANKTON IN NORTH CAROLINA LAKES

Morris, M. K., L. R. Williams, W. D. Taylor, F. A. Hiatt,  
S. C. Hern, J. W. Hilgert, V. W. Lambou, and F. A. Morris,  
EMSL-Las Vegas, Office of Research and Development, EPA,  
Las Vegas, Nevada  
EPA-600/3-78-051, May 1978. 80 pp.

Abstract: This is a data report presenting the species and abundance of phytoplankton in the 16 lakes sampled by the National Eutrophication Survey in the State of North Carolina. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Index, and species diversity and abundance indices).

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(Previously released in limited distribution as No. 687 in the Working Paper Series for the National Eutrophication Survey.)

#### FACTORS INFLUENCING THE VOLATILIZATION OF MERCURY FROM SOIL

Rogers, Robert D., and James C. McFarlane, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada EPA-600/3-78-054, May 1978. 20 pp.

Abstract: Mercury volatilization from soils amended to 1 ppm mercury with mercuric nitrate ceased within 1 week after application. During the first week, 20 percent of the applied mercury was lost from a silty clay-loam soil and 43 percent was lost from a loamy sand soil. Volatilization of mercury from the loamy sand soil resulted in a concurrent decrease in ammonium nitrate-extractable mercury. Other work with sterile soil indicates that the volatilization was mediated by microorganisms.

Order from: NTIS, No. PB286179  
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#### DISTRIBUTION OF PHYTOPLANKTON IN INDIANA LAKES

Morris, F. A., M. K. Morris, L. R. Williams, W. D. Taylor, F. A. Hiatt, S. C. Hern, J. W. Hilgert, and V. W. Lambou, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada EPA-600/3-78-078, August 1978. 80 pp.

Abstract: This is a data report presenting the species and abundance of phytoplankton in the 27 lakes sampled by the National Eutrophication Survey in the State of Indiana. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

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(Previously released in limited distribution as No. 682 in the Working Paper Series for the National Eutrophication Survey.)

#### TRACE ELEMENTS IN SOIL AROUND THE FOUR CORNERS POWER PLANT

Wiersma, G. B., and A. B. Crockett, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-079, August 1978. 24 pp.

Abstract: Ninety-six soil samples were collected on a radial grid employing 16 evenly spaced radii and 5 logarithmically spaced circles, concentric around the Four Corners Power Plant in New Mexico. The soil samples were analyzed for zinc, lead, copper, and cadmium by atomic absorption spectrophotometry. No statistical relationship could be detected between residue levels for the four elements and increasing distance from the power plant. A two-way analysis of variance indicated no significant difference among circles but there was a significant difference among radii for zinc, lead, and copper, with higher residues of these elements consistently indicated to the west of the power plant. Elevated levels of zinc, lead, and copper to the west of the power plant could be partially explained by wind rose patterns and the location of the fly ash settling ponds. Average residue levels for zinc, lead, and copper are below average residue levels reported for other power plants. Average cadmium levels are slightly higher than cadmium levels reported in the literature for other power plants.

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Microfiche \$3.00 (A01)

#### PLUTONIUM UPTAKE BY PLANTS GROWN IN SOLUTION CULTURE

McFarlane, James C., Allan R. Batterman, and Kenneth W. Brown, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-081, August 1978. 20 pp.

Abstract: Plants grown in aquatic systems were shown to rapidly accumulate large amounts of plutonium, about 40 percent of which was removed by washing. Detergent removed debris, most of which consisted of particles larger than 0.8 micrometers. After removing a portion of

the bound plutonium by rinsing in diethylenetriaminepent-acetate (DTPA) additional plutonium was removed by a citric acid rinse. This implies that more than one type of plutonium binding to plant roots exists or that more than one chemical form of plutonium was present. The high plutonium concentration on plant roots did not facilitate uptake and translocation to aerial portions of the plant: discrimination ratios were similar to those typically found in terrestrial studies. Plants with filamentous root systems are suggested as possible scavengers for plutonium in aquatic systems.

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#### DISTRIBUTION OF PHYTOPLANKTON IN FLORIDA LAKES

Taylor, W. D., F. A. Hiatt, S. C. Hern, J. W. Hilgert, V. W. Lambou, F. A. Morris, M. K. Morris, and L. R. Williams, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-085, September 1978. 120 pp.

Abstract: This is a data report presenting the species and abundance of phytoplankton in the 40 lakes sampled by the National Eutrophication Survey in the State of Florida. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

Order from: NTIS, No. PB296504/AS  
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(Previously released in limited distribution as No. 679 in the Working Paper Series for the National Eutrophication Survey.)

#### DISTRIBUTION OF PHYTOPLANKTON IN ARKANSAS LAKES

Hilgert, J. W., F. A. Morris, M. K. Morris, W. D. Taylor, L. R. Williams, S. C. Hern, and V. W. Lambou, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-101, December 1978. 60 pp.

Abstract: This is a data report presenting the species and abundance of phytoplankton in the 16 lakes sampled by the National Eutrophication Survey in the State

of Arkansas. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

Order from: NTIS, No. PB292742/AS  
Price: Paper copy \$5.25 (A04)  
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(Previously released in limited distribution as No. 694 in the Working Paper Series for the National Eutrophication Survey.)

#### A COMPARISON OF THREE FLOODING REGIMES: ATCHAFALAYA BASIN, LOUISIANA

van Beek, Johannes L., Karen Wicker, and Benjamin Small, Coastal Environments, Inc., Baton Rouge, Louisiana. Contract No. 68-01-2299. Victor W. Lambou, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/3-78-106, December 1978. 92 pp.

Abstract: Three backwater areas in the Atchafalaya Basin, Louisiana, are compared. The three areas studied are Fardoche and Buffalo Cove, within the Atchafalaya Basin Floodway and subject to annual flooding by the Atchafalaya River, and Pat Bay which is located outside the floodway and in which flooding is controlled by local rainfall. Hydrologic regimes are compared for relative contributions of river water and local drainage, amplitude of water level fluctuations, mode of water introduction and movement, and related introduction of sediments. From this comparison, the following were seen as the most urgent considerations for management of Atchafalaya Basin Floodway units: 1) Induction of low discharge throughflow in order to enhance water exchange in those areas presently subject to a backwater regime and insufficiently dewatered, 2) reduction of inflow associated with short-term water level fluctuations during annual rise of Atchafalaya River stages in order to reduce sediment introduction, 3) maximum utilization of the unit's precipitation surpluses as a source of floodwater to reduce inflow of Atchafalaya River water and sediments, 4) realization of 1), 2), and 3) through water introduction at the upper end of the unit and simultaneous control over outflow at the lower end of the unit.

Order from: NTIS, No. PB293157/AS  
Price: Paper copy \$6.00 (A05)  
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## ENVIRONMENTAL MONITORING

### OVERHEAD ENVIRONMENTAL MONITORING WITH LIGHT UTILITY AIRCRAFT: DEMONSTRATION AND EVALUATION OF THE SYSTEM

Howard, Gordon E., Jr., and Frank R. Wollé, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada EPA-600/4-78-008, January 1978. 32 pp.

Abstract: The EPA is seeking to provide its 10 Regional Offices with a low-cost remote-sensing capability through development of a self-contained sensor module called the Enviro-Pod (Pod). Its key attributes are economy, compactness, portability, and simplicity. It has been certified by the Federal Aviation Administration for use on commonly available light aircraft.

The design, development and manufacture of the prototype was accomplished by the U.S. Air Force Avionics Laboratory through an interagency agreement with the EPA. The Pod module contains two identical KA-85A panoramic cameras. One is mounted in the conventional vertical position and the second in an oblique position looking 45 degrees forward of the aircraft. Use of the Pod is foreseen in enforcement, compliance, episodic, and emergency monitoring activities.

This document summarizes results of feasibility demonstrations and recommends a program for the production and suitability testing of the Pod module. Possible future sensor configurations for the Pod are also presented.

Order from: NTIS, No. PB278748/AS  
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### OPTIMUM METEOROLOGICAL AND AIR POLLUTION SAMPLING NETWORK SELECTION IN CITIES: VOLUME I: THEORY AND DESIGN FOR ST. LOUIS

Vukovich, Fred M., Walter D. Bach, Jr., and C. Andrew Clayton, Research Triangle Institute, Research Triangle Park, North Carolina. Contract No. 68-03-2187. James L. McElroy, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada EPA-600/4-78-030, June 1978. 154 pp.

Abstract: A technique was developed to establish an optimum meteorological and air pollution sampling network in urban areas. The basis of the network is the wind field in the urban area rather than the air pollution distribution because it provided a solution

with longer-term stability than the air pollution distribution.

Three specific models are required in order to determine the optimum network. These are: a three dimensional hydrodynamic model; a statistical model; and an objective variational analysis model. The primitive equation model is used to simulate the wind field for a variety of cases. These simulated data were used to determine the form of a regression model which approximates the various wind fields. A regression model form was then used, along with a set of potential network sites and a criterion for judging alternative networks to derive the sampling network for the winds. The method used to develop the network involved the successive elimination of candidate sites until a reasonably sized network was achieved. The air pollution distribution is obtained through an objective variational analysis model. The model simultaneously minimizes the error variance by comparing observed pollution concentrations with derived pollution concentrations and the error variance of the constraint equation.

Order from: NTIS, No. PB285484/AS  
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#### ENVIRONMENTAL RADIOACTIVITY LABORATORY INTERCOMPARISON STUDIES PROGRAM, 1978-1979

Quality Assurance Branch, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/4-78-032, June 1978. 28 pp.

Abstract: The EPA intercomparison studies program for laboratories involved in environmental radiation measurements is described. The types of environmental samples distributed, the analyses required for each sample, the distribution schedule, and the statistical analysis and reporting of results are discussed. Instructions and application forms are included for laboratories desiring to participate in the program.

This document is not a research report. It is designed for use by laboratories participating or desiring to participate in the quality assurance program.

Order from: NTIS, No. PB284850/AS  
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## RADIOACTIVITY STANDARDS DISTRIBUTION PROGRAM, 1978-1979

Ziegler, Lee H., EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/4-78-033, June 1978. 28 pp.

Abstract: A program for the distribution of calibrated radioactive samples, as one function of EPA's quality assurance program for environmental radiation measurements, is described. Included is a discussion of the objectives of the distribution program and a description of the preparation, availability, and distribution of calibrated radioactive samples. Instructions and application forms are included for laboratories desiring to participate in the program.

This document is not a research report. It is designed for use by personnel of laboratories participating or desiring to participate in the Radioactivity Standards Distribution Program, which is a part of the EPA quality assurance program.

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## AIR MONITOR SITING BY OBJECTIVE

Koda, Masato, and John H. Seinfeld, California Institute of Technology, Pasadena, California. Contract No. 68-03-2441. James L. McElroy, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/4-78-036, June 1978. 88 pp.

Abstract: A method is developed whereby measured pollutant concentrations can be used in conjunction with a mathematical air quality model to estimate the full spatial and temporal concentration distributions of the pollutants over a given region. The method is based on the application of estimation theory to systems described by partial differential equations, such as the atmospheric diffusion equation. A computer code has been developed that can process monitoring data to produce concentration distribution estimates. The code has been tested extensively on a hypothetical airshed, designed to illustrate the key features of the method. Once concentration distributions have been estimated, new monitoring stations can be located based on several siting criteria.

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MACROINVERTEBRATE SAMPLING TECHNIQUES FOR STREAMS IN  
SEMI-ARID REGIONS: COMPARISON OF THE SURBER METHOD AND  
A UNIT-EFFORT TRAVELING KICK METHOD

Hornig, C. E., and J. E. Pollard, EMSL-Las Vegas, Office  
of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/4-78-040, July 1978. 28 pp.

Abstract: Streams of the arid and semi-arid regions of  
the western United States are characterized  
by irregular flow patterns resulting in highly unstable  
macroinvertebrate habitats and a sparse macrobenthic fauna.  
The use of a standard square-foot Surber stream-bottom  
sampler is of limited utility in these regions due to the  
combined effects of faunal paucity and patchiness. The  
efficiency of a unit-effort traveling kick method was com-  
pared with that of a standard Surber sampler in uniform  
fauna-poor riffles on the White River, Utah. Comparisons  
of 50 kick samples with 40 Surber samples reveals that  
kick samples provided more highly reproducible data than  
Surber samples in terms of counts of individuals and taxa,  
percentages of composition, and diversity indices. Visual  
preselection of the richest sites, however, improved the  
reliability of Surber sampler data. Some differences in  
organism selectivity of the two sampling methods were  
noted. The Surber method attributed greater relative  
importance to the more closely adherent and cryptic forms  
such as the simuliids, and the kick method was relatively  
biased towards easily dislodged organisms such as the  
baetid mayflies.

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QUALITY ASSURANCE GUIDELINES FOR BIOLOGICAL TESTING

Tracor Jitco, Inc., Rockville, Maryland. Contract No.  
68-03-2462. Richard E. Stanley, Project Officer, EMSL-  
Las Vegas, Office of Research and Development, EPA,  
Las Vegas, Nevada  
EPA-600/4-78-043, August 1978. 600 pp.

Abstract: This guideline document was prepared to address  
the need for a manual of quality assurance  
practices aimed specifically at biological testing. These  
guidelines draw from the good practices published for analyt-  
ical and clinical laboratories, and incorporate observations  
made in a number of EPA laboratories, contractor laboratories,  
and biological research laboratories in general. As quality  
assurance aspects of biological testing depend on the partic-  
ular test system being used, these guidelines cover the

general aspects of quality assurance, aquatic bioassay, microbiologic assay, and mammalian bioassay. Hopefully, attention to the principles presented in this document will assist in improving the validity and integrity of the data generated by biological testing.

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#### TESTS OF THE DUAL DIFFERENTIAL RADIOMETER UNDER FIELD CONDITIONS

Thomas, Robert W., EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/4-78-045, August 1978. 32 pp.

Abstract: A dual differential radiometer was tested on numerous eastern United States lakes and reservoirs. Remotely sensed data were compared with ground-truth chlorophyll *a* values. Results indicate that the instrument has only limited application in the remote sensing of chlorophyll *a* in the nation's lakes. At its present state of development, its use should be confined to large, deep, relatively clear water bodies in conjunction with ground-truth and surface survey efforts.

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#### MASS BALANCE DETERMINATIONS FOR POLLUTANTS IN URBAN REGIONS: METHODOLOGY WITH APPLICATIONS TO LEAD, ZINC, CADMIUM, AND ARSENIC

California Institute of Technology, Pasadena, California.  
Contract No. 68-03-4034. Edward A. Schuck, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada.  
EPA-600/4-78-046, August 1978. 126 pp.

Abstract: A methodology is presented for constructing mass balances for pollutants which move inter-actively through the air, land, and water of an urban-industrial region. Results are reported for lead, zinc, cadmium, and arsenic based on experiments conducted specifically for this study, and on available data from the open literature. The principle on which the analysis is based is the conservation of mass equation for a given chemical element. Using chemical element balance as in flow diagrams for the movement of pollutants through the

environment, rates of flow and accumulation can be estimated for the separate environmental compartments.

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#### MERCURY, LEAD, ARSENIC, AND CADMIUM IN BIOLOGICAL TISSUE: THE NEED FOR ADEQUATE STANDARD REFERENCE MATERIALS

Beckert, Werner F., EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/4-78-051, August 1978. 68 pp.

Abstract: The present situation of standard reference materials consisting of plant and animal tissues is examined. A brief literature review presents a cross-section of published data on the incorporation of mercury, lead, arsenic and cadmium into plant and animal tissues. It points out the wide concentration ranges of these elements that are encountered in biological tissue samples under environmental and experimental conditions. These concentration ranges are compared with the individual values of the corresponding elements as determined for the biological standard reference materials presently available from the National Bureau of Standards.

The conclusion is reached that there is a need for the preparation of additional biological reference materials encompassing wide concentration ranges of the elements of interest. The parameters of importance for the cost-effective preparation of biological tissue reference materials are discussed. Some plant and animal species are identified which could advantageously be used to prepare this kind of reference material. In an appendix, the concentrations of mercury in plant and animal tissue samples, as presented in the literature, are listed.

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#### DEVELOPMENT OF A POLLUTANT MONITORING SYSTEM FOR INTERNATIONAL BIOSPHERE RESERVES

Wiersma, G. Bruce, Kenneth W. Brown, and Alan B. Crockett, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/4-78-052, September 1978. 124 pp.

Abstract: This report presents an initial approach to identifying and solving the problems of developing a monitoring system for Biosphere Reserves. To date, most proposals have only focused on the selection of Reserves, pollutants to monitor, etc.; the real-world problems of how to monitor and collect and preserve samples and of statistical considerations and the logistics involved, have not been considered. This report attempts to address these problems and proposes specific field work to determine what additional problems may be encountered and what research is still required to enable us to develop a responsive and cost-effective pollutant monitoring program for Biosphere Reserves. Items covered include sample site selection criteria, statistical considerations, pollutant level monitoring techniques suitable to background areas, the development of biological monitors and accumulators and the development and application of pollutant impact monitoring techniques. Quality assurance requirements are also discussed. The above subjects are set in a site-specific framework of Yellowstone National Park and Sequoia-Kings Canyon National Parks.

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#### CARBON MONOXIDE NETWORK DESIGN METHODOLOGY--APPLICATION IN THE LAS VEGAS VALLEY

McElroy, James L., Joseph V. Behar, Leslie M. Dunn, Pong N. Lem, Ann M. Pitchford, Nancy T. Fisher, EMSL-Las Vegas, EPA, Las Vegas, Nevada, and Mei-Kao Liu, Terry N. Jerskey, James P. Meyer, Jody Ames, Gary Lundberg, Systems Applications, Incorporated, San Rafael, California. Contract No. 68-03-2399. Edward A. Schuck, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada EPA-600/4-78-053, September 1978. 108 pp.

Abstract: An objective methodology that uses aerometric data and a physically based air quality simulation model was proposed in a previous report for the optimal siting of air pollutant monitoring stations in urban areas. This report describes the continuation of that work--the application of the proposed methodology to the urban Las Vegas area.

The first part of this report contains an examination of the validity of the Atmospheric Pollution Simulation Model, a key component of the proposed methodology. It also describes an intensive field measurement program conducted to provide the necessary data base. The second part describes

the selection of meteorological scenarios associated with high pollution potential in the Las Vegas Valley and presents the results of the application of the siting methodology.

One of the principal features of this methodology is the concept of a Figure of Merit for general air quality monitoring. The Figure of Merit represents an average pollutant concentration at each grid point as weighted by the frequency of occurrence of meteorological scenarios.

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AIRBORNE MEASUREMENTS OF A COPPER SMELTER PLUME IN MONTANA,  
THE ANACONDA COMPANY, ANACONDA, MONTANA, OCTOBER 1-  
DECEMBER 9, 1976

Johnson, Frank G., David T. Mage, and Norman J. Cimon,  
EMSL-Las Vegas, Office of Research and Development, EPA,  
Las Vegas, Nevada  
EPA-600/4-78-054, September 1978. 230 pp.

Abstract: A field study was conducted during October 1 to December 8, 1976, to measure parameters of the effluent plume of The Anaconda Company's copper smelter, Anaconda, Montana. Plume parameters were observed with a helicopter-borne air quality monitoring system. This data report presents plume heights, plume horizontal and vertical dispersion, and plume centerline concentration, and low-altitude sulfur dioxide concentrations over areas of plume impaction. Nephelometer and sulfur dioxide data have been adjusted to account for instrument response times.

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GROUND-BASED SULFUR DIOXIDE MEASUREMENTS WITHIN A COPPER  
SMELTER PLUME--ANACONDA, MONTANA

van Ee, J. Jeffrey, EMSL-Las Vegas, Office of Research  
and Development, EPA, Las Vegas, Nevada  
EPA-600/4-78-055, September 1978. 76 pp.

Abstract: EMSL-Las Vegas developed a mobile sulfur dioxide ( $\text{SO}_2$ ) instrument package for use in the remote, rugged terrain surrounding The Anaconda Company's copper smelter at Anaconda, Montana. The



self-contained instrument package was used to obtain ground-level  $\text{SO}_2$  measurements in the area impacted by the smelter plume. Wind speed, wind direction, and temperature were also recorded at the sampling site. The requirement for the package to be quickly deployed in an area impacted by the smelter plume necessitated the use of a helicopter to sling-load the package into position. Calibration of the instruments was performed before and after each sampling period.

The primary area of interest for  $\text{SO}_2$  measurements was the mountainous terrain south of the smelter. During the four active months of the study, the package was deployed 17 times. The primary and secondary  $\text{SO}_2$  standards were exceeded on a number of occasions. Source emission strength estimates, obtained by EPA-Region 8 are presented for those times when  $\text{SO}_2$  was measured at a site. These data can be used to normalize the recorded  $\text{SO}_2$  values to account for the varying  $\text{SO}_2$  emissions from the source.

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INTERAGENCY ENERGY-ENVIRONMENT RESEARCH AND DEVELOPMENT

INTERCOMPARISON OF PLUTONIUM-239 MEASUREMENTS

Ziegler, Lee H., EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/7-78-105, June 1978. 16 pp.

Abstract: In 1977 EPA distributed calibrated solutions of plutonium-239 to laboratories interested in participating in an intercomparison study of plutonium analysis. Participants were asked to perform a quantitative radioactivity analysis of the solution. The results reported by all the participating laboratories are given here. Eighty-eight percent of the reported activity values were within  $\pm 20$  percent of the activity value certified by the EPA.

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PROCEEDINGS OF THE SECOND WORKSHOP ON SAMPLING GEOTHERMAL EFFLUENTS

Sanyal, Subir, and Richard Weiss, Geonomics, Inc., Berkeley, California. Contract No. 68-03-2468. Donald B. Gilmore, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/7-78-121, June 1978. 256 pp.

Abstract: This is a compilation of papers presented at the second in a series of workshops on sampling and analysis of geothermal effluents held February 15-17, 1977, at Las Vegas, Nevada. The purpose of the workshop was to continue the exchange of ideas and knowledge initiated in the first workshop of October 1975 with the intent of eventually developing an acceptable set of standard geothermal effluent sampling and analysis methods. Thirty-one papers were presented by representatives of industry, universities and government. All abstracts and 17 papers are published in this document.

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[Proceedings of the First Workshop on Sampling Geothermal Effluents, EPA-600/9-76-011, are available from NTIS, Accession No. PB258067/AS. Price: paper copy \$9.50 (A11), microfiche \$3.00 (A01)]

ANION EXCHANGE METHOD FOR THE DETERMINATION OF PLUTONIUM IN  
WATER: SINGLE-LABORATORY EVALUATION AND INTERLABORATORY  
COLLABORATIVE STUDY

Bishop, C. T., A. A. Glosby, R. Brown, and C. A. Phillips,  
Monsanto Research Corporation, Mound Facility, Miamisburg,  
Ohio. Contract No. EPA-IAG-D6-0015. Erich W. Bretthauer,  
Project Officer, EMSL-Las Vegas, Office of Research and  
Development, EPA, Las Vegas, Nevada  
EPA-600/7-78-122, June 1978. 80 pp.

Abstract: This report gives the results of a single-laboratory evaluation and an interlaboratory collaborative study of a method for determining plutonium in water. The method was written for the analysis of 1-liter samples and involved coprecipitation, acid dissolution, anion exchange, electrodeposition, and alpha pulse-height analysis. The complete method is given in the first appendix to the report.

After the single-laboratory evaluation of the selected method, four samples were prepared for the collaborative study. There were two river water samples, a substitute ocean water sample, and a sample containing sediment. These samples contained plutonium-239 and plutonium-238 at concentrations ranging from 0.42 to 28.9 dis/min/liter.

Standard deviations of the collaborative study plutonium concentrations ranged from 5 to 13 percent. In three cases standard deviations agreed with what was expected from counting statistics. It is believed that hydrolysis occurred in the river water samples resulting in errors greater than what was expected from counting statistics.

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REMOTE MONITORING OF COAL STRIP MINE REHABILITATION

Anderson, James E., and Charles E. Tanner, Lockheed Electronics Company, Inc., Las Vegas, Nevada. Contract No. 68-03-2636. G. J. D'Alessio, Project Officer, Western Energy/Environmental Monitoring Study, EPA, Washington, D.C. Gary A. Shelton, Project Manager, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/7-78-149, July 1978. 72 pp.

Abstract: This report discusses the accomplishments of the Phase I Operations of the EPA/NASA joint project and compares the results of manual photo-interpretation and

automated data analysis conducted during this phase. Included in the report are the results of a feasibility study to utilize Landsat data for performing a regional land-cover classification of a portion of the Powder River Basin area in northeastern Wyoming where there are numerous coal strip mines.

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#### EVALUATING THE SAMPLING FREQUENCIES OF WATER QUALITY MONITORING NETWORKS

Ward, Robert C., and Knud Strange Nielsen, Colorado State University, Fort Collins, Colorado. Contract No. CB-6-99-2530+A. Donald B. Gilmore, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/7-78-169, August 1978. 40 pp.

Abstract: Sampling frequency evaluation procedures presented utilize a number of simplifying assumptions and basic statistical methods. Employing such an approach will facilitate use of these procedures and, therefore, set the stage for wider understanding and use of more sophisticated approaches that may be developed at a later date. Practical application has been an overriding consideration in development of these procedures.

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#### GEOTHERMAL ENVIRONMENTAL IMPACT ASSESSMENT: BASELINE DATA FOR FOUR GEOTHERMAL AREAS IN THE UNITED STATES

Sanyal, Subir, and Richard Weiss, Geonomics, Inc., Berkeley, California. Contract No. 68-03-2468. Donald B. Gilmore, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/7-78-188, September 1978. 360 pp + 14 plates.

Abstract: This report describes the existing data on climatology, hydrology, water chemistry, seismicity, and subsidence in the Rio Grande Rift Zone, New Mexico; The Geysers, California; the Klamath Falls, Oregon; and, with special emphasis, The Imperial Valley, California.

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**GEOHERMAL ENVIRONMENTAL IMPACT ASSESSMENT: SUBSURFACE  
ENVIRONMENTAL ASSESSMENT FOR FOUR GEOHERMAL SYSTEMS**

Sanyal, Subir, and Richard Weiss, Geonomics, Inc., Berkeley, California. Contract No. 68-03-2468. Donald B. Gilmore, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/7-78-207, November 1978. 258 pp.

Abstract: This is the second in a series of reports concerning the environmental assessments of effluent extraction, energy conversion, and waste disposal in geothermal systems. This study involves the subsurface environmental impact of the Imperial Valley and The Geysers, California; Klamath Falls, Oregon; and the Rio Grande Rift Zone, New Mexico.

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**ENERGY-RELATED AIR QUALITY MONITORING IN THE WESTERN  
ENERGY RESOURCE DEVELOPMENT AREA**

Pitchford, M. L., R. N. Snelling, J. Bowen, M. Pearson, and D. N. McNelis, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/7-78-227, November 1978. 60 pp.

Abstract: This report describes a program designed to create an environmental data base which will be used to assess the air quality impact of energy development in an eight-state region (Arizona, Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah, Wyoming). The program was designed to use and augment existing monitoring activities as well as create new monitoring systems. Some of the activities described are an airborne air quality monitoring system, a regional particulate sampling network, a quality assurance program, a visibility monitoring system, an air quality simulation modeling program, and a program to investigate weather modification effects of energy-related pollutants. This report covers a period from January 1975 to April 1977 and work was completed as of August 1977.

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## REGULATORY WATER QUALITY MONITORING - A SYSTEMS PERSPECTIVE

Ward, Robert C., Colorado State University, Fort Collins, Colorado. Contract No. CB-6-99-2530-A. Donald B. Gilmore, Project Officer, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada.  
EPA-600/7-78-228, November 1978. 32 pp.

Abstract: The purpose of this report is to describe and analyze the evolving regulatory monitoring system as it exists today and to develop an overall perspective of the total system. This involves a review of regulatory monitoring purposes that have been identified over the past few years; categorizing and delineating the monitoring activities associated with regulatory monitoring; and development of a regulatory monitoring system matrix which provides an overall perspective of the interaction between monitoring purposes and activities.

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## GEOHERMAL ENVIRONMENTAL IMPACT ASSESSMENT: PROCEDURES FOR USING FAUNA AS BIOLOGICAL MONITORS OF POTENTIAL GEOHERMAL POLLUTANTS

Nelson, Z. C., W. W. Sutton, A. A. Mullen, W. F. Beckert, and G. D. Potter, EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/7-78-233, December 1978. 40 pp.

Abstract: This is the first in a series of reports that covers the feasibility of utilizing wildlife and domestic animals to design a monitoring strategy for assessing the environmental impact of geothermal resource development. This study is part of an overall program which will also include data on air, water, soil and flora.

Animal tissues and animal products were collected in the vicinity of California and Utah geothermal development sites. These samples are being analyzed for selected elements so as to confirm baseline concentrations in tissues of area fauna. Small mammal populations characteristics are also being monitored at Roosevelt Hot Springs, Utah. Laboratory studies are being conducted to relate the ingestion of selected elements to subsequent changes in elemental concentration of various tissues.

This report presents some preliminary data on trace

element concentrations in tissues of wildlife and domestic animals. Concentrations in geothermal effluents also were determined. Quality assurance, sample collection, relative abundance of small mammals and, especially, methodology (sample preparational and analytical procedures) are discussed.

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MISCELLANEOUS

**AUTOMATED IN SITU WATER QUALITY SENSOR WORKSHOP,  
FEBRUARY 14-16, 1978**

Compiled by Wruble, Donald T., Barbara Pijanowski, and John D. Koutsandreas. EMSL-Las Vegas, Office of Research and Development, EPA, Las Vegas, Nevada  
EPA-600/9-78-034, October 1978. 266 pp.

**Abstract:** A Federal agency workshop to discuss a common interagency need for development of automated in situ water quality sensors was held in February 1978. The meeting was organized to focus interagency attention on the lack of adequate automated in situ devices for meeting national water quality measurement needs, and to explore possible solutions to the problem by identifying technologies that might be applied and initiating interagency cooperation to consolidate required research and development efforts.

Agency programs and academic research programs are described. Working panels addressed sensor needs and technological areas that might be applied to sensor development, including electrochemical, automated wet chemistry, optical, and electrophysical sensors. Recommendations for greater development emphasis, greater coordination within lead-agency responsibilities, and technology emphasis are presented.

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## II. PUBLICATIONS IN THE EMSL-LV SERIES\*

### STATUS REPORT OF AN EXPERIMENTAL DAIRY HERD MAINTAINED ON THE NEVADA TEST SITE JANUARY 1, 1976, THROUGH DECEMBER 31, 1976

Daley, E. M., EMSL-Las Vegas, EPA, Las Vegas, Nevada  
EMSL-LV-0539-11, April 1978. 26 pp.

Abstract: The EMSL-Las Vegas maintains an experimental dairy herd and farm facility in Area 15 of the Nevada Test Site for the Department of Energy. This status report covers the period from January 1, 1976, through December 31, 1976. Improvements, changes, and additions made to the facilities, production and reproduction statistics for individual cows and the herd, the veterinary medicine practices employed, and summaries of the metabolism studies that involved the dairy herd are covered in this report.

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### FRUIT AND VEGETABLE RADIOACTIVITY SURVEY, NEVADA TEST SITE ENVIRONS

Andrews, Vernon E., and Jack C. Vandervort, EMSL-Las Vegas,  
EPA, Las Vegas, Nevada  
EMSL-LV-0539-13, April 1978. 30 pp.

Abstract: During the 1974 growing season, the EMSL-Las Vegas collected samples of fruit and vegetables grown in the off-site area surrounding the Nevada Test Site. The objective was to estimate the potential radiological dose to off-site residents from consumption of locally grown foodstuffs. Irrigation water and soil were collected

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\*Work reported in this series was performed under Memorandum of Understanding No. EY-76-A-08-0539 for the U.S. Department of Energy (formerly the U.S. Energy Research and Development Administration, formerly the U.S. Atomic Energy Commission).

from the gardens and orchards sampled. Soil concentrations of cesium-137 and plutonium-239 reflected the effects of close-in fallout from nuclear testing at the Nevada Test Site. The only radionuclide measured in fruit and vegetable samples which might be related to such fallout was strontium-90, for which the first year estimated dose to bone marrow of an adult with an assumed rate of consumption of food would be 0.14 millirad.

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#### ANIMAL INVESTIGATION PROGRAM 1975 ANNUAL REPORT: NEVADA TEST SITE AND VICINITY

Smith, D. D., K. R. Giles, D. E. Bernhardt, and K. W. Brown, EMSL-Las Vegas, EPA, Las Vegas, Nevada  
EMSL-LV-0539-14, February 1978. 90 pp.

Abstract: Data are presented from the radioanalysis of tissues collected from cattle, deer, desert bighorn sheep, and other wildlife that reside on or near the Nevada Test Site during 1975. Routine activities and special investigations of the Animal Investigation Program are also discussed.

Other than the naturally occurring potassium-40, gamma-emitting radionuclides are detected infrequently. Tritium concentrations in the tissues from most of the animals sampled are at background levels.

Strontium-90 levels in bones from deer and cattle are slightly lower than those reported for the preceding year while levels in desert bighorn sheep bones were elevated. A graph depicts the average levels found in the bones of the three species from 1956 through 1975.

The appendices of this report list actinide concentrations (plutonium-238, plutonium-239, uranium-234, uranium-235, and uranium-238) found in the tissues of all animals sampled. Graphs compare the plutonium-239 levels in lungs, livers, and femurs from Nevada Test Site cattle for the years 1971 through 1975. Levels reported appear to be relatively constant for these years with bone and lung data being nearly identical each year. Concentrations in liver are generally a factor of 2 or 3 lower than values for bone and lung.

Hypothetical dose estimates to man are calculated on the basis of the daily consumption of 0.5 kilogram of liver

or muscle from Nevada Test Site animals that contained peak activity levels. The highest postulated dose is 2.2 millirems from plutonium-239 in liver from a mule deer. All postulated doses from other radionuclides are less than 1 millirem, except for cesium-137 in muscle from a mule deer. All of these postulated doses are less than 1 percent of the 500 millirems per year guide for radiation doses to the general population.

A deer migration study was initiated with the successful capture of eight mule deer which were outfitted with radiotransmitter-equipped collars, then released, and their movements followed on a weekly basis.

A number of Nevada Test Site springs were renovated to provide cleaner and more dependable water sources for wildlife.

The dietary habits of desert bighorn sheep were determined through the botanical analysis of rumen contents and are discussed according to the geographical locations of the animals at time of collections. In general, grasses made up about 50 percent of the diet with approximately 45 percent provided by shrubs and the remainder coming from forbs.

The gross and microscopic lesions found in necropsied animals are discussed. In general, these lesions are consistent with the physical condition of the animal and type of population sampled. No gross or microscopic lesions were detected that could be directly attributed to the effects of ionizing radiation.

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OFF-SITE ENVIRONMENTAL MONITORING REPORT FOR THE NEVADA TEST SITE AND OTHER TEST AREAS USED FOR UNDERGROUND NUCLEAR DETONATIONS, JANUARY THROUGH DECEMBER 1977

Grossman, R. F., EMSL-Las Vegas, EPA, Las Vegas, Nevada  
EMSL-LV-0539-18, July 1978. 150 pp.

Abstract: This report contains summaries of the EMSL-LV dosimetry and sampling methods and analytical procedures, and the analytical results of environmental samples collected in support of the Department of Energy nuclear testing activities. Where applicable, dosimetry and sampling data are compared to appropriate guides for external and internal exposures to ionizing radiation.

In addition, a brief summary of pertinent, including demographical, features of the Nevada Test Site environs is presented for background information.

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Price: Paper copy \$8.00 (A08)  
Microfiche \$3.00 (A01)

#### FRUIT AND VEGETABLE RADIOACTIVITY SURVEY FOLLOW-ON, NEVADA TEST SITE

Andrews, Vernon E., and Jack C. Vandervort, EMSL-Las Vegas, EPA, Las Vegas, Nevada  
EMSL-LV-0539-19, September 1978. 26 pp.

Abstract: During the 1974 growing season, the EMSL-Las Vegas collected samples of fruits and vegetables grown in the area surrounding the Nevada Test Site. The objective was to estimate the potential radiological dose to off-site residents from consumption of locally grown foodstuffs. It became necessary to collect additional samples for analysis of iron-55 and plutonium-238 and -239. This report compiles the results of the earlier study with these new results. No evidence was found of contamination of foods by these radioisotopes resulting from close-in fallout of radioactivity from nuclear testing at the Nevada Test Site.

Order from: NTIS  
Price: Paper copy \$4.50 (A03)  
Microfiche \$3.00 (A01)

#### ANIMAL INVESTIGATION PROGRAM 1976 ANNUAL REPORT: NEVADA TEST SITE AND VICINITY

Smith, D. D., K. R. Giles, D. E. Bernhardt, and K. W. Brown, EMSL-Las Vegas, EPA, Las Vegas, Nevada  
EMSL-LV-0539-20, November 1978. 118 pp.

Abstract: Data are presented from the radioanalysis of tissues collected from cattle and mule deer, desert bighorn sheep, feral horses, and other wildlife that reside on or near the Nevada Test Site during 1976. Routine activities and special investigations of the Animal Investigation Program are also discussed.

Other than the naturally occurring potassium-40, gamma-emitting radionuclides were detected infrequently with the exception of iodine-131 in animal thyroid samples collected after September 25 (the date of a nuclear test by the People's Republic of China).

Strontium-90 concentrations in bones from deer, cattle, and desert bighorn sheep continued the downward trend of recent years. Tritium concentrations were generally within ambient limits with the exception of animals exposed to sources of contamination; e.g., Sedan Crater, drainage ponds from Area 12 tunnels, etc.

Analysis of actinide in tissues was emphasized during 1976. Graphs illustrate the plutonium-239 levels in lungs, livers, and femurs from Nevada Test Site beef cattle for the years 1971 through 1976. Femur and lung residue data are nearly identical for each year with liver concentrations being a factor of 2 or 3 lower.

Hypothetical dose estimates to man were calculated on the basis of the daily consumption of 0.5 kilogram of liver or muscle from animals that contained peak actinide levels. The highest postulated dose was 11 millirem from tritium from tissues for a mule deer. This dose is about 2 percent of 500 millirems/year guide for radiation doses to an individual in the general public. All other postulated doses for consumption of the tissue containing other radio-nuclides are less than 0.1 percent of this guide.

The food habits of desert bighorn sheep were discussed according to the geographic locations of the animals at time of collection. Grasses made up approximately 60 percent of the diet at all locations, with shrubs content approaching 30 percent and the remainder consisting of various forbs.

The movement of 13 mule deer fitted with collars containing a radiotransmitter unit was monitored on a weekly basis. During the winter months, several deer did not leave the general area of their original capture while others moved over 50 kilometers to the Timber Mountain area.

No gross or microscopic lesions were found in necropsied animals that could be directly attributable to the effect of ionizing radiation.

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Price: Paper copy \$6.50 (A06)  
Microfiche \$3.00 (A03)

#### AGRONOMIC PRACTICES OF THE NEVADA TEST SITE EXPERIMENTAL DAIRY FARM FROM 1974 THROUGH 1977

Daley, E. M., EMSL-Las Vegas, EPA, Las Vegas, Nevada  
EMSL-LV-0539-21, November 1978. 40 pp.

Abstract: This report is one of a series on the agronomic practices of the experimental dairy farm at the Nevada Test Site. It summarizes the agronomic practices at the farm for the calendar years 1974 through 1977. The topics covered include land preparation and seeding, irrigation, fertilization, weed and insect control, and forage production. Descriptive tabular data are included as appendices.

Order from: NTIS

Price: Paper copy \$4.50 (A03)

Microfiche \$3.00 (A01)

#### METABOLISM OF AMERICIUM-241 IN DAIRY ANIMALS

Sutton, W. W., R. G. Patzer, A. A. Mullen, P. B. Hahn, and G. D. Potter, EMSL-Las Vegas, EPA, Las Vegas, Nevada  
EMSL-LV-0539-22, October 1978. 26 pp.

Abstract: Groups of lactating cows and goats were used to examine americium-241 metabolism in dairy animals. Following either single oral or intravenous nuclide doses, samples of milk, urine, blood and feces were taken over a 168-hour collection period and the americium concentrations were determined by gamma counting.

Gastrointestinal uptake of americium by both cows and goats was estimated to be 0.014 percent of the respective oral doses. The cumulative percentage of oral dose transported to milk and urine was  $4.4 \times 10^{-4}$  and  $1.1 \times 10^{-3}$  respectively for cows and  $4.4 \times 10^{-3}$  and  $1.2 \times 10^{-3}$  respectively for goats. The relatively high americium concentrations noted in caprine milk following the oral doses are discussed. Plasma concentrations of americium decreased rapidly following all intravenous injections. The average percentage of injected americium transferred to milk, urine and feces was 3, 6 and 2 percent respectively for cows and 2, 4 and 2 percent respectively for goats. In both intravenously dosed groups, approximately 30 percent of all americium released from the body was found in the urine during the first 24 hours after injection.

All animals were sacrificed 8 to 9 days after dosing. Bovine bone retained the greatest fraction of the administered dose followed by the liver. However, liver retained the greatest amount of americium in the goats following both oral and intravenous doses. Comparisons

are presented between americium-241 and plutonium-238  
transport in dairy cows.

Order from: NTIS

Price: Paper copy \$4.50 (A03)  
Microfiche \$3.00 (A01)

### III. OTHER PUBLICATIONS

#### JOURNAL ARTICLES

##### TRITIUM ACCUMULATION IN LETTUCE FUMIGATED WITH ELEMENTAL TRITIUM

McFarlane, J. C.  
Environ. Exp. Bot., 18, pp. 131-138. 1978

Abstract: Lettuce plants fumigated with elemental tritium accumulated tritium in the plant water as well as in the organic constituents. The conversion rate of elemental tritium to tritiated water varied from 0.5 nanocuries per minute per pot at the start to 0.8 nanocuries per minute per pot at the termination of the 24 day exposure to an air concentration of 5 nanocuries per liter. Based on the concentration of tritium in various plant tissues, foliar absorption was postulated as the route of plant contamination. The data indicated that an enzymatically facilitated conversion on the leaf or soil surface was the probable mechanism.

(Also published as EPA-600/3-76-006, January 1976)

##### ENVIRONMENTAL TRITIUM OXIDATION IN SURFACE SOIL

McFarlane, James C., Robert D. Rogers, and Donald V. Bradley, Jr.  
Environ. Sci. Technol. 12:5, pp. 590-593. May 1978

Abstract: The site, rate, and method of oxidation of elemental tritium ( $T_2$  or HT) to tritiated water (HTO) were determined. Exposure of leaves (attached or detached), sterilized clay loam, and various extractable nonliving soil components to HT resulted in less than 4 percent conversion to HTO after 48 hours. However, exposure of natural (unsterilized) clay loam or of sterilized soil inoculated with a water extract from the former yielded over 97 percent conversion. This reaction occurred primarily near the soil surface. Microbial isolations from the soil yielded bacteria that were able to reproduce this reaction in solution. This reaction is considered important due to



the expectation of increasingly large atmospheric tritium discharges from nuclear fuel reprocessing plants, which may result in significant contamination of food and water with HTO.

#### ENERGY RESOURCE DEVELOPMENT: THE MONITORING COMPONENTS

Morgan, George B.

Environ. Sci. Technol. 12:1, pp. 35-43. January 1978

Abstract: At the same time that this nation is developing its coal resources in the western part of the United States, it is developing air and water instrumentation and monitoring techniques to ensure adequate surveillance and safeguards protective of health and welfare. This article covers 18 papers from eight different Federal agencies involved in a multimedia, interdisciplinary approach toward evaluating the total effects of energy development upon the environment. Through such an interagency effort, it is possible to develop a compatible data base to determine the source, transport and fate of environmental pollutants. It is only from such a compatible data base that logical decisions can be made as to the types of strategies for energy resource development.

#### PLUTONIUM UPTAKE BY PLANTS GROWN IN SOIL CONTAINING PLUTONIUM-238 DIOXIDE PARTICLES

Brown, K. W., and J. C. McFarlane

Health Phys. (NOTES), Vol. 35, pp. 481-485, September 1978  
EPA-600/J-78-115

Abstract: Three plant species--alfalfa, lettuce, and radishes--were grown in soils contaminated with plutonium-238 dioxide at concentrations of 23, 69, 92, and 342 nanocuries per gram. The length of exposure varied from 60 days for the lettuce and radishes to 358 days for the alfalfa. The magnitude of plutonium incorporation as indicated by the discrimination ratios for these species, after being exposed to the relatively insoluble PuO<sub>2</sub>, was similar to previously reported data using different chemical forms of plutonium.

Evidence indicates that the predominant factor in plutonium uptake by plants may involve the chelation of plutonium contained in the soils by the action of compounds such as citric acid and/or other similar chelating agents released from the plant roots.

(Also published as EPA-600/3-77-052, May 1977)

BASE-LINE GROWTH STUDIES OF 'GRAND RAPIDS' LETTUCE IN  
CONTROLLED ENVIRONMENTS

Hammer, P. Allen, T. W. Tibbitts, Robert W. Langhans, and  
J. Craig McFarlane  
J. Amer. Soc. Hort. Sci. 103:5, pp. 649-655. 1978

Abstract: 'Grand Rapids' lettuce (*Lactuca sativa* L.) was grown in four different controlled environment facilities to establish base-line growth ("normal") rates under a standard set of environmental conditions. Growing and environmental measurement procedures to minimize variability and environmental measuring instruments to set environmental conditions are described. The variation in growth within laboratories was greater than the variation among laboratories. The base-line data, with described procedures, can be used to compare lettuce growth in other growth chambers and provides a biological check for operation and environmental control in research facilities.

#### PRESENTATIONS PUBLISHED IN PROCEEDINGS

##### FOOD HABITS OF DESERT BIGHORN SHEEP IN NEVADA, 1956 -- 1976

Brown, K. W., D. D. Smith, and R. P. McQuivey

Presented: Desert Bighorn Council  
Las Cruces, New Mexico  
April 6-8, 1977

Published: Desert Bighorn Council 1977 Transactions  
Death Valley National Monument  
Death Valley, California. pp. 32-61

##### INCORPORATION OF TRANSURANICS INTO VEGETABLE AND FIELD CROPS GROWN AT THE NEVADA TEST SITE

Au, F. H. F., V. D. Leavitt, W. F. Beckert, and J. C. McFarlane

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
Las Vegas, Nevada  
March 3-4, 1977

Published: Transuranics in Desert Ecosystems. U.S. Department of Energy, Las Vegas, Nevada. November 1977.  
Publication No. NVO-181. pp. 1-15

##### THE SOLUBILITY OF NEPTUNIUM-234 IN AN ARTIFICIAL RUMEN AND SIMULATED BOVINE GASTROINTESTINAL FLUIDS

Barth, Julius

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
Las Vegas, Nevada  
March 3-4, 1977

Published: Transuranics in Desert Ecosystems. U.S. Department of Energy, Las Vegas, Nevada. November 1977.  
Publication No. NVO-181. pp. 221-228

##### ENVIRONMENTAL PLUTONIUM LEVELS NEAR THE NEVADA TEST SITE

Bliss, W. A., and F. M. Jakubowski

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group

Las Vegas, Nevada  
March 3-4, 1977

Published: Transuranics in Desert Ecosystems. U.S. Department of Energy, Las Vegas, Nevada. November 1977.  
Publication No. NV0-181. pp. 187-205

#### ABSORPTION, DISTRIBUTION, AND MILK SECRETION OF NEPTUNIUM IN THE DAIRY GOAT

Mullen, A. A., S. R. Lloyd, R. E. Mosley, G. D. Potter,  
and R. G. Patzer

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
Las Vegas, Nevada  
March 3-4, 1977

Published: Transuranics in Desert Ecosystems. U.S. Department of Energy, Las Vegas, Nevada. November 1977.  
Publication No. NV0-181. pp. 267-279

#### COMPARISONS OF CURIUM-243 AND PLUTONIUM-238 BIOLOGICAL TRANSPORT IN DAIRY ANIMALS FOLLOWING INTRAVENOUS INJECTION

Patzer, R. G., W. W. Sutton, P. B. Hahn, and G. D. Potter

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
Las Vegas, Nevada  
March 3-4, 1977

Published: Transuranics in Desert Ecosystems. U.S. Department of Energy, Las Vegas, Nevada. November 1977.  
Publication No. NV0-181. pp. 243-265

#### ACTINIDE CONCENTRATIONS IN TISSUES FROM CATTLE GRAZING A CONTAMINATED RANGE

Smith, D. D., and D. E. Bernhardt

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
Las Vegas, Nevada  
March 3-4, 1977

Published: Transuranics in Desert Ecosystems. U.S. Department of Energy, Las Vegas, Nevada. November 1977.  
Publication No. NV0-181. pp. 281-303

PLUTONIUM RETENTION IN DAIRY CALVES FOLLOWING INGESTION  
OF EITHER IN VIVO LABELED OR IN VITRO LABELED MILK

Sutton, W. W., R. G. Patzer, P. B. Hahn, and G. D. Potter

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
Las Vegas, Nevada  
March 3-4, 1977

Published: Transuranics in Desert Ecosystems. U.S. Department of Energy, Las Vegas, Nevada. November 1977.  
Publication No. NV0-181. pp. 229-241

QUALITY ASSURANCE FOR AIRBORNE CONTACT MONITORING

Hansen, D. Alan

Presented: Aerial Techniques for Environmental  
Monitoring Topical Symposium  
American Nuclear Society  
Las Vegas, Nevada  
March 7-11, 1977

Published: Topical Symposium Proceedings, American  
Nuclear Society, La Grange Park, Illinois  
ISBN No. 0-90448-104-5. pp. 238-241

PLUME CHARACTERIZATION FOR ENFORCEMENT PURPOSES

Johnson, Frank G., and David T. Mage

Presented: Aerial Techniques for Environmental  
Monitoring Topical Symposium  
American Nuclear Society  
Las Vegas, Nevada  
March 7-11, 1977

Published: Topical Symposium Proceedings, American  
Nuclear Society, La Grange Park, Illinois  
ISBN No. 0-90448-104-5. pp. 105-115

AN ACTIVE SYSTEM FOR REMOTE AIRBORNE MEASUREMENTS OF SO<sub>2</sub>  
IN SMOKE STACK PLUMES (Abstract)

Thompson, Richard

Presented: Aerial Techniques for Environmental  
Monitoring Topical Symposium

American Nuclear Society  
Las Vegas, Nevada  
March 7-11, 1977

Published: Topical Symposium Proceedings, American  
Nuclear Society, La Grange Park, Illinois  
ISBN No. 0-90448-104-5. p. 116

AERIAL PHOTOGRAPHIC SURVEY OF VEGETATION DAMAGE CAUSED BY  
AN AIR POLLUTION INCIDENT

Williams, David R., and James H. Long

Presented: Aerial Techniques for Environmental  
Monitoring Topical Symposium  
American Nuclear Society  
Las Vegas, Nevada  
March 7-11, 1977

Published: Topical Symposium Proceedings, American  
Nuclear Society, La Grange Park, Illinois  
ISBN No. 0-90448-104-5. pp. 127-135

A 16-DETECTOR ALPHA SPECTROMETER USING 1 MULTICHANNEL  
ANALYZER

Phillips, William G.

Presented: Eleventh Midyear Topical Symposium on  
Radiation Instrumentation  
Health Physics Society  
San Diego, California  
January 17-19, 1978

Published: Proceedings of the Health Physics Society,  
Eleventh Midyear Topical Symposium on Radia-  
tion Instrumentation. 1978. pp. 248-257

PHOTO INTERPRETATION KEYS FOR HAZARDOUS SUBSTANCES SPILL  
CONDITIONS

Landers, R. W., and H. V. Johnson

Presented: 1978 National Conference and Exhibition  
on Control of Hazardous Material Spills  
Miami Beach, Florida  
April 10-14, 1978

Published: Control of Hazardous Material Spills,  
Proceedings of the 1978 National Conference  
on Control of Hazardous Material Spills.  
Library of Congress Catalog No. 78-55400.  
pp. 124-127

#### MONITORING OF AIR AND WATER QUALITY IN THE WESTERN REGION

McNelís, David N., and Rudolf F. Pueschel

Presented: Third National Conference on the  
Interagency Energy/Environment R&D  
Program  
Washington, D.C.  
June 1-2, 1978

Published: Energy/Environment II. U.S. Environ-  
mental Protection Agency, Washington,  
D.C. October 1978. Publication No.  
EPA-600/9-78-002. pp. 95-112

#### MATHEMATICAL SIMULATION OF LAND AND SEA BREEZES IN THE TAMPA/ST. PETERSBURG AREA

Liu, Mei-Kao, Thomas C. Myers, and James L. McElroy

Presented: Summer Computer Simulation Conference  
Society for Computer Simulation  
Newport Beach, California  
July 24-26, 1978

Published: Proceedings of Summer Computer Simula-  
tion Conference. 1978. pp. 542-547  
AFIPS Press, Montvale, New Jersey

#### INTRODUCTION TO THE SYMPOSIUM, AND A QUALITY ASSURANCE PROGRAM IN GROWTH CHAMBER RESEARCH

McFarlane, James C.

Presented: The XXth International Horticultural  
Congress  
Sidney, Australia  
August 22, 1978

Published: Phytotronic Newsletter 19, Growth Chamber  
Environments, Proceedings of a Symposium  
held at the XXth International Horticultural  
Congress. Secretariat Phytotronique,  
Phytotron C.N.R.S., 91190 Gif-sur-Yvette-  
France. pp. 1 and 57-61

#### INTRODUCTION TO THE SYMPOSIUM

McFarlane, James C.

Presented: The 74th Annual Meeting, American Society for  
Horticultural Science  
Symposium on Controlled Environments in  
Horticultural Research  
Salt Lake City, Utah  
October 13, 1977

Published: HortScience, 13:4, August 1978, p. 446



## MISCELLANEOUS

### LIGHT

McFarlane, J. Craig

Environmental Control for Plants, A Growth Chamber Manual, Chapter 1. Comstock Publishing Associates, Cornell University Press, Ithaca, New York. pp. 15-44

### REMOTE SENSING FOR AIR QUALITY MANAGEMENT

Melfi, S. H.

Laser Monitoring of the Atmosphere. Springer-Verlag, New York, 1976. pp. 9-28

### THE EXCELLENT BUT DETERIORATING AIR QUALITY IN THE LAKE POWELL REGION

Walther, Eric G., William C. Malm, and Robert Cudney, Visibility Research Center, John Muir Institute for Environmental Studies, Inc., in collaboration with the University of Nevada, Las Vegas, Department of Physics. 172 pp.

Abstract: This report presents the findings, conclusions, and recommendations made during 4-1/2 years of measuring air quality in the Lake Powell region and collecting the data from other measurement programs. This report builds on the earlier results presented in Bulletin 3 ("Air Quality in the Lake Powell Region," out of print) of the Lake Powell Research Project.

Although the air quality of the Lake Powell region is still excellent (as of 1977), several variables indicate it is deteriorating. This deterioration shows up in the data for visual range, turbidity, sulfur dioxide, sulfates, sulfation rate, and aerosol mass concentration. The timing of these changes does not clearly indicate that the Navajo Generating Station is the cause of the deterioration.

Methane and ethane concentrations downwind of Page are anomalously lower than the concentrations in Page and at remote sites.

The turbidity coefficients at 380 nanometers are anomalously lower than those at 500 nanometers during 1973, most of 1974, and occasionally during 1975 and 1976.

It is important to continue selected measurements in the future in order to monitor important trends and to learn which sources are causing deterioration. Measurements of visual range, turbidity, some hydrocarbons, oxidant, nitrogen oxides, sulfur dioxide, sulfates, and sulfation rate should continue to be made.

Order from: Department of Physics  
University of Nevada, Las Vegas  
Las Vegas, Nevada 89154

#### IV. UNPUBLISHED PRESENTATIONS AT SCIENTIFIC AND PROFESSIONAL MEETINGS

##### THE EFFECT OF SO<sub>2</sub> ON SOIL MICROORGANISM ACTIVITY\*

McFarlane, J. C., R. D. Rogers, and D. V. Bradley, Jr.

Presented: Program Review for Coal Fired Power  
Plant Study  
Corvallis, Oregon  
January 17-19, 1978

##### APPLICATIONS OF REMOTE SENSING TO VEGETATION INJURY CAUSED BY AIR POLLUTION\*

Williams, David R.

Presented: Symposium on Remote Sensing for  
Vegetation Damage Assessment  
Seattle, Washington  
February 14-16, 1978

##### MICROBIAL CONTRIBUTION TO PLUTONIUM BIOAVAILABILITY AND TRANSPORT TO THE ENVIRONMENT\*

Au, Frederick H. F., and Werner F. Beckert

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
San Diego, California  
February 28-March 2, 1978

##### SOIL SURVEYS AND PROFILE DESCRIPTIONS OF PLUTONIUM-CONTAM- INATED AREAS ON THE TEST RANGE COMPLEX IN NEVADA--1970-1977\*

Leavitt, Verr D.

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group

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\* To appear in proceedings

San Diego, California  
February 28-March 2, 1978

OVERVIEW OF THE EPA BIOENVIRONMENTAL RESEARCH PROGRAM NAEG  
RESEARCH\*

Bretthauer, E. W.

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
San Diego, California  
February 28-March 2, 1978

AREA 13 GRAZING STUDIES--ADDITIONAL DATA\*

Smith, D. D.

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
San Diego, California  
February 28-March 2, 1978

METABOLISM OF AMERICIUM-241 IN DAIRY ANIMALS\*

Sutton, W. W., R. G. Patzer, A. A. Mullen, P. B. Hahn, and  
G. D. Potter

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
San Diego, California  
February 28-March 2, 1978

THE SOLUBILITY OF AMERICIUM-241 IN IN VITRO BOVINE  
RUMINAL-GASTROINTESTINAL FLUIDS AND PREDICTED TISSUE  
RETENTION AND MILK SECRETION OF FIELD-INGESTED AMERICIUM-  
241\*

Barth, Julius

Presented: Plutonium Information Conference  
Nevada Applied Ecology Group  
San Diego, California  
February 28-March 2, 1978

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\* To appear in proceedings

BIOLOGICAL MONITORING TECHNIQUES FOR ASSESSING EXPOSURE\*

Wiersma, G. B., R. D. Rogers, J. C. McFarlane, and D. V. Bradley, Jr.

Presented: Biological Monitoring Symposium  
Raleigh, North Carolina  
March 21-22, 1978

BIOLOGICAL MONITORING OF AVAILABLE TOXIC MATERIALS

Rogers, R. D., D. V. Bradley, and J. C. McFarlane

Presented: Biological Monitoring Symposium  
Raleigh, North Carolina  
March 21-22, 1978

THE EFFECTIVENESS OF COMMAND PROCEDURE FILES\*

Briggs, James M.

Presented: ORD ADP Workshop III  
Athens, Georgia  
May 10, 1978

STRUCTURED PROGRAMMING: A CASE STUDY\*

Allison, George C.

Presented: ORD ADP Workshop III  
Athens, Georgia  
May 10, 1978

ANALYSIS OF AEROMETRIC DATA COLLECTED BY AIRCRAFT DURING A STAGNATION PERIOD IN WASHINGTON, D.C., AUGUST 1976\*

Fitzsimmons, Charles K., Karl Zeller, Michael J. Pearson

Presented: Annual Meeting of the Air Pollution  
Control Association  
Houston, Texas  
June 25-29, 1978

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\* To appear in proceedings

PLUME DISPERSION IN COMPLEX TERRAIN\*

Johnson, F. G.

Presented: Annual Meeting of the Air Pollution  
Control Association  
Houston, Texas  
June 25-29, 1978

ACID DISSOLUTION METHOD FOR THE ANALYSIS OF PLUTONIUM-239  
AND PLUTONIUM-238 IN SOIL

Whittaker, E. L., and G. E. Grothaus

Presented: Conference on Effluent and Environmental  
Radiation Surveillance  
Johnson State College  
Johnson, Vermont  
July 13, 1978

(Published as EPA-600/7-79-081, Acid Dissolution Method for the  
Analysis of Plutonium in Soil: Evaluation of an interlaboratory  
collaborative test and comparison with results of a fusion method  
test.)

THE STATUS AND QUALITY OF RADIATION MEASUREMENTS IN  
WATER--1977\*

Shawver, J. M.

Presented: Conference on Effluent and Environmental  
Radiation Surveillance  
Johnson State College  
Johnson, Vermont  
July 13, 1978

USE OF REMOTE SENSING TECHNOLOGY TO CONSTRUCT AND VALIDATE  
A DYNAMIC BASIN SIMULATION MODEL

Hill, J. M., and Steve Graham

Presented: Verification of Mathematical and  
Physical Models  
University of Maryland  
College Park, Maryland  
August 11, 1978

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\* To appear in proceedings

NEW DISTRIBUTIONS AND HABITAT OF COELASTRUM RETICULATUM  
VAR. POLYCHORDON KORSCHIKOV (CHLOROCOCCALES) IN INLAND  
LAKES OF THE UNITED STATES

Taylor, W. D.

Presented: Phycological Society of America  
Annual Meeting  
Athens, Georgia  
August 20-25, 1978

Abstract published in Supplement to J. Phycol. 14, p. 23, June 1978  
(Abstract No. 19)

COMPARISON OF SOME NEW AND OLD INDICES AND MEASUREMENTS OF  
LAKE TROPHIC STATE

Taylor, W. D., L. R. Williams, S. C. Hern, and V. W. Lambou

Presented: Phycological Society of America  
Annual Meeting  
Athens, Georgia  
August 20-25, 1978

Abstract published in Supplement to J. Phycol. 14, p. 22, June 1978  
(Abstract No. 18)

PRODUCTIVITY RESPONSES TO CHANGES IN HYDROLOGICAL REGIMES  
IN THE ATCHAFALAYA BASIN, LOUISIANA\*

Hern, Stephen C., and Victor W. Lambou

Presented: Environmental Effects of Hydraulic  
Engineering Works  
Knoxville, Tennessee  
September 12-14, 1978

METROLOGY FOR ENVIRONMENTAL ASSESSMENT

Morgan, George B., Thomas R. Hauser, and Dwight G. Ballinger

Presented: 1978 Symposium of the National  
Conference of Standards Laboratories  
Washington, D.C.  
October 4, 1978

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\* To appear in proceedings

A LIGHT AIRCRAFT CAMERA POD, THE ENVIRO-POD

Howard, Gordon E., Jr.

Presented: American Society of Photogrammetry  
Albuquerque, New Mexico  
October 15-21, 1978

MULTISPECTRAL SCANNING FOR ENVIRONMENTAL MONITORING

McNelís, D. N., and R. W. Landers

Presented: Water and Wastewater Symposium  
Miami, Florida  
November 12-16, 1978

THE FATE OF BENZENE IN SOIL

Rogers, R. D.

Presented: American Society of Soil Science  
Chicago, Illinois  
December 3, 1978



## V. WORKING PAPER SERIES

### EPA NATIONAL EUTROPHICATION SURVEY WORKING PAPER SERIES, 1978

The National Eutrophication Survey was initiated in 1972 to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs. The Survey was designed to develop, in conjunction with State and environmental agencies, information on nutrient sources, concentrations and impact on selected freshwater lakes. This information provides a basis for formulating comprehensive and coordinated national, regional and State management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds. Lake sampling was completed in November 1975.

Reports of data on individual lakes are being prepared cooperatively by the Special Studies Section, Criteria and Assessment Division, Corvallis Environmental Research Laboratory, 200 SW 35th Street, Corvallis, Oregon 97330, and the Water and Land Quality Branch, Monitoring Operations Division, EMSL-Las Vegas, P. O. Box 15027, Las Vegas, Nevada 89114.

Working papers listed here are available from NTIS and, as long as their supplies last, from the groups which prepared the reports.

<u>Working Paper No.</u>	<u>Date in 1978</u>	<u>Title</u>
739	June	Lake Amador, Amador County, California
740	June	Boca Reservoir, Nevada County, California
741	June	Lake Britton, Shasta County, California
742	June	Lake Casitas, Ventura County, California
743	June	Lake Crowley, Mono County, California
744	June	Don Pedro Reservoir, Tuolumne County, California

<u>Working Paper No.</u>	<u>Date in 1978</u>	<u>Title</u>
745	June	Lake Elsinore, Riverside County, California
746	June	Fallen Leaf Lake, El Dorado County, California
747	June	Lake Hennessey, Napa County, California
748	June	Lake Henshaw, San Diego County, California
749	June	Iron Gate Reservoir, Siskiyou County, California
750	June	Lopez Reservoir, San Luis Obispo County, California
751	February	Lake Mary, Mono County, California
752	February	Lake Mendocino, Mendocino County, California
753	February	Nicasio Reservoir, Marin County, California
754	February	Lower Otay Reservoir, San Diego County, California
755	March	Lake Pillsbury, Lake County, California
756	March	Santa Margarita Lake, San Luis Obispo County, California
757	June	Shasta Lake, Shasta County, California
758	June	Shaver Lake, Fresno County, California
759	June	Siver Lake, Mono County, California
760	June	Tullock Reservoir, Calaveras and Tuolumne Counties, California
761	June	Lower Twin Lake, Mono County, California
762	June	Upper Twin Lake, Mono County, California
827	March	Brownlee Reservoir, Baker County, Oregon and Washington County, Idaho
828	January	Diamond Lake, Douglas County, Oregon

<u>Working Paper No.</u>	<u>Date in 1978</u>	<u>Title</u>
829	April	Hells Canyon Reservoir, Baker and Wallowa Counties, Oregon, and Adams and Idaho Counties, Idaho
830	January	Hills Creek Reservoir, Lane County, Oregon
831	January	Lake Owyhee, Malheur County, Oregon
832	March	Oxbow Reservoir, Baker County, Oregon, and Adams County, Idaho
833	January	Suttle Lake, Jefferson County, Oregon
834	January	Waldo Lake, Lane County, Oregon

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