

ABSTRACTS OF RECENT OFFICE OF RESEARCH AND DEVELOPMENT PROJECT REPORTS

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• FOREWORD

This is the second issuance of the ORD Abstract Bulletin covering Abstracts received by the Headquarters Publications Staff since November, 1973. The contents of this bulletin is arranged by Program Element within Program Areas.

Items are reported on as received by copy of the Abstract form located within the reports except as noted below. This form may be EPA Form 2220, Technical Report Data Page, or either of the superceded extra-agency forms: WRSIC-102, Input Transaction Form or NTIS-35, Bibliographic Data Sheet. Additional data that was submitted on title pages has been incorporated on abstract forms so that all information for a particular report is usually contained on a single sheet.

Any questions or comments should be directed to the Publications Staff, phone 202/426-2175.

BIBLIOGRAPHIC DATA HEF 7		1. Report No. FPA-650-1-13-002	2.	3. Recipient's Accession No.	
Title and Subtitle Interactions of Various Air Pollutants on Causation of Pulmonary Disease				5. Report Date September 1973	
Author(s) Fenters, James D., and Maigetter, Robert Z.				6.	
Performing Organization Name and Address IIT Research Institute 10 West 35th Street Chicago, Ill. 60616				8. Performing Organization Rep. No. IITRI-L6060-4	
Program Officer: Dr. David Coffin Pathobiology Research Branch NERC-RTP				10. Project/Task/Work Unit No. 1007, ROAP 21AYF, Task -07	
				11. Contract/Grant No. 68-02-0666	
2. Sponsoring Organization Name and Address Pathobiology Research Branch, Experimental Biology Laboratory National Environmental Research Center - RTP Environmental Protection Agency Research Triangle Park, N. C. 27711				13. Type of Report & Period Covered Final: Aug. 18, 1972 to Aug. 17, 1973	
7. Supplementary Notes <u>ABSTRACT:</u> Previous contract studies indicated that chronic exposure to 1 or 5 ppm NO ₂ markedly affected squirrel monkeys' ability to produce serum neutralization antibodies. To elucidate the effect of NO ₂ on immunological response, further studies were conducted in mice vaccinated with a highly purified influenza virus. Parameters studied were hemagglutination-inhibition (HI) and serum neutralization (SN) antibody formation, serum immunoglobulin levels, lung histopathology, and mortality rates, lung lesion scores, and extent of lung edema in mice challenged with live infectious influenza. The results of a long-term study of mice exposed to either 2 ppm or 0.5 ppm NO ₂ suggest that fluctuations in environmental conditions are more significant in continuous exposure to a single stressful atmosphere. Continuous exposure of mice for approximately 10 months to 2 ppm NO ₂ did not appear to influence formation of antibodies or levels of immunoglobulins, nor the resistance to subsequent respiratory challenge with live influenza virus. Conversely, continuous exposure to 0.5 ppm NO ₂ with daily 1-hr peaks of 2 ppm NO ₂ appeared to depress ability to form SN antibodies and significantly altered the levels of IgM, IgG ₁ and IgG ₂ immunoglobulins. Furthermore, these mice developed a more severe infection as reflected by increased mortality rates upon challenge with live influenza virus. A short-term study of 4 weeks duration was also conducted. After 4 wks. exposure to 0.5 ppm with daily 2 ppm 1-hr pulses, or to 2 ppm NO ₂ for 5 days per week, or to filtered air, mice were challenged with influenza vaccine. No significant difference was observed in HI and SN antibody titers between the control and experimental groups. IgA levels elevated, and IgG ₁ and IgG ₂ were initially depressed. No Statistical differences were noted between control and experimental groups in mortality rates and lung lesion scores. HI antibody titers in surviving mice indicated that NO ₂ exposure had no effect on the anamnestic response of vaccinated mice.				14.	
7. Key Words and Document Analysis <u>17a. Descriptors</u> 17. Nitrogen Dioxide, Hemagglutination-inhibition, Serum Neutralization, Immunoglobulins					
7b. Identifiers/Open-Ended Terms A ₂ /Taiwan/1/64 virus, <u>Klebsiella pneumoniae</u> , chronic exposure, mortality rates, lung histopathology, lung lesion scores, lung edema, control and experimental groups.					
7c. COSA Field/Group					
8. Availability Statement May be released to public.				19. Security Class (This Report) UNCLASSIFIED	
- 1 -				21. No. of Pages 56	
				20. Security Class (This Page) UNCLASSIFIED	
				22. Price	

BIBLIOGRAPHIC DATA SYNOPSIS	1. Report No.	2	3. Recipient's Accession No.
4. Title and Subtitle Metabolism of Carbamate Insecticides			5. Report Date September 1973
7. Author(s) H. W. Dorrough			6. Performing Organization Report No.
7. Performing Organization Name and Address Department of Entomology University of Kentucky Lexington, Kentucky 40506			10. Project/Task/Work Unit No. 1E1078/21AFM/38
			11. Contract/Grant No. R-802005
12. Sponsoring Organization Name and Address EPA, Office of Pesticides Program Research Triangle Park, North Carolina 27709			13. Type of Report & Period Covered Final Report
14.			
15. Supplementary Notes Project Officer: Dr. R.L. Baron NERC-RTP			
16. Abstract The metabolic fate of aldicarb, carbaryl, and carbofuran was investigated in a variety of biological systems. In addition, the effects of other insecticides and certain monoamine oxidase inhibitors on carbaryl metabolism in rats was studied. The fate of 3-hydroxy carbofuran, its glucoside and glucuronide, and naphthyl glucoside in rats was determined. Using 1-naphthol as a model compound, in vitro methods were developed to study mechanisms of glycosylation in insects and mammals. The glucosides of 4- and 5-hydroxy carbaryl were prepared chemically and their acute toxicity to mice compared to the aglycones. Results of these studies showed that carbamate insecticides are metabolized initially by hydrolytic- and oxidative-type reactions and the resulting products are then almost totally conjugated. These conjugated products constitute the majority of the terminal residues of carbamates in both animals and plants.			
17. Key Words and Document Analysis 17a. Descriptors Metabolism Carbamate insecticides Aldicarb Carbaryl Carbofuran Conjugation Synthesis of glucosides			
17b. Identifiers/Open-Ended Terms Insecticide metabolism Fate of carbamate insecticides			
17c. COSATI Field/Group			
18. Availability Statement - 2 -	19. Security Class (This Report) UNCLASSIFIED		21. No. of Pages
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BIBLIOGRAPHIC DATA SHEET		1. Report No.	2.	3. Recipient's Accession No.
4. Title and Subtitle			5. Report Date	
Behavior of ^{85}Kr in Animals			October 1973	
7. Author(s)			8. Performing Organization Rept. No.	
William P. Kirk				
9. Performing Organization Name and Address			10. Project/Task/Work Unit No.	
Toxicology Branch, Experimental Biology Laboratory National Environmental Research Center Research Triangle Park, NC 27711			PE 1F1082 ROAP 21 A17 Tasks	
			11. Contract/Grant No. 01a,02a,05	
12. Sponsoring Organization Name and Address			13. Type of Report & Period Covered	
United States Environmental Protection Agency National Environmental Research Center Research Triangle Park, North Carolina 27711				
			14.	
15. Supplementary Notes				
Program Officer: W.P. Kirk NERC-RTP 919-549-2781				
16. Abstracts				
<p>The <u>in vivo</u> behavior of ^{85}Kr can usually be predicted if the protein/water/fat composition of a body or tissue and its blood perfusion characteristics are known. The amount of isotope taken up by the tissue is the weighted sum of component tissue: air partition coefficients multiplied by the concentration of ^{85}Kr in alveolar air while the rates of saturation or desaturation are determined by perfusion. Equations describing postulated kinetic behavior of noble gases are presented and compared with ^{85}Kr data reported for individual organs and tissues from several species in the literature and data obtained with whole guinea pigs and rats. Partition coefficients are discussed and theoretical values compared with <u>in vitro</u> data from this laboratory and the literature and with <u>in vivo</u> data for blood and 22 other organs/tissues obtained with guinea pigs in current work. Equilibrium beta radiation doses to various organs/tissues from contained isotope in guinea pigs breathing ^{85}Kr at present MPC_a are given.</p>				
17. Key Words and Document Analysis. 17a. Descriptors				
^{85}Kr , kinetics, dosimetry, guinea pigs				
17b. Identifiers/Open-Ended Terms				
Radiation, noble gas, mammals, internal distribution				
17c. COSATI Field/Group				
18. Availability Statement		19. Security Class (This Report)	21. No. of Pages	
- 3 -		UNCLASSIFIED		
		20. Security Class (This Page)	22. Price	
		UNCLASSIFIED		

**SELECTED WATER
RESOURCES ABSTRACTS
INPUT TRANSACTION FORM**

W

Odors Emitted from Raw and Digested Sewage Sludge

5 Report Date

8 Form Organization
9 File No.

7 Author(s)

Bernard A. Rains, Mario J. DePrimo & I. L. Groseclose

10 Accession No.
11010EZQ

12 Organization

Metropolitan St. Louis Sewer District
10 East Grand Avenue
St. Louis, Missouri 63147

13 Grant WPD 23-01-68

14 Sponsoring Organization Environmental Protection Agency

15 Type, Report and
Period Covered

16 Subject(s)

Program Element 1BB033
ROAP 21-ASD

EPA-670/2-73-098

Program Officer: Dr. William Garner
EPA-Kansas City, Missouri 64108
816-374-5736

Odors emitted during thickening of raw and secondary sludge have been responsible for adverse criticism at many sewage treatment plants. This study was undertaken to identify typical odor causing substances and evaluate selected conventional methods for controlling or eliminating these substances. A styrofoam dome covering a sludge thickener was utilized to control atmospheric conditions and concentrate odors.

Field collected vapor samples were analyzed using gas chromatography techniques. Analyses using both polar and nonpolar column material indicated that the major odor causing compounds were mercaptans and amines. Other compounds which were minor contributors to odor were aldehydes, alcohols, and organic acids.

Odor control methods selected for study included air dilution, activated carbon adsorption, and chlorine oxidation. Air dilution using cyclic operation of an exhaust fan was found to be an effective means of odor control when outside atmospheric conditions were conducive to odor dissipation. Passing vapors through activated carbon filters was not completely effective in odor control since a detectible residual odor remained. A 1.5 mg/l solution of chlorine was effective in removing all odors from vapor samples bubbled through the solution.

17a Descriptors

odor	sewage
odor abatement	sludge
	sludge treatment

17b Indexing

odor control
malodors

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Metropolitan St. Louis Sewer District

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W

Combined Sewer Overflow Seminar Papers

USEPA Storm & Combined Sewer Technology Branch

U.S. Environmental Protection Agency
Edison Water Quality Research Laboratory
National Environmental Research Center- Cinn.
Edison, New Jersey

U.S. Environmental Protection Agency

U.S. Environmental Protection Agency Report No. EPA 670/2-73-077

Project Officer: R. Field Program Element 1B2034
201-548-3503

The U.S. Environmental Protection Agency in conjunction with the New York State Department of Environmental Conservation conducted three one-day seminars on the problem of wet-weather flow pollution abatement. Many facets of the problem were considered including a brief overview of its magnitude and what the federal government is doing to manage and control this source of pollution. Various management, control, and treatment techniques were described and the most up-to-date information on design and economics was presented. The audience consisted of consulting and municipal engineers from all areas of New York State.

This publication is a compilation of the papers presented at the seminar, November 29, 1972, January 3, 1973, and February 1, 1973.

17a Descriptors

Combined sewer overflow management and control

17b Identifiers

Infiltration/Inflow, Regulation, Pressure Sewers, Microstraining, Filtration, Dissolved Air Flotation, Disinfection, Storm Water Management Model.

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USEPA Storm and Combined

U.S. Environmental Protection Agency

Sewer Technology Branch

USCOMM DC 14952 P72

PHYSICAL-CHEMICAL TREATMENT OF RAW MUNICIPAL WASTEWATER

Bishop, Dolloff F., O'Farrell, Thomas P.,
Cassel, Alan F., and Pinto, Adolph P.

11010 FYM

EPA-DC Pilot Plant
5000 Overlook Avenue S.W.
Washington, D.C. 20032

14-12-818

ENVIRONMENTAL PROTECTION AGENCY

Environmental Protection Agency Report Number EPA-670/2-73-070

ROAP 21ASU; Program Element 1BB043; Project Officer: D.F. Bishop

Physical-chemical treatment of raw wastewater consisted of two-stage lime clarification with intermediate recarbonation, filtration, pH control, ion exchange or breakpoint chlorination, and carbon adsorption. Lime treatment with approximately 300 mg/l of CaO increased the wastewater pH to 11.5 and removed 96% of the phosphorus and 80% of the organics. In the second stage, recarbonation with 120 mg/l of CO₂ and mineral addition of 5 mg/l of Fe⁺⁺⁺ reduced the pH to 10.0 and precipitated excess Ca⁺⁺ as CaCO₃. Dual media filtration decreased effluent suspended solids and total phosphorus to less than 5 mg/l and 0.15 mg/l as P, respectively. Addition of 10 mg/l chlorine to the filter influent controlled biological growth within the filter and produced filter runs of greater than 50 hours. With extensive operator surveillance, the clinoptilolite exchange media reduced the NH₃ to less than 1 mg/l as NH₄⁺-N. Breakpoint chlorination oxidized the NH₃ to N₂, leaving a residual NH₃-N concentration of less than 0.4 mg/l. The 20 mg/l of soluble BOD entering the granular carbon columns produced anaerobic biological growth on the carbon, which contributed to heavy H₂S production and high carbon losses during backwash. Breakpoint chlorination ahead of carbon adsorption minimized biological activity.

The complete physical-chemical system, with ion exchange, removed 98% of the phosphorus, 95% of the organics (COD) and 78% of the total nitrogen. With breakpoint chlorination, the complete system removed 98% of the phosphorus, 94% of the organics (COD) and 86% of the total nitrogen.

17a Descriptors

Wastewater Treatment	Biochemical Oxygen Demand	*Flocculation
Anaerobic Conditions	Calcium Carbonate	Phosphorus
*Filtration	Chemical Oxygen Demand	Nitrogen
*Adsorption	Colloids	Lime
*Ion Exchange	Ammonia	Sedimentation

17b Information

*Physical-Chemical Treatment	Organic Loading
Lime Clarification	
Carbon Adsorption	
Breakpoint Chlorination	
Recarbonation	

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Kent S. Kisenbauer

ENVIRONMENTAL PROTECTION AGENCY

BIBLIOGRAPHIC DATA SHEET		1. Report No EPA-670/2-73-096	2.	3. Recipient's Accession No
4. Title and Subtitle "BOD, Solids and Nutrient Removal by Foam Flotation"			5. Report Date	
			6.	
7. Author(s) Edward R. Becker			8. Performing Organization Rept No	
9. Performing Organization Name and Address Public Works Department City of San Jose San Jose, California 95131			10. Project/Task/Work Unit No 1BB043 21-ASQ	
			11. Contract/Grant No Grant No. WPRD 30-01-67	
12. Sponsoring Organization Name and Address Environmental Protection Agency National Environmental Research Center Cincinnati, Ohio 45268			13. Type of Report & Period Covered Final Report	
			14.	
15. Supplementary Notes Project Officer: Dr. Carl A. Brunner EPA - NERC - Cincinnati, Ohio 45268 513 684 8243				
16. Abstracts <p>The results of a field demonstration project to investigate the removal of BOD, suspended solids and nutrients from a secondary effluent flowstream by the foam flotation process are presented. Two major tasks were accomplished: (1) operation of and the accumulation of data from a 0-10 gpm foam flotation pilot plant using secondary effluent from the San Jose-Santa Clara Water Pollution Control Plant, and (2) economic evaluation of the foam flotation process.</p> <p>It was found that efficient phosphorus and suspended solids removals and an improved effluent saturated with oxygen could be effected by the foam flotation process. Based on a 10 MGD plant, the projected costs for the foam flotation process were shown to be 5.76¢/1000 gallons for chemicals and power.</p>				
17. Key Words and Document Analysis 17a. Descriptors Sewage treatment* Flotation* Waste water Water Pollution				
17b. Identifiers/Open-Ended Terms				
17c. COSATI Field/Group				
18. Availability Statement Release unlimited		19. Security Class (This Report) UNCLASSIFIED		21. No. of Pages
		20. Security Class (This Page) UNCLASSIFIED		22. Price

SELECTED WATER
RESOURCES ABSTRACTS
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Report No. 2

W

BACTERIAL ZOOGLOEA FORMATION

Unz, R. F. and Farrah, S. R.

EPA 17050 DBI

The Pennsylvania State University
University Park, Pa.

Type, Rep., and
Period Covered

Scientific Organization

Environmental Protection Agency report number EPA-670/1-73-097
ROAP 21ASR Task 03 Project Officer: C. W. Chambers, NERC-Cincinnati, OH 45268

Activated sludge flocs suspended in wet mounts on microscope slides were observed to sprout, finger-like, bacterial zoogloea as a consequence of the outgrowth of bacteria from flocs. The rate of extension of finger-like zoogloea was typically 5.1 to 15.0 μ m per hr and mean cell doubling time was estimated to be approximately 2 hrs. Photomicrographic and fluorescent antibody studies revealed that the bacterial zoogloea consisted of the progeny of specific zoogloea-forming bacteria. Purified exopolymers of Zoogloea strains and domestic activated sludge contained two amino sugars, one of which was identified as glucosamine. Zoogloea exopolymer was not fibrillar or cellulosic and contained approximately 17 to 19 per cent amino sugar and about one percent hexoses, uronic acids and ether soluble substances on a dry weight of polymer basis. Amino sugar production was found to parallel zoogloea formation by Zoogloea sp. Calcium ion appeared to augment flocculation of bacterial cells capable of undergoing natural coalescence. Two cell types, described as rough and smooth colony-forming, were found in some strains of Zoogloea. Rough cells readily flocculated in agitated cultures whereas smooth cells produced relatively turbid cultures under similar growth conditions. A predominance of one of the two types could influence the degree of flocculation by Zoogloea cultures.

Indexing

*Activated sludge, *Bacteria, *Flocculation, *Microphotography, *Polymers, Scum

Subject

Zoogloea sp., Zoogloea ramigera, Zoogloea, Zoogloea bacteria, Fluorescent antibody

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Richard F. Unz

The Pennsylvania State University

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W

DESIGN CONSTRUCTION AND INITIAL EVALUATION OF THE EL LAGO
AWT FACILITY,

Barth, E. F. and Ryan, B. W.

Environmental Protection Agency, National Environmental Research
Center, Cincinnati, Ohio and Harris County Water Control and
Improvement District #50, Seabrook, Texas

11010 GNM

Environmental Protection Agency

EPA-670/2-73-082

Program Element 1GB043; ROAP 21AS0; Task 32

Project Officer: E. F. Barth, NERC-Cincinnati, OH 45268

All existing facilities of the El Lago, Texas 1,135 cu m/day plant were utilized in the advanced treatment design. The processes in operation control phosphorus by metallic salt addition to the primary settler, carbonaceous removal by trickling filters, nitrification by a second-stage suspended growth reactor, nitrogen removal by attached growth column denitrification, and tertiary solids removal by granular media filtration. These processes are operated in series. Effluent residuals are as follows:

BOD₅ ~ 10 mg/l
COD₅ ~ 40 mg/l
SS ~ 5 mg/l
TP ~ 3 mg/l
TN ~ 2 mg/l

An evaluation program is now in progress to slightly modify operation to produce lower residuals, and determine process variability.

*Nitrification, *Denitrification, *Biological Treatment, *Municipal Wastewater,
*Phosphorus, Filtration.

*Attached Growth, *Chemical Precipitation, Process Design, Process Efficiency.

05D

Nov. 1973

FERRIC CHLORIDE AND ORGANIC POLYELECTROLYTES FOR THE
REMOVAL OF PHOSPHORUSStacy L. Daniels,
Otto Green, Doris VanDam, Bernard LaBeau, Terry L. CampbellWastewater Treatment Plant
City of Grand Rapids
Grand Rapids, Michigan 49502

PE-1BB043

11010 ENK

Environmental Protection Agency

Environmental Protection Agency report
number EPA-670/2-73-103 November 1973

Project Officer:

E.F. Barth

NERC-Cincinnati, Ohio 48268

The primary objective of this project was to demonstrate the feasibility and economic practicability of chemical removal of phosphorus from municipal wastewater in the 44 mgd (166,500 m³) activated sludge plant at Grand Rapids, Michigan. The full-scale system for chemical phosphorus removal was implemented to meet water quality criteria established by the State of Michigan. Ferric chlorine and polymer flocculant were introduced into the raw wastewater flow by automated systems. During the period of best performance when split dosage of chemicals was employed, residual phosphorus concentrations of less than 1 mg/l could be obtained. Total phosphorus concentrations in the final effluent were related to final clarifier overflow rates.

The nature of the chemically precipitated sludge evolved by the process was also evaluated relative to further chemical conditioning, vacuum filtration and incineration.

*Municipal wastewater, *Phosphorus removal, Biological treatment, Sludge disposal

*Chemical precipitation, *Automatic control systems, Process efficiency

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E. F. Barth

NERC-Cincinnati

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1 Report No. 2

660/2-73-026

W

Technical and Economic Evaluation of Cooling System Blowdown
Control Techniques

5 Report No.

October 1973

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D. B. Boies, J. E. Levin, D. Baratz

PE #B12036

ROAP 16ACQ Task 11

Wapora Inc.
6900 Wisconsin Ave. N.W.
Washington, D.C. 20015

12. Sponsorin Organization

68-03-0233

13. Type of Report and
Period Covered

4-73

Final

9-73

Environmental Protection Agency

Project Officer: Guy R. Nelson

NERC-Corvallis, Oregon

503-752-4211 (Comm.) or 503-752-4349 (FTS)

This report presents descriptions of methods which are either currently applied or commercially available to reduce the pollution impact of blowdown from large cooling systems (recirculating rates > 500 cfs). Treatment equipment descriptions, capabilities and compatibilities are discussed. Where appropriate, broad ranges of both capital costs and operating expenses are provided.

The described methods include (a) the application and design of closed-cycle cooling systems, (b) makeup water treatment, (c) recirculating water treatment (d) mechanical treatment, and (e) blowdown treatment and/or disposal.

17a. Descriptions

Cooling systems, Cooling towers*, cooling water, Control systems*, water treatment*

17b. Applications

Automatic control, control, instrumentation, water management, water pollution treatment*

05G, 05F

Release to Public

19. Security Class.
(Report)

20. Security Class.
(Page)

21. Number of Pages

22. Number of Pages

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**SELECTED WATER
RESOURCES ABSTRACTS**

INPUT TRANSACTION FORM

1 Report No 2

W

5 10/73

A Demonstration of Waste Heat Use in Agriculture

ROAP 10 BAL Task 03

Eugene Water and Electric Board, Eugene, Oregon

SB02032

12. Sponsor Organization

1 Type of Rep. and
Period Covered

Final 6/1/73

Environmental Protection Agency
National Environmental Research Center
Corvallis, Oregon 97330

Project Officer: Alden G. Christianson
NERC-Corvallis, Oregon 97330

This paper describes the planning, conduction, and results related to a joint government-industry funded warm water use project near Springfield, Oregon. The five year project which ended in May 1973, was sponsored by the Eugene, Oregon, Water and Electric Board with partial support provided by the Environmental Protection Agency. Other key participants included seven farmers owning a total of 170 acres of land comprising the actual study site, Automation Industries for Project Management, and a Weyerhaeuser, Inc., Pulp and Paper Mill which supplied the warm condenser cooling water.

Conclusions of the demonstration project indicate that the greatest potential benefit of waste heat use for the agricultural applications studied are in the area of greenhouse soil heating. Monetary benefits from industrial waste heat appear achievable through proper management.

17a Descriptor

*Waste heat, Thermal Pollution, *Pollution Abatement, *Green Houses, *Frost Protection, Irrigation

*Soil temperature, heated water, shelters, heating, *frost prevention, sprinkling, *temperature control

05D, 03C

Release to Public

19 Security Class
(Report)

20 Security Class
(Page)

21 No. of

- 13 -

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U.S. DEPARTMENT OF THE INTERIOR
WASHINGTON D C 20240

Environmental Protection Agency

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA 660/2-74-006	2.	3. Recipient's Accession No	
4. Title and Subtitle EVALUATION OF A NEW BLANCHING PROCESS (IQB) FOR WASTE WATER ABATEMENT IN CANNING VEGETABLES				5. Report Date November 1973	
				6. Project # S-801484	
7. Author(s) Daryl B. Lund				8. Performing Organization Rpt No.	
9. Performing Organization Name and Address				10. Project/Task/Work Unit No 1BB037 ROAP 21ALG	
				11. Contract/Grant No. TASK 25 144-D640	
12. Sponsoring Organization Name and Address NERC-EPA 200 S.W. 35th Street Corvallis, Oregon 97330				13. Type of Report & Period Covered	
				14.	
15. Supplementary Notes Project Officer: Harold Thompson (FTS) 8-503-752-4304 thru 6 NERC-EPA Corvallis, Oregon 97330					
16. Abstracts <p>This report presents the results of a study on the efficacy of a new blanching system, Individual Quick Blanching (IQB), as applied to vegetables prior to canning. Peas, corn, lima beans, green beans, potatoes, carrots and beets were adequately blanched by IQB. Compared to deep bed steam blanching or pipe blanching, IQB generally resulted in a significant reduction in effluent. Alight drying of the vegetables before IQB reduced effluent even more; however, product quality was adversely affected in most cases. It was demonstrated that the IQB process can significantly reduce effluent volume and BOD generation in the blanching operation while adequately fulfilling the objectives of blanching. Commercial application of IQB appears economically favorable.</p> <p>This report was submitted in fulfillment of Project Number S-801484, Contract Number 144-D640, by Daryl Lund, University of Wisconsin, under the partial sponsorship of the Environmental Protection Agency. Work was completed as of August 1972.</p>					
17. Key Words and Document Analysis 17a. Descriptors					
17b. Identifiers/Open-Ended Terms					
17c. COSATI Field/Group					
18. Availability Statement - 14 -				19. Security Class (This Report) UNCLASSIFIED	
				20. Security Class (This Page) UNCLASSIFIED	
				21. No. of Pages	
				22. Price	

BIBLIOGRAPHIC DATA SHEET		1 Report No. EPA 660/2-73-030	2.	3 Recipient's Accession No.
4. Title and Subtitle TREATMENT OF SULFITE EVAPORATOR CONDENSATES FOR RECOVERY OF VOLATILE COMPONENTS			5 Report Date December 73	
			6. Project #	
7. Authors: Kenneth W. Baierl, Nai L. Chang, Bernard F. Lueck, Averill J. Wiley, and Robert A. Holm			8. Performing Organization Rept No	
9. Performing Organization Name and Address EPA-NERC Paper and Forest Industries Corvallis, Oregon 97330			10. Project/Task/Work Unit No 1BBO37 ROAP-21AZX TASK-23	
			11. Contract/Grant No. S801207	
12. Sponsoring Organization Name and Address Project Officer: Ralph H. Scott NERC-EPA Corvallis, Oregon 97330 503-752-4211, extension 336			13. Type of Report & Period Covered	
			14.	
15. Supplementary Notes				
16. Abstracts A pilot plant study of a process to recover the volatile constituents of the condensate derived from the evaporation of a sulfite spent wood pulping liquor has been made. The data from this one-year evaluation confirm prior work demonstrating that recovery of sulfur dioxide, furfural, methanol, and acetic acid (in the form of ethyl acetate) will yield reusable and salable materials, and provide either 60 or 90% BOD ₅ reduction on the condensate depending on whether the condensate is contaminated by using it as wash liquor. The work reported covers four major sections: 1. Assay of condensate samples from supporting mills, 2. Operation and data of a pilot system comprising steam stripping, activated carbon adsorption, and fractional distillation, (continued on next page)				
17. Key Words and Document Analysis. 17a. Descriptors				
17b. Identifiers/Open-Ended Terms				
17c. COSATI Field/Group				
18. Availability Statement		- 15 -	19. Security Class (This Report) UNCLASSIFIED	21. No of Pages
			20. Security Class (This Page) UNCLASSIFIED	22. Price

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA 660/2-73-030	2.	3. Recipient's Accession No.
4. Title and Subtitle TREATMENT OF SULFITE EVAPORATOR CONDENSATES FOR RECOVERY OF VOLATILE COMPONENTS				5. Report Date
				6.
7. Author(s)				8. Performing Organization Rept No
9. Performing Organization Name and Address				10. Project/Task/Work Unit No.
				11. Contract/Grant No.
12. Sponsoring Organization Name and Address				13. Type of Report & Period Covered
				14.
15. Supplementary Notes				
16. Abstracts (continued) 3. Mass, heat, and BOD ₅ balances made according to the actual operating condition of the pilot plant at the Appleton Division mill of Consolidated Papers, Inc. to January 1973, 4. Low temperature (200°C-390°F) regeneration of carbon. Assays of the condensate samples indicated a large variation in condensates from different mills which would necessitate tailoring of the complete process to the individual mill. Operation of the pilot system, an extension of work previously done at the Scott Paper company, has shown that the above-mentioned materials can be recovered as relatively pure products. Mass and heat balances, recoverable product values, and credits for BOD ₅ removal combine to show the process to the individual mill. Operation of the pilot system, an extension of work previously done at the Scott Paper Company, has shown that the above-mentioned materials can be recovered as relatively pure products. Mass and heat balances, recoverable product values, and credits for BOD ₅ removal combine to show the process to be a favorable avenue for the elimination of the pollution potential of the sulfite condensate waste. The low temperature regeneration of carbon was an extension of work previously performed at the Institute of Paper Chemistry. This approach continues to be of interest and is considered to be technically feasible. However, all attempts to use the principles and equipment for electrical induction heating, as developed at the Lowell Technological Institute, failed due to mechanical design problems encountered in the pilot trials and which could not be developed and corrected within the time and funding available for this project. This report was submitted in fulfillment of Grant Number S-801207 under the partial sponsorship of the Environmental Protection Agency, by the Institute of Paper Chemistry with the Wisconsin Department of Natural Resources and a group of pulp and paper mills cooperating. Work was completed as of May 1973.				
16. Availability Statement		19. Security Class (This Report) UNCLASSIFIED		21. No. of Pages
- 16 -		20. Security Class (This Page) UNCLASSIFIED		22. Price

SELECTED WATER
RESOURCES ABSTRACTS

INPUT TRANSACTION FORM

EPA 660/2-73-039

1 Report No

W

Accurately Measuring Residual Chlorine Concentrations in
Brackish Water -- Amperometric Method

Nov. 1973

Ron M. Manabe

1BB392

ROAP 21AZU, Task 23

Environmental Protection Agency
National Environmental Research Center
Corvallis, Oregon

12 Sponsoring Organization

13 Type: Report
Period Covered 7/1/73
10/1/73

Environmental Protection Agency

Project Officer: Guy R. Nelson
NERC-Corvallis, Oregon 97330
503-752-4211 (Comm.) or 503-752-4349 (FTS)

This report is concerned with modification of the amperometric titration method for chlorine residuals to cooling tower blowdowns or other water systems with a high degree of metal ion content along with other dissolved and suspended solids. The addition of sodium pyrophosphate as a blanket complexing agent appears to remove successfully the heavy metals interferences contributed by Fe and Cu in the blowdown matrix.

Procedure recommendations are made to increase the efficiency of both sampling and the actual titration procedure in order to allow a residual determination in the minimum amount of time. Equipment recommendations along with a design of a biampereometric endpoint system which allows greater titration speed along with portability are described.

*Chlorine, Chlorination, Chemical analysis, *Polarographic analysis

Water treatment, *Cooling towers, cooling systems, *Quantitative analysis

05A

Release to Public

19 Security Class.
(Report)

20 Security Class.
(Page)

21. Author

22. - 17 -

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U.S. DEPARTMENT OF THE INTERIOR
WASHINGTON D C 20240

Guy R. Nelson

EPA

BIBLIOGRAPHIC DATA SHEET		1 Report No 660/2-73-036	2	3 Recipient's Accession No.	
4. Title and Subtitle Chemical/Physical and Biological Treatment of Wool Processing Wastes				5. Report Date December 1973	
				6.	
7. Author(s) L.T. Hatch, R.E. Sharpin, W.T. Wirtanen				8. Performing Organization Rept No	
9. Performing Organization Name and Address EPA-Southeast Environmental Research Laboratory Athens, Georgia 30601				10. Project/Task/Work Unit No Project 12130 HMX	
				11. Contract/Grant No	
12. Sponsoring Organization Name and Address EPA				13. Type of Report & Period Covered	
				14.	
15. Supplementary Notes Project Officer: Thomas N. Sargent PE-1BB039 EPA - Athens Georgia 30601					
16. Abstracts <p>Elevated temperature acid cracking combined with pilot activated sludge and lagoon treatment were utilized to treat effluent wastewater from a woolen processing plant. Effluent from woolen "top" (raw wool scouring) making is very high in biochemical oxygen demand (BOD), chemical oxygen demand (COD), and suspended solids (SS) (18,990 ppm, 60,600 ppm, and 37,600 ppm, respectively). The chemical/physical system consisted of a hot acid-cracking process to reduce the grease content in the influent to the biological system. Average grease reductions were from 13,400 milligrams per liter (mg/L) to 120 mg/L or 99 percent with a BOD reduction of 70 percent and COD reduction of 80 percent. The biological system consisted of a pilot extended aeration activated-sludge unit with clarification and retention in a pilot facultative lagoon (53 days' retention). Typical BOD and COD reductions in the activated sludge/clarification unit were 83 percent and 54 percent, respectively, and in lagoon 56 percent and 54 percent, respectively.</p> <p>This report was submitted in fulfillment of Grant Number 12130HFX by Metcalf and Eddy, Inc. under the sponsorship of the Water Quality Office, Environmental Protection Agency. Work was completed as of October 1973.</p>					
17b. Identifiers/Open-Ended Terms					
17c. COSATI Field/Group					
18. Availability Statement		- 18 -		19. Security Class (This Report) UNCLASSIFIED	21. No of Pages
				20. Security Class (This Page) UNCLASSIFIED	22. Price

1. Title and subject line Abidation of the reverse osmosis to the drinking water treatment	5. Date of publication December 1973		
2. Author(s) Robert W. Whitthorn	6. 6.		
3. Performing organization name and address U.S. Environmental Protection Agency Cromwell Drive Riverside, W.Va. 26883	8. Performing organization file No. No.	10. Publication title and No. 18080/2/27/31	11. Classification No. No.
4. Distribution statement U.S. Environmental Protection Agency National Environmental Research Center Cincinnati OH 45263	13. By what body published Coordinated Final Report	14. 14.	
5. Supplementary notes			
6. Abstract The following is a summary of the results of a study conducted by the author to determine the feasibility of using reverse osmosis for the treatment of drinking water. The study was conducted in the laboratory and the results show that reverse osmosis is a viable method for the treatment of drinking water. The study also shows that reverse osmosis is a cost-effective method for the treatment of drinking water. The study was conducted in the laboratory and the results show that reverse osmosis is a viable method for the treatment of drinking water. The study also shows that reverse osmosis is a cost-effective method for the treatment of drinking water.			
7. Key words Abidation of the reverse osmosis to the drinking water treatment Reverse osmosis Cromwell Drive Riverside, W.Va. 26883 National Environmental Research Center Cincinnati OH 45263			
8. Additional information The following is a summary of the results of a study conducted by the author to determine the feasibility of using reverse osmosis for the treatment of drinking water. The study was conducted in the laboratory and the results show that reverse osmosis is a viable method for the treatment of drinking water. The study also shows that reverse osmosis is a cost-effective method for the treatment of drinking water. The study was conducted in the laboratory and the results show that reverse osmosis is a viable method for the treatment of drinking water. The study also shows that reverse osmosis is a cost-effective method for the treatment of drinking water.			
19. Document title Reverse osmosis Final Report		21. Document title Reverse osmosis Final Report	
20. Document title Reverse osmosis Final Report		22. Document title Reverse osmosis Final Report	

4. Title INVESTIGATION OF SURFACE FILMS - CHESAPEAKE BAY ENTRANCE,		5. Report Date 8. Performing Organization Report No. 15080 EJO	
7. Author(s) MacIntyre, W. G.; Smith, C. L.; Munday, J. C.; Gibson, V. M.; Lake, J. L.; Windsor, J. G.; Dupuy, J. L.; et. al.		10. Contract Grant No. 13. Type of Report and Period Covered Project Officer: R.D. Kaiser Region III-Philadelphia PE-1BB041	
9. Organization Virginia Institute of Marine Science Gloucester Point, Virginia 23062		12. Sponsor Organization U.S. Environmental Protection Agency, WQ0	
15. Supplementary Notes U.S. Environmental Protection Agency report number EPA 670/2-73-099		16. Abstract <p>Experimental point source oil releases have been conducted in the Chesapeake Bay mouth area. Predictions of oil slick motion were tested, and slicks were sampled and analyzed to measure their aging rates over periods up to 32 hours. Remote sensing techniques were used to detect and measure the spreading rate of oil. Some laboratory oil film aging experiments were done to further document and elucidate aging processes. Results indicate a reasonable motion prediction, an explanation of the non-biological initial aging of oil films, and a fair corroboration of a theoretical oil spreading model.</p> <p>Indigenous surface films in the study area were analyzed for lipid and chlorinated hydrocarbon content. Hydrocarbons were 300-500 microgram per liter and fatty acids and esters 700-7800 microgram per liter in surface film samples. Chlorinated hydrocarbons were generally less than 100 parts per trillion in surface films, in contrast to some earlier high concentrations found in Biscayne Bay. Surface film analysis limitations imposed by sampling methods are discussed. Plankton in slick, non-slick, and subsurface water were counted. Populations were higher in surface than subsurface water, and higher in non-slick than in slicked surface water.</p>	
17a. Descriptors *Oil Spills, *Estuarine Environment, *Chesapeake Bay, Oil Pollution, Estuaries, Currents, Sampling, Chemical Analysis, Chromatography, Chlorinated Hydrocarbons, Pesticides, Liquids			
17b. Identifiers *Surface films, *Oil slicks, Remote sensing, Hydrocarbon analysis, oil aging, fatty acids			
17c. G.O.P.R. Field & Group 05A			
19. Availability	19. Security Class (Repor.) 20. Security Class. (Page)	21. - 20 - 22. Price	Send To: WATER RESOURCES SCIENTIFIC INFORMATION CENTER U.S. DEPARTMENT OF THE INTERIOR WASHINGTON D C 20240
1. Author Dr. Wm. G. MacIntyre		2. Institution Virginia Institute of Marine Science	

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-R2-73-253	2	3. Recipient's Accession No.	
4. Title and Subtitle Reduction of Atmospheric Pollution by the Application of Fluidized-Bed Combustion and Regeneration of Sulfur-Containing Additives				5. Report Date June 1973	
7. Author(s) G. J. Vogel, E. L. Carls, J. Ackerman, M. Haas, J. Riha, C. B. Schoffstoll, J. Hepperly, and A. A. Jonke				8. Performing Organization Rept. No. ANL/ES-CEN-1005	
9. Performing Organization Name and Address Argonne National Laboratory 9700 South Cass Avenue Argonne, Illinois 60439				10. Project/Task/Work Unit No. 1A2013/ ADB11	
				11. Contract/Grant No. EPA-IAG-0020	
12. Sponsoring Organization Name and Address EPA, Office of Research and Monitoring NERC/RTP, Control Systems Laboratory Research Triangle Park, North Carolina 27711				13. Type of Report & Period Covered Annual July 1971-June 1972	
14.					
15. Supplementary Notes Project Officer: D.B. Henschel NERC-RTP FTS-919-688-8391					
16. Abstracts The report discusses fluidized-bed combustion (FBC) as a means of removing from the gas phase nearly all of the atmospheric pollutants (sulfur and nitrogen compounds) generated during the combustion of fossil fuels. Particulate lime solids (additives) are introduced into the fluidized bed and react with the sulfur compound formed during combustion. It discusses: pollution control by FBC of oil with an excess of air and by the combustion of coal with a deficiency of air; the thermodynamics of several proposed processes for regenerating additives; and regeneration of sulfur-containing additive by the two most promising processes-- a one-step reductive decomposition of CaSO4 and a two-step (reduction-CO2/H2O regeneration) procedure.					
17. Key Words and Document Analysis 17a. Descriptors					
Air Pollution			Calcium Sulfates		
Fluidized-Bed Processing			Sulfur		
Sulfur Oxides			Additives		
Nitrogen Oxides			Fossil Fuels		
Limestone			Calcium Oxides		
Dolomite (Rock)			Stoichiometry		
Combustion			Thermodynamics		
Oils					
Coal					
17b. Identifiers/Open-Ended Terms					
Air Pollution Control					
Stationary Sources					
Fluidized-Bed Combustion					
Fluidized-Bed Oil Combustion					
Two-Stage Coal Combustion					
17c. COSATI Field/Group 13B					
18. Availability Statement		- 22 -		19. Security Class (This Report) UNCLASSIFIED	
Unlimited				21. No. of Pages 73	
				22. Price \$5.45	

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-650/2-73-013	2.	3. Recipient's Accession No.	
4. Title and Subtitle EPA Alkali Scrubbing Test Facility: Sodium Carbonate and Limestone Test Results				5. Report Date August 1973	
7. Author(s) M. Epstein, L. Sybert, and I. Raben				8. Performing Organization Paper No.	
9. Performing Organization Name and Address Bechtel Corporation 50 Beale Street San Francisco, California 94119				10. Project/Task/Work Unit No. 1A2013/ACY32	
				11. Contract/Grant No. PH 22-68-67	
12. Sponsoring Organization Name and Address EPA, Office of Research and Development NERC-RTP, Control Systems Laboratory Research Triangle Park, North Carolina 27711				13. Type of Report & Period Covered Final	
15. Supplementary Notes Project Officer: Frank T. Princiotta NERC-RTP FTS-919-688-8251				14.	
16. Abstracts The report describes and presents initial results of testing a prototype wet-lime/limestone scrubbing facility for removing SO ₂ and particulates from flue gases. The facility consists of three parallel scrubbers--a venturi/spray tower, a Turbulent Contact Absorber (TCA), and a marble-bed scrubber--each able to treat a 10-Mw equivalent (30,000 acfm) of flue gas from a coal-fired boiler at TVA's Shawnee Station. Na ₂ CO ₃ tests were completed in 7/72. As of 6/73, short-term (less than 1 day) limestone factorial tests were essentially complete, and longer term (2+ week) reliability verification tests were 50% complete. Long-term (4-10 month) limestone tests and initial lime tests are scheduled to begin 9/73. The short-term limestone tests, conducted at high scrubber inlet liquor pH (6.0-6.2), saw SO ₂ removals of 80 (venturi/spray tower and marble-bed scrubber) to 96% (TCA). Initial longer term tests were run at reduced stoichiometries to increase system reliability and limestone utilization. For the TCA, limestone utilization was 83% with SO ₂ removal of 80-85%. Operability and reliability of the scrubbers for these tests were good.					
17. Key Words and Document Analysis Air Pollution Calcium Oxides Limestone Washing Sulfur Dioxide Flue Gases Spray Tanks Coal Boilers				17a. Descriptors Test Facilities Prototypes	
17b. Identifiers/Open-Ended Terms Air Pollution Control Stationary Sources Particulates Venturi/Spray Tower Scrubber Turbulent Contact Absorber (TCA) Marble-Bed Scrubber					
17c. COSATI Field/Group 13B, 7A, 14D					
18. Availability Statement Unlimited				- 23 -	
				19. Security Class (This Report) UNCLASSIFIED	
				20. Security Class (This Page) UNCLASSIFIED	
				21. No. of Pages 217	
				22. Price	

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-650/2-73-017	2.	3. Recipient's Accession No.
4. Title and Subtitle Atmospheric Emissions from the Petroleum Refining Industry			5. Report Date August 1973	
7. Author(s) L. L. Laster			8. Performing Organization Rep. No.	
9. Performing Organization Name and Address Control Systems Laboratory Environmental Protection Agency National Environmental Research Center Research Triangle Park, North Carolina 27711			10. Project/Task/Work Unit No. 1A2013/ADC	
			11. Contract/Grant No. In-house report	
12. Sponsoring Organization Name and Address			13. Type of Report & Period Covered Final	
			14.	
15. Supplementary Notes Project Officer: K. Baker (FTS) 919-549-2746				
16. Abstracts As petroleum refining has developed in recent years into one of the leading industries of the nation, with a growth rate of 4 to 8 percent annually, air pollution problems have increased, though the corporations involved have, as a result of research, produced control methods for some of the pollutants. The principal emissions from refining operations are sulfur oxides, nitrogen oxides, hydrocarbons, particulates, carbon monoxide, and odors. The estimated emissions of these pollutants (except for odor per se) at the 262 refineries operating in the United States in 1969 totaled 7.04 million tons with substantial control exercised only in the case of hydrocarbons, particulates, and carbon monoxide. In accordance with guidelines proposed by the U. S. Environmental Protection Agency for emissions from refinery operations, oil companies, working in conjunction with trade organizations and equipment manufacturers, have employed interim controls in many cases and have developed processes and devices for at least reducing all pollutants from refineries.				
17. Key Words and Document Analysis 17a. Descriptors Sulfur oxides Nitrogen oxides Hydrocarbons Emission Air pollution Refining Crude oil Pollution				
17b. Identifiers/Open-Ended Terms				
17c. COSATI Field/Group 13b				
18. Availability Statement Release unlimited		- 24 -	19. Security Classification Report) UNCLASSIFIED	21. No. of Pages 62
			20. Security Classification Page UNCLASSIFIED	22. Page

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-G50/2-73-024	2.	3. Recipient's Accession No.	
4. Title and Subtitle Measurement and Characterization of Particles in Wet Scrubbing Process for SO _x Control				5. Report Date July 1972	
7. Author(s)				6.	
9. Performing Organization Name and Address Walter C. McCrone Associates, Inc. 2820 South Michigan Avenue Chicago, Illinois 60616				8. Performing Organization Report No. MA Proj 2001	
12. Sponsoring Organization Name and Address EPA, Office of Research and Development NERC-RTP, Control Systems Laboratory Research Triangle Park, North Carolina 27711				10. Project/Task/Assignment No. 1A2013/ADM (21 ADM)	
				11. Contract/Grant No. EHSD 71-25	
15. Supplementary Notes Project Officer: D. Bruce Harris NERC-RTP FTS-919-549-2557				13. Type of Report & Period Covered Final 8/15/70-7/7/72	
14.					
16. Abstracts The report gives results of the development of a technique for size-selective, high-capacity particulate sampling to be used in measuring and characterizing the particles in the wet-scrubbing process for SO _x control. It provides information on both wet-scrubbing system process variables, and the efficiency of scrubbers to be used at the TVA test station. The sampler, existing as a manually operated bench-scale prototype, is capable not only of fractionating the particles in the desired range, but also of tolerating the process stream environment. A preliminary evaluation indicated not only that existing hardware did not meet all requirements, but that automatic sampling was more cost effective (despite higher initial costs) than manual sampling, by at least 16 percent. However, program economics resulted in the decision to design a manually operated model.					
17. Key Words and Document Analysis 17a. Descriptors					
Air Pollution		Field Tests			
Particle Size		Dust Filters			
Measurement		Dust			
Sampling		Dust Collectors			
Sulfur Oxides		Fly Ash			
Cost Effectiveness		Cyclone Separators			
Washing		Elutriators			
Scrubbers		Flue Gases			
Wind Tunnels					
17b. Identifiers/Open-Ended Terms					
Air Pollution Control		Wet Scrubbing			
Particulates		Andersen Stack Sampler			
Characterization					
Particle Collection					
Cascade Impactors					
17c. COSATI Field/Group 13B, 14A, 14B					
18. Availability Statement Unlimited		- 25 -		19. Security Class (This Report) UNCLASSIFIED	
				21. No. of Pages 100	
				20. Security Class (This Page) UNCLASSIFIED	
				22. Price	

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-650/2-73-044	2.	3. Recipient's Accession No. 1
4. Title and Subtitle Petrographic Characteristics and Physical Properties of Marls, Chalks, Shells, and Their Calcines Related to Desulfurization of Flue Gases			5. Report Date September 1973	
7. Author(s) R. D. Harvey, R. R. Frost, and J. Thomas, Jr.			8. Performing Organization Rept. No.	
9. Performing Organization Name and Address Illinois State Geological Survey Natural Resources Building Urbana, Illinois 61801			10. Project/Task/Work Unit No. Pgm Elem 1AB013	
			11. Contract/Grant No. Contract 68-02-C212 ROAP No. 21ACY-17	
12. Sponsoring Organization Name and Address EPA, Office of Research and Development NERC-RTP, Control Systems Laboratory Research Triangle Park, NC 27711			13. Type of Report & Period Covered Final	
			14.	
15. Supplementary Notes				
<p>16. Abstracts The report gives results of sampling and studies of 37 operating and other pits in fresh-water marl in northeastern U.S., and 24 deposits of chalk in chalky limestone, four deposits of shell and coquina, two deposits of caliche, and a large carbonate sludge refuse pile, all in the eastern U.S. The studies related to their potential use in limestone processes for SO₂ emission control from fossil fuel combustion. Each sample and its calcined product were investigated for petrography, mineralogy, chemistry, pore structure, and surface area. It was indicated that marls and their calcines should have high reactivities with SO₂; because of their ease of production and disaggregation, marls should be given important consideration for use in limestone scrubbing of flue gases at power plants near marl deposits. Chalks and some chalky limestones should also have higher reactivities with SO₂ gases than would dense limestones. Carbonate shell materials should not be crushed and used in SO₂ scrubbing; however, their calcines are probably as reactive as those of other carbonates. Carbonate waste sludge resembles marl in many properties and is potentially very reactive with SO₂, especially in wet scrubbing processes.</p>				
17. Key Words and Document Analysis. 17a. Descriptors				
Air Pollution Calcium Carbonates Calcines Limestone Marls Sludge Area Inorganic Chemistry Mineralogy			Petrography Porosity Combustion Desulfurization Flue Gases Fossil Fuels Sulfur Dioxide	
17b. Identifiers/Open-Ended Terms				
Air Pollution Control Caliche Coquina Shells				
17c. COSATI Field/Group			7B, 13B	
18. Availability Statement			- 26 -	
Unlimited			19. Security Class (This Report) UNCLASSIFIED	
			20. Security Class (This Page) UNCLASSIFIED	
			21. No. of Pages 123	
			22. Price	

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-R2-73-051a	2.	3. Recipient's Accession No.	
4. Title and Subtitle Development of Aqueous Processes for Removing NOx from Flue Gases -- Addendum				5. Report Date June 1973	
7. Author(s) Gilford A. Chappell				8. Performing Organization Rept No.	
9. Performing Organization Name and Address EPA, Office of Research and Monitoring NERC/RTP, Control Systems Laboratory Research Triangle Park, North Carolina 27711				10. Project/Task/Work Unit No. 1A2014/ACX	
				11. Contract/Grant No. 68-02-0220	
12. Sponsoring Organization Name and Address Esso Research and Engineering Co. Government Research Laboratory Linden, New Jersey 07036				13. Type of Report & Period Covered	
				14.	
15. Supplementary Notes Project Officer: D. A. Kemnitz NERC-RTP FTS-919-688-8251					
16. Abstracts The report summarizes the findings of a laboratory program for developing aqueous processes for removing NOx and SO2 from combustion flue gases. It discusses analytical techniques and scrubber design, as well as results obtained experimentally with a vertical spray tower scrubber: blended flue gases passed up an unpacked glass column, countercurrent to the absorbing solution which was sprayed down from the top. The experiments showed that: NO2 and SO2 are effectively absorbed by 1.0 molar Na2SO3 solutions; NO2 absorption by 1.0 molar NaOH solution is enhanced by SO2 in the flue gas; neither NO nor NO2 is effectively absorbed by 1.0 molar NaOH solution in the absence of SO2 (NO absorption is not improved by SO2); increasing the L/G ratio improves NO2 and SO2 absorption by 1.0 molar Na2SO3; and under similar conditions, Mg(OH)2 slurry is not as effective as Na2SO3 solution for NO2 absorption.					
17. Key Words and Document Analysis. 17a. Descriptors					
Air pollution		Sodium sulfites			
Nitrogen oxides		Absorbers (materials)			
Sulfur dioxide		Sodium hydroxide			
Combustion		Nitrogen oxide			
Flue gases		Nitrogen dioxide			
Chemical analysis		Magnesium hydroxides			
Design		Sulfites			
Washing		Slurries			
Spraying					
17b. Identifiers/Open-Ended Terms					
Air pollution control					
Stationary sources					
Aqueous processes					
Scrubbers					
Liquid/gas ratio					
17c. COSATI Field/Group 13B, 7A					
18. Availability Statement		- 27 -		19. Security Class (This Report) UNCLASSIFIED	
Unlimited				21. No. of Pages 25	
				20. Security Class (This Page) UNCLASSIFIED	
				22. Price	

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-R2-73-191	2.	3. Recipient's Accession No.	
4. Title and Subtitle Systems Study of Conventional Combustion Sources in the Primary Aluminum Industry				5. Report Date April 1973	
				6.	
7. Author(s) J. Goldish, G. Margolis, J. Ehrenfeld, R. Bernstein				8. Performing Organization Report No.	
9. Performing Organization Name and Address Walden Research Corporation 359 Alston Street Cambridge, Massachusetts 02139				10. Project/Task/Work Unit No. 1A2014/AUZ34	
				11. Contract/Grant No. EHSD 71-21	
12. Sponsoring Organization Name and Address EPA, Office of Research and Monitoring NERC/RTP, Control Systems Laboratory Research Triangle Park, North Carolina 27711				13. Type of Report & Period Covered Final	
				14.	
15. Supplementary Notes Project Officer: G.B. Martin NERC-RTP FTS-919-549-2470					
16. Abstracts The report provides an estimated inventory of boiler capacity and related pollutant emissions in the primary aluminum industry. Boiler capacity and pollutant emissions are projected to 1980. The report supplements a separate systems study of all process-related emissions from the aluminum industry. Significant findings include: the limited boiler capacity is used for process steam; and the vast majority of the boilers are natural-gas-fired. The large amount of electric power used in aluminum processing is supplied from outside sources, rather than being generated on site. It is concluded that the boiler emissions are insignificant, compared to process emissions.					
17. Key Words and Document Analysis. 17a. Descriptors Air Pollution *Aluminum Industry Boilers Capacity Emission Inventories Forecasting					
17b. Identifiers/Open-Ended Terms Stationary Sources					
17c. COSATI Field/Group 13B					
18. Availability Statement Unlimited				19. Security Class (This Report) UNCLASSIFIED	
- 28 -				20. Security Class (This Page) UNCLASSIFIED	
				21. No. of Pages	
				22. Price	

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-R2-73-192	2	3. Recipient's Accession No.	
4. Title and Subtitle Systems Study of Conventional Combustion Sources in the Iron and Steel Industry				5. Report Date April 1973	
7. Author(s) J. Goldish, G. Margolis, J. Ehrenfeld, R. Bernstein				8. Performing Organization Report No.	
9. Performing Organization Name and Address Walden Research Corporation 359 Allston Street Cambridge, Massachusetts 02139				10. Project/Task/Work Unit No. 1A2014/AUZ34	
				11. Contract/Grant No. EHSD 71-21	
12. Sponsoring Organization Name and Address EPA, Office of Research and Monitoring NERC/RTP, Control Systems Laboratory Research Triangle Park, North Carolina 27711				13. Type of Report & Period Covered Final	
				14.	
15. Supplementary Notes Project Officer: G.B. Martin NERC-RTP FTS 919-549-2470					
16. Abstracts The report provides an estimated inventory of: conventional boiler capacity; and the pollutant emissions attributable to these boilers. Boiler capacity and emissions are projected to 1980. The report supplements a separate iron and steel industry process systems study report. Significant findings are that the boilers are often fired with process waste gases supplementing conventional fuels, and that the boiler pollutant emissions are significant, compared to process emissions					
17. Key Words and Document Analysis. 17a. Descriptors *Iron and Steel Industry Air Pollution Boilers Capacity Emission Inventories Forecasting					
17b. Identifiers/Open-Ended Terms Stationary Sources					
17c. COSATI Field/Group 13B					
18. Availability Statement Unlimited				19. Security Class (This Report) UNCLASSIFIED	
- 29 -				21. No. of Pages	
				20. Security Class (This Page) UNCLASSIFIED	
				22. Price	

BIBLIOGRAPHIC DATA SHEET		1. Report No EPA-650/2-73-021	2.	3. Recipient's Accession No
4. Title and Subtitle Proceedings, Coal Combustion Seminar, June 19-20, 1973 Research Triangle Park, N.C. 27711				5. Report Date September 1973
7. Author(s) R. E. Hall and D. W. Pershing (Chairman and Vice Chairman)				6.
9. Performing Organization Name and Address Miscellaneous				8. Performing Organization Report No
				10. Project/Task/Work Unit No 1A2014/ADG
				11. Contract/Grant No
12. Sponsoring Organization Name and Address EPA, Office of Research and Development NERC-RTP, Control Systems Laboratory Research Triangle Park, N.C. 27711				13. Type of Report & Period Covered Proceedings
				14.
15. Supplementary Notes				

16. Abstracts The proceedings document the 10 presentations made during the Seminar, which dealt with subjects related to EPA's research and development activities for control of air pollutant emissions from the combustion of pulverized coal. The Seminar was divided in two parts: participating in the portion on fundamental research were Rockwell International's Rocketdyne Division, KVB Engineering, Inc. and Southern California Edison Co., EPA, Holland's International Flame Research Foundation, and Jet Propulsion Laboratory; and taking part in the portion on pilot- and full-scale tests were Babcock and Wilcox (Alliance Research Center), U.S. Bureau of Mines, Esso Research and Engineering Co., Combustion Engineering, Inc. and Tennessee Valley Authority. Purpose of the Seminar was to provide contractors and industrial representatives with the latest information on coal combustion research.

17. Key Words and Document Analysis 17a. Descriptors

Air Pollution	Pulverized Fuels
Combustion	Boilers
Combustion Control	Utilities
Combustion Chambers	
Coal	

Nitrogen Oxides

Carbon Monoxide

Carbon

Hydrocarbons

17b. Identifiers/Open-Ended Terms

Air Pollution Control

Stationary Sources

Unburned Hydrocarbons

Fuel Nitrogen

Fundamental Research

Pilot-Scale Tests

Full-Scale Tests

* COSATI Field/Group 13A, 13B, 21B

Availability Statement

Unlimited

- 30 -

19. Security Class (This Report)

UNCLASSIFIED

21. No. of Pages

319

20. Security Class (This Page)

UNCLASSIFIED

22. Price

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-650/3-73-031		3. Recipient's Accession No.	
4. Title and Subtitle Effectiveness of Selected Fuel Additives in Controlling Pollution Emissions from Residual-Oil-Fired Boilers				5. Report Date October 1973	
7. Author(s) D. W. Pershing, G. B. Martin, E. E. Berkau, R. E. Hall				8. Performing Organization Rept. No.	
9. Performing Organization Name and Address EPA, Office of Research and Development NERC-RTP, Control Systems Laboratory Research Triangle Park, North Carolina 27711				10. Project/Task/Work Unit No. 1A2014/21ADG	
				11. Contract/Grant No. In-House	
12. Sponsoring Organization Name and Address NA				13. Type of Report & Period Covered Final	
				14.	
15. Supplementary Notes Project Officer: G.B. Martin (FTS) 919-549-2470					
16. Abstracts The report gives results of a study to experimentally evaluate the effectiveness of four additive materials in controlling pollutant emissions from fossil fuel combustion: Trimex, PACE, KAP, and Glo-Klen. Each was carefully examined in a highly instrumented package boiler over the range of typical operating conditions (e g., combustion intensity and residence time) for industrial and utility systems. Results show that none of the four reduce emissions of SOx, NO, CO, or UHC under any condition tested. Based on these results, the boiler operating problems, and the possibility that their use might create potentially harmful new emissions, none of the additives can be recommended as a means of controlling pollutant emissions.					
17. Key Words and Document Analysis 17a Descriptors Air Pollution Boilers Fuel Additives Residual Oil Combustion Sodium Carbonates Sulfur Oxides Hydrocarbons Carbon Monoxide Nitrogen Oxide (NO) 17b. Identifiers/Open-Ended Terms Air Pollution Control Glo-Klen Stationary Sources Unburned Hydrocarbons Trimex Metallic Emissions PACE Particulates KAP 17c. COSATI Field/Group 13B, 13A, 21B					
18. Availability Statement Unlimited				19. Security Class (This Report) UNCLASSIFIED	
- 31 -				21. No. of Pages 49	
				20. Security Class (This Page) UNCLASSIFIED	
				22. Price	

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-R2-73-084b	2.	3. Recipient's Accession No.
4. Title and Subtitle Field Investigation of Emissions from Combustion Equipment for Space Heating (Data Supplement)			5. Report Date June 1973	
7. Author(s) R. E. Barrett, S. E. Miller, and D. W. Locklin			8. Performing Organization Report No.	
9. Performing Organization Name and Address Battelle - Columbus Laboratories 505 King Avenue Columbus, Ohio 43201			10. Project/Task/Work Unit No. 1A2015/ADG-A1	
			11. Contract/Grant No. 68-02-0251	
12. Sponsoring Organization Name and Address EPA, Office of Research and Development NERC-RTP, Control Systems Laboratory Research Triangle Park, North Carolina 27711			13. Type of Report & Period Covered Final	
15. Supplementary Notes Project Officer: Robert E. Hall NERC-RTP FTS-919-549-2477			14.	
16. Abstracts This "Data Supplement" volume records individual data points and plots in greater detail than is practical in the main volume of the report. It is intended for use by researchers who wish to refer to individual data points. Data is included from the 13 residential units and 6 commercial boilers investigated in Phase II of the program under different combustion conditions. This volume contains the emissions data, plots of emissions versus CO ₂ , computed emission factors, and emission concentrations calculated at 3% O ₂ . Additional details, including descriptions of individual units and sampling and measurement procedures, are contained in the main body of the report.				
17. Key Words and Document Analysis 17a. Descriptors				
Air Pollution		Nitrogen Oxides Sulfur Trioxide		
Space Heating		Nitrogen Oxide (NO) Natural Gas		
Residential Buildings		Nitrogen Dioxide Fuel Oil		
Commercial Buildings		Particulate Composites		
Combustion		Smoke		
Emission		Carbon Monoxide		
Burners		Hydrocarbons		
Boilers		Sulfur Oxides		
Furnaces		Sulfur Dioxide		
17b. Identifiers/Open-Ended Terms				
Air Pollution Control		No. 5 Oil		
Stationary Sources		No. 6 Oil		
Emission Factors				
No. 2 Oil				
No. 4 Oil				
17c. COSATI Field/Group		13B, 7C		
18. Availability Statement		19. Security Class (This Report)		21. No. of Pages
Unlimited		UNCLASSIFIED		225
		20. Security Class (This Page)		22. Price
		UNCLASSIFIED		

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-R4-73-031	2.	3. Recipient's Accession No.	
4. Title and Subtitle Existing Needs in the Experimental and Observational Study of Atmospheric Chemical Reactions				5. Report Date June, 1973	
				6. (Date of Preparation)	
7. Author(s) John H. Seinfeld, Thomas A. Hecht, and Philip M. Roth				8. Performing Organization Report No. R73-21	
9. Performing Organization Name and Address Systems Applications, Inc. 9418 Wilshire Boulevard Beverly Hills, California				10. Project/Task/Work Unit No. ROAP 26A10/Task 10	
				11. Contract/Grant No. 68-02-0580	
12. Sponsoring Organization Name and Address Environmental Protection Agency Office of Research and Monitoring National Environmental Research Center Research Triangle Park, N. C. 27711				13. Type of Report & Period Covered Interim Report	
				14.	
15. Supplementary Notes Project Officer: Marcia C. Dodge NERC-RTP FTS-919-549-8411, extension 2374 PE-1AA008					
16. Abstracts This report contains recommendations to aid those concerned with photochemical modeling in planning studies. The suggested programs are designed to provide information needed to develop kinetic models to describe the chemical transformations of atmospheric pollutants. The core of this report focuses on kinetic and mechanistic studies of individual reactions, smog chamber studies, and atmospheric measurement programs that the authors feel should be undertaken to provide the necessary data for model development. Existing deficiencies in knowledge in each of these areas are discussed and the types of programs needed to provide the missing information are examined in detail. The report also includes a short history of model development, describing the various photochemical mechanisms developed to date.					
17. Key Words and Document Analysis. 17a. Descriptors computer modeling chemical kinetics photochemistry atmospheric chemistry					
17b. Identifiers/Open-Ended Terms					
17c. COSATI Field/Group					
18. Availability Statement Unlimited				19. Security Class (This Report) UNCLASSIFIED	
				20. Security Class (This Page) UNCLASSIFIED	
				21. No. of Pages 354	
				22. Price	

Mathematical Simulation of Atmospheric Photochemical Reactions: Model Development, Validation and Application		July, 1973	
		6.	
7. Author(s) Thomas A. Hecht, Philip M. Roth, John H. Seinfeld		8. Performing Organization Rep No R73-28	
9. Performing Organization Name and Address Systems Applications, Inc. 950 Northgate Drive San Rafael, California 94903		10. Project/Task/Work Unit No 26AAD, Task 10	
		11. Contract/Grant No. 68-02-0580	
12. Sponsoring Organization Name and Address Environmental Protection Agency Office of Research & Monitoring National Environmental Research Center Research Triangle Park, N. C. 27711		13. Type of Report & Period Covered Final	
		14.	
15. Supplementary Notes Project Officer: Marcia C. Dodge NERC-RTP FTS-919-549-8411, extension 2374			
16. Abstracts The development and evaluation of a kinetic mechanism, for use in air quality simulation models to describe photochemical smog formation, is described. The mechanism, which treats inorganic reactions in detail and organic reactions in general terms, was formulated to achieve a balance between accuracy of prediction and compactness of representation. The results of the evaluation of this mechanism using n-butane/NO _x , propylene/NO _x , and n-butane/propylene/NO _x smog chamber data are included.			
17. Key Words and Document Analysis. 17a. Descriptors Computer Modeling Chemical Kinetics Photochemistry Atmospheric Chemistry			
17b. Identifiers/Open-Ended Terms			
17c. COSATI Field/Group			
18. Availability Statement - 34 -		19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 156
		20. Security Class (This Page) UNCLASSIFIED	22. Price

A Physical Model for Simulation of Aquatic Ecosystems

Report Date

Performing Organization
Report No.

Falco, James W., and Sanders, Walter M. III

PE# 1BA023

ROAP 21AIM, Task 13

National Pollutants Fate Research Program
Southeast Environmental Research Laboratory
NERC-Corvallis, U. S. Environmental Protection Agency
Athens, Georgia 30601

15 Type, Report and
Period Covered

12. Sponsoring Organization U. S. Environmental Protection Agency

13. Distribution Statement

This paper is to be published in the proceedings of the workshop, "Modeling of the Eutrophication Process," held in Logan, Utah, September 5-7, 1973.

16
A description of a physical model of a flowing stream, the Aquatic Ecosystem Simulator (AEcoS), is presented. Included is a discussion of parameters measured and controlled. The transport characteristics of the flume and quantitative calibration experiments are discussed. The importance of transport and proper scaling of experimental results to full scale natural ecosystems is explained.

A demonstration experiment which shows the possibility of simulating varied responses to environmental perturbations in an aquatic ecosystem containing mixed populations of algae and bacteria is discussed.

The development of a mathematical model to analyze results in the form of transport coefficients and specific and maximum uptake rates is also discussed. A brief statement on the role of stochastic modeling in handling field data to generate control functions for chamber operation of the AEcoS is also made. (Falco-U.S. Army Corps of Engineers)

17a Descriptors

*Ecology, *Model Studies, *Aquatic Environment, *Simulation, *Physical Models, Aquatic Microbiology, Ecological Distribution, Primary Productivity, Environmental Effects, Engineering, Energy Transfer, Lentic Environments, Computer Models, Biological Communities, Chemical Properties, Chemical Reactions, Physical Properties, Light, Infrared Radiation, Distribution Patterns, Temperature Control.

17b Unrestricted

*AEcoS

05B, 05C, 05G

18 Security Class.
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James W. Falco

U. S. Army Corp of Engineers, Vicksburg
Waterways Experiment Station

SELECTED WATER RESOURCES ABSTRACTS INPUT TRANSACTION FORM		Report No.		W	
BIOLOGICAL MODELS OF FRESHWATER COMMUNITIES				5 Report Title 6 8 Performer Organization Report No.	
TAUB, Frieda B.				16050 DXM	
Washington University, Seattle, College of Fisheries				EPA Grant 16050 DXM	
12 Sponsoring Organization U. S. Environmental Protection Agency				13 Type, Report and Period Covered Final Report	
Environmental Protection Agency report number, EPA-660/3-73-008, August 1973.					
<p>Data from continuous cultures of an alga (<u>Chlamydomonas reinhardtii</u>) and protozoan (<u>Tetrahymena vorax</u>) have been used to construct a model of algal standing crop over ranges of light intensity, dilution rate, and nutrient concentration both in the absence and presence of predation by the protozoa. The model predicts that predation can reduce algal standing crop only within certain ranges of the environmental variables.</p> <p>The comparative toxicities of Aroclor 1242, a polychlorinated biphenyl, and DDT, were tested on the alga and protozoan, and also on daphnids, ostracods, and guppies. (Taub-University of Washington)</p> <p>Project Officer: Dr. Walter M. Sanders III EPA-Athens, Georgia 30601</p>					
17a Description *Model studies, *Algae, *Protozoa, Chlamydomonas, Ciliates, Bacteria, Nitrates, Light intensity, Primary productivity, Secondary productivity, cultures, Pesticide toxicity, DDT					
17b Illustrations *Chemostats, *Polychlorinated biphenyls					
Ø5C					
19 Security Class. (Report)		- 36 -		Send To.	
20 Security Class (Page)		22 Price		WATER RESOURCES SCIENTIFIC INFORMATION CENTER U.S. DEPARTMENT OF THE INTERIOR WASHINGTON D.C. 20240	
Frieda B. Taub			University of Washington		

SELECTED WATER RESOURCES ABSTRACTS INPUT TRANSACTION FORM		W	
DYNAMIC WATER QUALITY FORECASTING AND MANAGEMENT			
O'Connor, Donald J., Thomann, Robert V., and Di Toro, Dominic M.		R800369	
Manhattan College, Bronx, New York, Civil Engineering Dept.		R800369	
U. S. Environmental Protection Agency		Final Report	
Environmental Protection Agency report number, EPA-660/3-73-009, August 1973.			
<p> This report describes the formulation and initial verification of two modeling frameworks. The first is directed toward an analysis of the impact of the carbonaceous and nitrogenous components and wastewater on the dissolved oxygen resources of a natural water system. The second modeling framework concentrates on the interactions between the discharge of nutrient, both nitrogen and phosphorus, and the biomass of the phytoplankton and zooplankton populations which result, as well as incorporating the overall impact on dissolved oxygen. The models are formulated in terms of coupled differential equations which incorporate both the effect of transport due to tidal motion and turbulence, and the kinetics which describe the biological and chemical transformations that can occur. The modeling frameworks are applied to the Delaware and Potomac estuaries in order to estimate the ability of such models to describe the water quality effects of carbon, nitrogen, and phosphorous discharges. The agreement achieved between observation and calculation indicate that the major features of the impact of wastewater components on eutrophication phenomena can be successfully analyzed within the context of the models presented herein. (O'Connor-Manhattan College) </p> <p> Project Officer: Dr. Walter M. Sanders III EPA-Athens Georgia 30601 </p>			
*Water quality, *Mathematical Models, *Computer Models, Water pollution, Cycling nutrients, Eutrophication, Dispersion, Mass Transfer, Nutrients, Oxygen Demand, Photosynthesis, Simulation Analysis			
Ø5C, Ø5G, Ø6G			
Security Class Rep.	- 37 - P1	Send To WATER RESOURCES SCIENTIFIC INFORMATION CENTER U.S. DEPARTMENT OF THE INTERIOR WASHINGTON D C 20240	
Donald J. O'Connor		Manhattan College, Bronx, New York	

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BIBLIOGRAPHIC DATA SHEET	1. Report No.	2.	3. Recipient's Accession No
4. Title and Subtitle Tidal Flats in Estuarine Water Quality Analysis		5. Report Date August 1973	
7. Author(s) David A. Bella		8. Performing Organization Report No	
9. Performing Organization Name and Address Department of Civil Engineering Oregon State University Corvallis, Oregon 97331		10. Project/Task/Work Unit No	
		11. Contract/Grant No. 16070D00	
12. Sponsoring Organization Name and Address EPA		13. Type of Report & Period Covered	
		14.	
15. Supplementary Notes Project Officer: Richard T. Callaway			
16. Abstracts This report summarizes the results of a research project entitled "Tidal Flats and Estuarine Water Quality Analysis." The initial phases of the study involved mixing processes and tidal hydraulics, however, the study emphasis shifted to estuarine benthic systems as the importance of these systems became more apparent. The sulfur cycle was given particular emphasis because: <ul style="list-style-type: none"> (1) sulfides, resulting from sulfate reduction within the benthic systems, can influence the benthic oxygen uptake rate, (2) free sulfides are highly toxic to a variety of organisms, and (3) the release of hydrogen sulfide may contribute to a deterioration of air quality. <p>The sulfur cycle is of particular importance in tidal estuaries because of the high sulfate concentrations of saline waters in comparison to fresh waters. A conceptual model of estuarine benthic systems was developed and a classification system of</p>			
17. Key Words and Document Analysis. 17a. Descriptors			
17b. Identifiers/Open-Ended Terms			
17c. COSATI Field/Group			
18. Availability Statement		19. Security Class (This Report) UNCLASSIFIED	21. No of Pages
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7. Author(s)		8. Performing Organization Rept No	
9. Performing Organization Name and Address		10. Project/Task/Work Unit No	
		11. Contract/Grant No.	
12. Sponsoring Organization Name and Address		13. Type of Report & Period Covered	
		14.	
15. Supplementary Notes			
16. Abstracts (continued) <p>estuarine benthic deposits which is based on the availability of hydrogen acceptors and reactive iron was developed.</p> <p>Field studies demonstrated that estuarine waters overlying organic rich tidal flat deposits could contain significant concentrations of free sulfides even when dissolved oxygen was present. Field studies of benthic oxygen uptake and benthic sulfide release were conducted to determine the rate of sulfate reduction. Results from experiments using extracts from benthic deposits and algal mats demonstrated a close relationship between the rate of sulfate reduction and the sulfate and soluble organic carbon concentrations. A general systems model of estuarine benthic systems was developed, however, specific definition of all processes was not possible without further experimental results. A variety of activities which could contribute to significant environmental changes with estuarine benthic systems were identified.</p> <p>Methods of determining dispersion coefficients from salinity profiles were examined and an improved method was developed. The build-up of a pollutant in the vicinity of the outfall during the slack water period of the tide was studied through a field experiment and mathematical model study.</p>			
17b. Identifiers/Open-Ended Terms			
17c. COSATI Field/Group			
18. Availability Statement		19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages
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4. Title and Subtitle WOOD WASTE REUSE IN CONTROLLED RELEASE PESTICIDES		5. Report Date 1973-issuing date	
7. Author(s) G. G. Allan, C. S. Chopra, R. I. Gara, A. N. Neogi, and R. M. Wilkins		8. Performing Organization Report No.	
9. Performing Organization Name and Address Institute of Forest Products College of Forest Resources University of Washington Seattle, Washington 98105		10. Project/Task/Work Unit No.	
		11. Contract/Grant No. EP-00319	
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency National Environmental Research Center Office of Research and Development Cincinnati, Ohio 45268		13. Type of Report & Period Covered Final	
		14.	
15. Supplementary Notes Project Officer: Henry Johnson NERC-Cincinnati, Ohio 45268			
16. Abstracts The utilization of large quantities of solid waste materials by chemical combination with pesticides is discussed. The associated expenditures and the disadvantages of the current methods of application for these pesticides are contrasted with the general advantages of the corresponding controlled release forms based on solid waste macromolecules. The preparation of such combinations is described. Theories which permit the prediction of the period of effectiveness of solid waste-pesticide combinations have been developed and validated. Solid waste-herbicide combinations based on 2,4-dichlorophenoxybutyric acid have been found to be capable of safely suppressing weeds and brush in the presence of conifers and field tests have shown that conifer growth is thereby substantially accelerated. The practicability of longacting controlled release forms of insecticides was also demonstrated.			
17. Key Words and Document Analysis. 17a. Descriptors *Wood, Pesticides, Herbicides, Hardwoods, Softwoods			
17b. Identifiers/Open-Ended Terms * *Resource recovery, Solid waste management, Solid waste macromolecule, 2,4-dichlorophenoxybutyric acid, Weeds, Controlled release pesticides, Douglas-fir, Ponderosa pine			
17c. COSATI Field/Group 02F; 06F; 11L; 13B			
18. Availability Statement NTIS PB-22051 Release to public		19. Security Class (This Report) UNCLASSIFIED 20. Security Class (This Page) UNCLASSIFIED	
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BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-670/2-73-09	2. PB 221 171
4. Title and Subtitle BIOLOGICAL CONVERSION OF ANIMAL WASTES TO NUTRIENTS		5. Report Date 1973-issuing date	
7. Author(s) Byron F. Miller		8. Performing Organization Report No.	
9. Performing Organization Name and Address Department of Avian Science Colorado State University Fort Collins, Colorado 80521		10. Project/Task/Work Unit No. PE-1DB314	
		11. Contract/Grant No. EP-00262-02	
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency National Environmental Research Center Office of Research & Development Cincinnati, Ohio 45268		13. Type of Report & Period Covered Final	
		14.	
15. Supplementary Notes Project Officer: Charles J. Rogers NERC-Cincinnati, Ohio 45268			
16. Abstracts As part of studies to determine how living organisms may be used to catabolize poultry manure, larvae of house flies (<u>Musca domestica</u>) were used to process poultry manure, with the pupae being used as a feed supplement. Temperature and relative humidity conditions were determined to produce an optimum yield of dry pupae. Three feeding trials were conducted to evaluate fly pupae and catabolized poultry manure residue as protein sources for growing chickens. White Leghorn chicks, White Plymouth Rock chicks, and New Hampshire and Indian River broiler chicks were fed the various diets and differences in body weight and feed conversion were recorded. The results indicated that fly pupae have potential as a protein supplement in chick starter and broiler diets; the protein quality was found to be similar to that of meat and bone meal or fish meal, and superior to soybean oil meal. -4-			
17. Key Words and Document Analysis. 17a. Descriptors *Waste disposal, Wastes, *Recycling, *Biodeterioration, Chemical analysis, Agricultural Wastes, Residues, Weight measurement, Feeding habits, Conversion, Proteins, Metabolism, Statistical analysis, Temperature measurement, Humidity, Amino acids, *Diptera, Larvae			
17b. Identifiers/Open-Ended Terms Solid waste disposal, Resource recovery, *Poultry manure, *Manure disposal, Manure residue, Single Comb White Leghorn chicks, White Plymouth Rock chicks, New Hampshire and Indian River broiler chicks, *Feeding trials, Feed conversion, *Catabolism, Fly egg hatchability, <u>Musca domestica</u>			
17c. COSATI Field/Group 13-B			
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Title and Subtitle

PREPARATION AND EVALUATION OF ACTIVATED
CARBON PRODUCED FROM MUNICIPAL REFUSE

5. Report Date

1973-issuing date

6.

Author(s)

M. K. Stevenson, J. O. Leckie, and R. Eliassen

Performing Organization Name and Address

Department of Civil Engineering
Stanford University
Stanford, California 943058. Performing Organization Rept
No.

10. Project/Task/Work Unit No.

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11. Contract/Grant No.

CPE-70-129

Sponsoring Organization Name and Address

U.S. Environmental Protection Agency
National Environmental Research Center
Office of Research & Development
Cincinnati, Ohio 4526813. Type of Report & Period
Covered

Final

14.

Supplementary Notes

Project Officer: Richard Chapman
NERC-Cincinnati, Ohio 45268

Abstracts

Activated carbons were produced from municipal refuse. The carbons were characterized by determining the methylene blue number, iodine number, phenol number, COD adsorptive capacity (municipal sewage), ash content, apparent density, surface area and pore size distribution. The rate of COD adsorption, rate of settling and leachate characteristics were also investigated. Municipal refuse was shredded, air classified, pyrolyzed, air classified (a second time), activated and ground. A number of different activation schemes were used; the most effective was steam at 910 C without the use of catalysts. Activation was accomplished as a batch process in a fluidized bed. The refuse activated carbon was compared with Aqua Nuchar A, Calgon BL and Darco M for selected adsorptive properties. Results of several COD adsorption tests indicate that the refuse activated carbon is comparable to Aqua Nuchar A for COD removal. The approximate yield of activated carbon was ten percent, or 200 lbs per ton of raw refuse. The cost of producing the activated carbon was 5.5 cents per pound when pyrolysis costs are included and 0.93 cents per pound when pyrolysis costs are not included.

Key Words and Document Analysis. 17a. Descriptors

Air pollution, Costs, Economic analysis, Pollution, *Recycling, Tests, *Waste disposal, Wastes, Waste treatment, *Refuse disposal, *Conversion, Byproducts, Adsorbents, *Activated carbon, Methylene blue, Phenol, Iodine, Oxygen demand, Ash content, Area, Porosity, Settling, Pyrolysis

Identifiers/Open-Ended Terms

*Solid waste disposal, Resource recovery, *Municipal refuse, Char, Aqua Nuchar A, Calgon BL, Darco M, Apparent density, Leachate characterization

c. COSATI Field/Group 13-B

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4. Title and Subtitle			5. Report Date	
THE DIRECT DETERMINATION OF METALS IN AIR			June 1, 1973	
7. Author(s)			8. Performing Organization Rept No	
J.W. Robinson				
9. Performing Organization Name and Address			10. Project/Task/Work Unit No	
			PE-1AA010	
			11. Contract/Grant No	
			AP 00866	
12. Sponsoring Organization Name and Address			13. Type of Report & Period Covered	
			14.	
15. Supplementary Notes				
16. Abstracts				
<p>An instrument has been developed capable of the direct determination of metals in air. No prior scrubbing or extracting of the metals from the air is necessary. Consequently, the time necessary for analysis is a matter of minutes - permitting real time analysis to be carried out on small volumes of air.</p> <p>The method was based on atomic absorption spectroscopy and involved the development of a highly efficient atomizer. The sensitivity of the method was determined to be about 10^{-12} g. Procedures for the direct quantitative determination of lead, mercury or cadmium in the air were developed.</p> <p>Problems were encountered with traces of impurities in the system. Normal 'trace' levels are unacceptable at the levels necessary for direct metal determination. Calibration techniques were especially difficult to develop and numerous methods were studied. The calibration methods which were found to be useful at these concentrations were developed into reliable analytical techniques. These methods are described.</p> <p>Preliminary studies indicated that other elements such as Ag, K, Na, Se, As, Cu, Zn were also detectable in air; but calibration techniques for these methods have not yet been developed.</p> <p>This report was submitted in fulfillment of Grant Number AP 00866, by J. W. Robinson under the sponsorship of the Environmental Protection Agency. Work was completed as of June 1, 1973.</p> <p>PE 1AA010</p>				
18. Availability Statement		- 43 -	19. Security Class (This Report)	21. No of Pages
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BIBLIOGRAPHIC DATA SHEET	1. Report No.	2	3. Recipient's Accession No.
4. Title and Subtitle Development of X-Ray Fluorescence Spectroscopy for Elemental Analysis of Particulate Matter in the Atmosphere and in Source Emissions. Phas II. Evaluation of Commercial Multiple Crystal Spectrometer Instruments		5. Report Date June 1973	
7. Author(s) L.S. Birks and J.V. Gilfrich		6. Interagency Agreement 690114	
9. Performing Organization Name and Address Naval Research Laboratory Washington, D.C.		8. Performing Organization Rept No.	
		10. Project/Task/Work Unit No PE 1AA010	
		11. Contract/Grant No	
12. Sponsoring Organization Name and Address EPA		13. Type of Report & Period Covered	
		14.	
15. Supplementary Notes Project Officer: Jack Wagman Chemistry and Physics Laboratory, Durham, NC			
16. Abstracts <p>Four commercial multiple crystal spectrometer x-ray analyzers were evaluated for use in the elemental analysis of air pollution particulate samples. Fourteen to twenty-four elements can be measured simultaneously in these instruments. 100 second detection limits of 1 to 10 ng/cm² were achieved for about one-half of the elements examined. Any one of the commercial instruments is capable of performing quantitative analysis of the particulate matter filtered out of the atmosphere or source emissions. Some actual pollution samples were analyzed in all four instruments to demonstrate suitability.</p> <p>This report was submitted in fulfillment of one phase of Interagency Agreement No. 690114 by the Naval Research Laboratory under the sponsorship of the Environmental Protection Agency. Work was completed as of November 1972.</p>			
17b. Identifiers/Open-Ended Terms			
17c. COSATI Field/Group			
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- 45 -		20. Security Class (This Page) UNCLASSIFIED	22. Price

BIBLIOGRAPHIC DATA SHEET		1. Report No. EPA-R2-73-218	2	3. Recipient's Accession No.	
4. Title and Subtitle Development of In Situ Prototype Diode Laser System to Monitor SO ₂ Across the Stack				5. Report Date May 1973	
				6.	
7. Author(s) E. David Hinkley				8. Performing Organization Rept. No.	
9. Performing Organization Name and Address Lincoln Laboratory Massachusetts Institute of Technology P. O. Box 73 Lexington, Massachusetts 02173				10. Project/Task/Work Unit No. Prog. Element 1A1010	
				11. Contract/Grant No. 68-02-0569	
12. Sponsoring Organization Name and Address Environmental Protection Agency Division of Chemistry and Physics Research Triangle Park, N.C. 27711				13. Type of Report & Period Covered Final, 11/71-3/73	
				14.	
15. Supplementary Notes Project Officer: John S. Nader NERC-RTP 919-549-8411, extension 2381					
16. Abstracts This report describes the development and testing of a semiconductor diode laser system to monitor sulfur dioxide by differential absorption of infrared radiation. Laser material was prepared and diodes fabricated which would operate in a temperature-independent region of SO ₂ absorption. Data concerning sensitivity and interferences from aerosols and other gases were recorded in the laboratory. Field tests were then performed at an operating coal-burning power generating station, with the results compared with SO ₂ measurements taken with a conventional chemical monitor.					
17. Key Words and Document Analysis. 17a. Descriptors tunable infrared laser differential absorption infrared detection <u>in situ</u> monitoring					
17b. Identifiers/Open-Ended Terms					
17c. COSATI Field/Group					
18. Availability Statement Release unlimited				19. Security Class (This Report) UNCLASSIFIED	
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1. Report No. EPA-R2-73-219	2.	3. Recipient's Accession No.
4. Title and Subtitle Feasibility Study of In-Situ Source Monitoring of Particulate Composition by Raman or Fluorescence Scatter		5. Report Date June 1973 (D/A and D/I)
6.		7. Performing Organization Rept. No.
8. Author(s) M. L. Wright and K. S. Krishnan		9. Performing Organization Name and Address Stanford Research Institute Menlo Park, California 94025
10. Sponsoring Organization Name and Address Environmental Protection Agency Research Triangle Park North Carolina 27711		11. Program Element ROAP 28AA1 Task 25 SRI Project 2059 Contract/Grant No. 68-02-0594
12. Type of Report & Period Covered FINAL June 72 thru Apr 73		13.

14. Supplementary Notes
Project Officer: John S. Nader
NERC-RTP 919-549-8411, extension 2381

Abstracts

The purpose of this project was to assess the feasibility of in-stack monitoring of air-suspended particulate stream by fluorescence or Raman optical interactions. The study explored the feasibility of two approaches: quantitatively monitoring a prescribed constituent, and monitoring the relative concentrations of several constituents simultaneously. Fluorescence-monitoring systems were found suitable for the study.

The method of approach was to assess the magnitude of the Raman and fluorescence interaction, and then calculate the detectability of that material for a typical in-stack system. Thirty-four materials were investigated on the project; thirteen materials had significant fluorescent responses and twenty-two materials had measurable responses (continued on reverse side)

Key Words and Document Analysis. 17a. Descriptors

Source monitoring
Particulate
Raman
Fluorescence
Stack monitoring
Monitoring systems
Aerosols
Spectra

Identifiers/Open-Ended Terms

COSATI Field/Group

Availability Statement

19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 228
20. Security Class (This Page)	22. Price

(Abstract-concluded)

Raman responses. When these responses were used to calculate in-stack detectability, all thirteen materials could be detected by fluorescence systems (although few could be uniquely identified), and fifteen of the twenty-two Raman-active materials could be detected by a Raman system.

The use of a laboratory Raman instrument to analyze conventionally sampled particulates was considered. The primary advantage of this instrument appears to be the capability for measuring ions--for example, sulfate.

Finally, a few crude experiments were made to detect the fluorescent response of a particulate material suspended in a liquid (rather than air). These measurements showed substantial interference from fluorescence by the liquid medium; nevertheless, a component of the particulate fluorescence was detectable. This experimental result partially verifies the calculated feasibility of detection by fluorescence.

It is concluded that both fluorescence and Raman in-stack monitoring systems can yield useful information about the quantity and composition of a particulate stream. Recommendations are made for additional efforts toward achieving an operational in-stack monitoring system.

8. BIBLIOGRAPHIC DATA SERIES		1. Report No. EPA-650/2-73-006	2.	3. Recipient's Accession No.
4. Title and Subtitle Development of X-ray Fluorescence Spectroscopy for Elemental Analysis of Particulate Matter Phase II: Evaluation of Commercial Multiple Crystal Spectrometer Instruments				5. Report Date June 1973 (date of issue)
7. Author(s) L. S. Birks and J. V. Gilfrich				6. Performing Organization Report No. 7617
9. Performing Organization Name and Address Naval Research Laboratory Washington, DC 20375				10. Project/Task Statement ROAP 26 A-1, Task 12
				11. Contract/Grant No. Interagency Agreement EPA-IAG-085(D)
12. Sponsoring Organization Name and Address Office of Research and Development U. S. Environmental Protection Agency Washington, DC 20460				13. Type of Report & Period Covered Final - 6 months ending Dec. 1972
14.				
15. Supplementary Notes Project Officer: Jack Wagman NERC-RTP				
16. Abstracts Four commercial multiple crystal spectrometer x-ray analyzers were evaluated for use in the elemental analysis of air pollution particulate samples. Fourteen to twenty-four elements can be measured simultaneously in these instruments. 100 second detection limits of 1 to 10 ng/cm ² were achieved for about one-half of the elements examined. Any one of the commercial instruments is capable of performing quantitative analysis of the particulate matter filtered out of the atmosphere or source emissions. Some actual pollution samples were analyzed in all four instruments to demonstrate suitability.				
17. Key Words and Document Analysis. 17a. Descriptors Air pollution Particulate matter Elemental analysis X-ray fluorescence analysis Multiple crystal x-ray analyzers				
17b. Identifiers/Open-Ended Terms				
17c. COSATI Field/Group				
18. Availability Statement Release unlimited				19. Security Class. (This Report) UNCLASSIFIED
- 49 -				20. Security Class. (This Page) UNCLASSIFIED
				21. No. of Pages 14
				22. Price

BIBLIOGRAPHIC DATA SHEET		1. Report No EPA-650/2-73-001	2.	3. Recipient's Accession No
4. Title and Subtitle Chemical and Physical Characterization of Automotive Exhaust Particulate Matter in the Atmosphere (Year ending June 30, 1972)			5. Report Date June 1973 (date of issue)	
7. Author(s) C. W. Melton, R. I. Mitchell, D. A. Trayser, and J. E. Foster			8. Performing Organization Report No.	
9. Performing Organization Name and Address Battelle Columbus Laboratories 505 King Avenue Columbus, Ohio 43201			10. Project/Task/Work Unit No EPA-650/2-73-001 ROAP 26 ACV, Task 34	
			11. Contract/Grant No. 68-02-0205	
12. Sponsoring Organization Name and Address Coordinating Research Council, Inc. 30 Rockefeller Plaza New York, New York 10020			13. Type of Report & Period Covered Final - Year ending June 30, 1972	
			14.	
15. Supplementary Notes APRAC Project CAPE-19-70			Project Officer: Dr. Jack Wagman NERC-RTP	
16. Abstracts The objective of this project is to determine the physical and chemical characteristics of particulate matter from internal combustion engines as a function of sampling procedure, engine operating conditions including emission control systems, fuel composition, and residence time in the atmosphere. Emphasis is to be placed on the study of particulate matter during its lifetime in the atmosphere. Following a 4500 mile break in of two 1971 model Fords on non-leaded gasoline, the comparability of the vehicles was established from measurements of total hydrocarbons, carbon monoxide, total particulate mass, and particle size distribution in the tunnel diluted exhaust samples. Selected particulate samples were also studied for particle morphology (by TEM), and organic fractions of these were subjected to IR and GC analysis. Break-in of the vehicles was resumed for another 4000 miles, during which one car was operated using leaded fuel (2.5 g Pb/gal added to base stock) while the use of unleaded fuel was continued in the other car. In preparation for the residence				
17. Key Words and Document Analysis 17a. Descriptors chamber experiments, the exhaust dilution tunnel was modified so that it could be operated at a positive pressure to provide sample flow to a rectangular chamber, constructed of 6 mil black polyethylene, about 2100 cubic feet in volume (9 x 12 x 20 ft.). Initial experiments were carried out at an overall exhaust gas dilution of about 300:1. Renewal of this contract for another year was negotiated.				
17b. Identifiers/Open-Ended Terms				
17c. COSALL Field/Group				
18. Availability Statement Release unlimited			19. Security Class (this Report) UNCLASSIFIED	
- 50 -			20. Security Class (this Page)	
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BIBLIOGRAPHIC DATA SHEET		1. Report No EPA-650/2-73-011	2.	3. Recipient's Accession No.
4. Title and Subtitle DIRECT DETERMINATION OF METALS IN AIR			5. Report Date August 1973, Date of Prep.	
7. Author(s) J. W. Robinson			6.	
9. Performing Organization Name and Address Louisiana State University Baton Rouge, Louisiana 70803			8. Performing Organization Report No.	
			10. Project/Task/Work Unit No 26ACK-17 1AA010	
			11. Contract/Grant No. 800866	
12. Sponsoring Organization Name and Address National Environmental Research Center Chemistry and Physics Laboratory Environmental Protection Agency Research Triangle Park, N. C. 27711			13. Type of Report & Period Covered Final 4/1/70-5/31/73	
15. Supplementary Notes Project Officer: Carole R. Sawicki NERC-RTP			14.	
<p>16. Abstracts An instrument has been developed capable of the direct determination of metals in air. No prior scrubbing or extracting of the metals from the air is necessary. Consequently, the time necessary for analysis is a matter of minutes - permitting real time analysis to be carried out on small volumes of air.</p> <p>The method was based on atomic absorption spectroscopy and involved the development of a highly efficient atomizer. The sensitivity of the method was determined to be about 10-12_g. Procedures for the direct quantitative determination of lead, mercury or cadmium in the air were developed. Calibration techniques were studied and reliable analytical techniques were developed.</p>				
<p>17. Key Words and Document Analysis. 17a. Descriptors</p> <p>Atomizer Atomic Absorption spectroscopy Trace elemental analysis Metals Air Analysis Lead Mercury Cadmium</p> <p>17b. Identifiers/Open-Ended Terms</p> <p>17c. COSATI Field/Group</p>				
18. Availability Statement Release unlimited		- 51 -		<p>19. Security Class (This Report) UNCLASSIFIED</p> <p>20. Security Class (This Page) UNCLASSIFIED</p>
				<p>21. No. of Pages 73</p> <p>22. Price</p>

INFRARED FOURIER TRANSFORM SPECTROMETRY
OF GAS CHROMATOGRAPHY EFFLUENTS

Sarraga, Leo V., McCall, Ann C.

16ADN-26

Southeast Environmental Research Laboratory
Athens, Georgia 30601

United States Environmental Protection Agency

Environmental Protection Agency

ROAP 16ADN-26
PE-1BA027

An evaluation was made of the performance of a computerized Fourier transform infrared spectrometer for the on-line measurement of the infrared spectra of GC effluents. An optimum condition for GCIR analysis was described. Detection limits of a few nanomoles were obtained for common organic compounds. The system requires between 10 and 100 nanomoles of organic substances for qualitative identification.
(Azacraga-SERL)

*Spectroscopy, *Gas Chromatography, *Analytical Techniques,
*Organic Compounds, Interferometry, Infrared Radiation

*GCIR, *Fourier Transform Infrared Spectroscopy,
*On-The-Fly Vapor Phase Infrared Spectroscopy,
Infrared Spectra, Computer Controlled

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- 52 -

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Leo V. Azacraga

EP, Southeast Env. Res. Laboratory

1. REPORT NUMBER E-1-73-4-73-102		2. PROJECT ACCESS CODE	
3. REPORT DATE December 1973 (preparation)		4. REPORT DATE	
5. SIMPLIFIED ATOMIC ABSORPTION DETERMINATION OF STABLE STRONTIUM IN MILK AND HAY: A comparison of methods and stepwise procedure		6. PERFORMING ORGANIZATION CODE	
7. AUTHOR(S) Julius Barth, NERC-Las Vegas, EPA Benjamin H. Bruckner, Center for Disease Control, NIOSH		8. PERFORMING ORGANIZATION REPORT NO. n/a	
9. PERFORMING ORGANIZATION NAME AND ADDRESS National Environmental Research Center U.S. Environmental Protection Agency P. O. Box 15027 Las Vegas, NV 89114		10. PROGRAM ELEMENT NO.	
		11. CONTRACT/GRANT NO. n/a	
12. SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U.S. Environmental Protection Agency Washington, DC 20460		13. TYPE OF REPORT AND PERIOD COVERED Final	
		14. SPONSORING AGENCY CODE	
15. SUPPLEMENTARY NOTES This work was performed at the Rockville Radiological Health Laboratory when it was a part of the National Center for Radiological Health, DHEW, under a program later incorporated into the EPA.			
16. ABSTRACT A highly simplified atomic absorption procedure for the determination of stable strontium in fluid milk, milk powder, and alfalfa is evaluated. A comparison is made between the atomic absorption method of additions and the standard curve method. A suggested stepwise procedure is given.			
17. KEY WORDS AND DOCUMENT ANALYSIS			
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group	
chemical analysis hay milk quantitative analysis strontium		07 02 / 02 01	
- 53 -			
18. DISTRIBUTION STATEMENT Release unlimited authors (NERC-LV and NIOSH), NTIS	19. SECURITY CLASS (This Report) Unclassified	21. NO. OF PAGES 32	
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BIBLIOGRAPHIC DATA SHEET	1. Report No EPA-650/4-73-003	2.	3. Recipient's Accession No
4. Title and Subtitle Determination of Coronal Ozone Production by High Voltage Power Transmission Lines		5. Report Date Issued November 1973	
7. Author(s) Frank C. Whitmore and Robert L. Durfee		8. Performing Organization Rep. No	
9. Performing Organization Name and Address Versar, Incorporated 6621 Electronic Drive Springfield, Virginia		10. Project/Task/Work Unit No Program Element 1H1326	
		11. Contract/Grant No. 68-02-0553	
12. Sponsoring Organization Name and Address Environmental Protection Agency National Environmental Research Center, RTP Quality Assurance and Environmental Monitoring Laboratory Research Triangle Park, North Carolina 27711		13. Type of Report & Period Covered Final Report	
15. Supplementary Notes Formerly Program Element 110501		14. Project Officer: Elbert C. Tabor NERC-RTP 919-549-8411	
16. Abstracts A sub-scale simulation of a high-voltage transmission line was constructed and operated in a chamber roughly 1.5 meters long by 0.5 meter in diameter to determine ozone production characteristics. Effects of voltage and corona power, conductor size and surface condition, air temperature, relative humidity, and air flow rate (wind velocity) on ozone yield were determined. Of these, corona power (voltage), relative humidity, and air flow rate exhibited significant effects on ozone yield. Averaged yield values ranged from about 3 gm/kw-hr at high humidity (75-80 per cent) to about 7 gm/kw-hr at low humidity (25-30 per cent). Application of these results to three areas of high concentration of transmission lines showed that, under minimal wind conditions, such transmission line concentrations can produce sizeable local ozone levels.			
17. Key Words and Document Analysis. 17a. Descriptors Air pollution Ozone Power transmission lines Electric corona Sources Measurement			
17b. Identifiers/Open-Ended Terms Ozone concentrations Transmission line simulation			
17c. COSATI Field/Group 13B			
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TECHNICAL REPORT DATA

REPORT NO EPA-680/4-73-001-a		2		3 RECIPIENT'S ACCESS CODE	
4 TITLE AND SUBTITLE Radioactivity Standards Distribution Program 1973-1974				5 REPORT DATE Oct. 1973 (preparation date)	
				6 PERFORMING ORGANIZATION CODE	
7 AUTHOR(S) Quality Assurance Branch, Technical Support Laboratory				8 PERFORMING ORGANIZATION REPORT NO n/a	
9 PERFORMING ORGANIZATION NAME AND ADDRESS National Environmental Research Center U.S. Environmental Protection Agency P. O. Box 15027 Las Vegas, NV 89114				10 PROGRAM ELEMENT NO 1HA327	
				11 CONTRACT/GRANT NO in-house report	
12 SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U.S. Environmental Protection Agency Washington, DC 20460				13 TYPE OF REPORT AND PERIOD COVERED interim 1973-1974	
				14 SPONSORING AGENCY CODE	
15 SUPPLEMENTARY NOTES					
16 ABSTRACT A program for the distribution of calibrated radioactive samples 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 U.S. Environmental Protection Agency's quality assurance program.					
17 KEY WORDS AND DOCUMENT ANALYSIS					
a DESCRIPTORS		b IDENTIFIERS/OPEN ENDED TERMS		c COSATI Field/Group	
quality assurance quality control radioactivity quantitative analysis calibrating standards				07 05/14 04	
- 55 -					
18 DISTRIBUTION STATEMENT Release unlimited NERC-LV, NTIS		19 SECURITY CLASS (This Report) Unclassified		21 NO OF PAGES 20	
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TECHNICAL REPORT DATA

1 REPORT NUMBER EPA-600/4-73-001-b		3 RECIPIENT'S ACCESS CODE	
2 TITLE - SUBJECT Environmental Radioactivity Laboratory Intercomparison Studies Program, 1973-1974		5 REPORT DATE December 1973 (preparation)	
7 AUTHOR(S) Quality Assurance Branch Technical Support Laboratory		8 PERFORMING ORGANIZATION REPORT NO n/a	
9 PERFORMING ORGANIZATION NAME AND ADDRESS National Environmental Research Center U.S. Environmental Protection Agency P. O. Box 15027 Las Vegas, NV 89114		10 PROGRAM ELEMENT NO 1HA327	
		11 CONTRACT/GRANT NO in-house report	
12 SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U.S. Environmental Protection Agency Washington, DC 20460		13 TYPE OF REPORT AND PERIOD COVERED interim (1973-1974)	
		14 SPONSORING AGENCY CODE	
15 SUPPLEMENTARY NOTES			
16 ABSTRACT The U.S. Environmental Protection Agency's intercomparison studies program for laboratories involved in environmental radiation measurements is described. The types of environmental samples distributed, the analysis 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 this quality assurance program.			
17 KEY WORDS AND DOCUMENT ANALYSIS			
a DESCRIPTORS		b IDENTIFIERS/OPEN ENDED TERMS	c COSATI Field/Group
quality assurance quality control quantitative analysis radioactivity statistical quality control			07 05/14 04
- 56 -			
18 DISTRIBUTION STATEMENT Release unlimited (NERC-LV, NTIS)		19 SECURITY CLASS (This Report) Unclassified	21 NO OF PAGES 27
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4. Title and Subtitle Socio-Economic Factors Affecting Demand for Municipal Collection of Household Refuse		5. Report Date August 1973	
7. Author(s) Condensed by Battelle Columbus Laboratories		6.	
9. Performing Organization Name and Address Center for Urban Studies, University of Chicago Chicago, Illinois		10. Program Element 1DA312	
		11. Contract/Grant No. EC-00281	
12. Sponsoring Organization Name and Address U.S. EPA, National Environmental Research Center Solid & Hazardous Waste Research Laboratory 5555 Ridge Avenue Cincinnati, Ohio 45268		13. Type of Report & Period Covered Final	
		14.	
15. Supplementary Notes Project Officer: Oscar Albrecht NERC-Cincinnati, Ohio 45268			
16. Abstracts The influences of the socio-economic variables, race and income, on the demand for a municipally - provided collection service of household refuse were investigated. Marked seasonal variations in the effects of income and race alone and in combination were noted. The results of the study may be interpreted to suggest that household refuse consists of two components. The basic solid waste component is independent of income and race and relatively constant throughout the year. The additional component varies seasonally and is highly sensitive to income and race except in midsummer when it appear to stem from consumption activities closely related to race.			
17. Key Words and Document Analysis. 17a. Descriptors Socio-economic Economic Demand for Refuse Collection Service			
17b. Identifiers Open-Ended Terms			
17c. COSATI Field/Group			
18. Availability Statement Unlimited distribution		19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 58
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