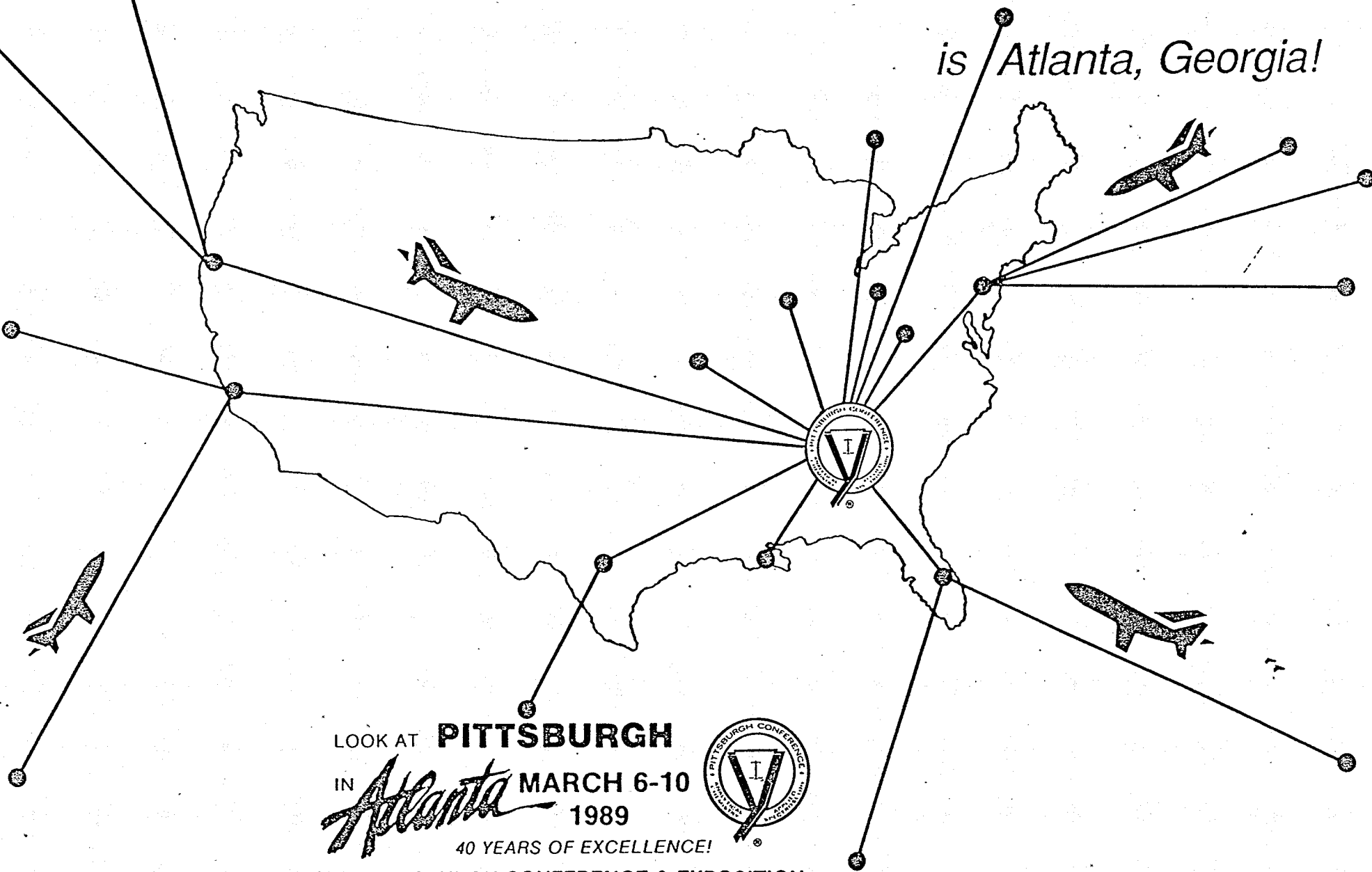


The next scheduled stop for the

PITTSBURGH CONFERENCE

is Atlanta, Georgia!



LOOK AT **PITTSBURGH**

IN *Atlanta* **MARCH 6-10**
1989

40 YEARS OF EXCELLENCE!

THE PITTSBURGH CONFERENCE & EXPOSITION



- (1394) Capital Equipment Acquisition for the Laboratory: Budgeting and Justification—J.H. GOLDEN, Lab. Management Systems, Inc.
 (1395) Molecular Modeling and the Analytical Lab Manager—B.R. Olygen Corporation

POSIUM

Water Analysis - arranged by S.L. Shockey, Consultant

Afternoon, Room 364
 Shockey, Presiding
 Introductory Remarks—S.L. SHOCKEY

- (1396) In-Situ Spectroscopy Using Optical Fibers: An Overview—J. Western Research Institute
 (1397) Soil Gas Analysis for Delineation of Groundwater Contaminants—B. KERFOOT, Lockheed Engineering & Sci. Co.
 (1398) Experiences with Evaluation of Pesticide Enzyme Assay Kits—LINER, United States Geological Survey
 RECESS
 (1399) Statistical Analysis of Groundwater Data for RCRA Compliance—ITSTONE, John Mathes and Associates, Inc.
 (1400) EPA Method Development for Analysis of Organics in water—B. LESNIK, U.S. Environmental Prot. Agency

ses of Carbohydrates, Amino Acids, and Peptides by and CZE

Afternoon, Rooms 365/366
 astiani, Presiding
 ice High School

- (1401) High Sensitivity Liquid Chromatographic Determination of rates—S.R. CARTER, Dionex Corporation
 (1402) A High Performance Liquid Chromatographic Phase for Carbohydrate Analyses—D.P. LEE, Hamilton Company
 (1403) Analysis of Carbohydrates by Liquid Chromatography with electrochemical Detection—M.E. SWARTZ, Waters Chrom. Div. Millipore Corp., Berholtzer
 (1404) Comparison of HPLC Electrochemical Detection Techniques for Determination of Carbohydrates, Amines, and Sulfur Containing Compounds—R.D. ROCKLIN, Dionex Corporation, W. Edwards
 (1405) High-Sensitivity Fluorescence Detection of Amino Acids Separated by Capillary LC and Capillary Zone Electrophoresis—S.C. BEAL, University, Y.Z. Hsieh, J. Liu, M. Novotny
 RECESS
 (1406) Analysis of NDA-Labeled Amino Acids by Open Tubular Liquid Chromatography with Electrochemical Detection—M.D. OATES, University of Carolina, Chapel Hill, J.W. Jorgenson
 (1407) A Convenient, Precise Method for Low Level Peptide or Protein Analysis and Amino Acid Analysis—J.W. MAYHEW, Beckman Instruments, Inc., Terry, J.S. Hobbs
 (1408) Fast Peptide Mapping by Reversed-Phase Liquid Chromatography—P.A. PERRONE, The Perkin-Elmer Corporation, M.W. Dong, F.L. Vandemark
 (1409) Novel Techniques for the Analysis of Peptides Using LC with photodiode Array Detection—S.A. COHEN, Waters Chrom. Div. Millipore Corp., Beverly
 (1410) Determination of Benzylpenicillin in Pharmaceutical Preparations by Capillary Zone Electrophoresis—A.M. HOYT, The University of Tennessee, M.J. Sepaniak

mic Absorption—Applications and Analysis

Afternoon, Rooms 264/265
 Arkhoff, Presiding
 Laboratories

- (1411) Mercury Analysis at PPT Levels—R. COMEAU, Questron Corporation, P.B. Stockwell
 (1412) Binding and Removal of Chromium Ions in Solution by an Immobilized Biomass—J. SNEDDON, University of Lowell, C. Pappas
 (1413) The Effect of Changing Program Requirements on a Government Environmental Trace Metals Laboratory—K.W. KUBIK, USEPA, J. Birri, L. D. Lillian

- 2:30 (1414) Development and Application of an Extractive Alkali Monitor and Its Sampling Systems for Process Stream Analysis—J.K. WACHTER, U.S. Department of Energy (METC), R.G. Logan, R.L. Pineault

- 2:50 (1415) Speciation of Urinary Arsenic into Occupational and Dietary Components: Methodology Adapted to Zeeman Flame AAS Application—S. DOMVILLE, Environmental Services, L. Desjarlais

3:10 RECESS

- 3:25 (1416) Theoretical Computation and Application of Atomic Absorption Coefficient—R.N. ZHOU, Hunan Inst. Analysis & Testing, G. Li, G.C. Rao

- 3:45 (1417) Extractive Atomic Absorption Determination of Lead in Alloys—V.M. SHINDE, The Institute of Science, B. Raman

- 4:05 (1418) Preconcentration of Lead from Aqueous Solutions by Algae with Analysis by Atomic Absorption Spectrometry—C. MAHAN, University of Texas at Austin, V. Majidi, J.A. Holcombe

- 4:25 (1419) Study Interferences in the Determination of Calcium with Simplex—R.N. ZHOU, Hunan Inst. Analysis & Testing, G.C. Rao, J.K. Cao

- 4:45 (1420) Flow Injection Donnan Dialysis - Atomic Spectrometry: Optimization and Applications—L. ALLEN, Southern Illinois University, J.A. Koropchak

Capillary Zone Electrophoresis II

Thursday Afternoon, Room 367
 D.J. Rose, Presiding
 Hewlett-Packard Labs

- 1:30 (1421) Application of Capillary Zone Electrophoresis in Biological Analysis—J. PANG, Dionex Corporation, M. Love, T. Tullisen, J.P. Rouland

- 1:50 (1422) Micro-Scale Peptide Mapping by Capillary Zone Electrophoresis and Microcolumn Liquid Chromatography—K.A. COBB, Indiana University, J. Liu, M. Novotny

- 2:10 (1423) Determination of Drugs of Abuse by High Performance Capillary Electrophoresis with UV Detection—L. HERNANDEZ, Princeton University, B.G. Hoebel, N.A. Guzman

- 2:30 (1424) Manipulation of EEO in Capillary Zone Electrophoresis—A. WAINWRIGHT, Dionex Corporation, J. Pang, J. Thayer, B. Edwards, E. Johnson

- 2:50 (1425) Capillary Zone Electrophoresis in Pharmaceuticals Analysis—S.D. FAZIO, Sandoz Research Institute, R.V. Vivilecchia, J.V. Sheridan, L.F. LeSueur, S.A. Tomellini

3:10 RECESS

- 3:25 (1426) Electrophoretic Mobility of Peptides in Free-Solution Capillary Electrophoresis—P.D. GROSSMAN, Applied Biosystems, Inc., J.C. Colburn, S.E. Moring, H.H. Lauer

- 3:45 (1427) Analysis of Proteins and Peptides by Free-Solution Capillary Zone Electrophoresis (CZE)—J.C. COLBURN, Applied Biosystems, Inc., P.D. Grossman, S.E. Moring, H.H. Lauer

- 4:10 (1428) Separation of Isotopically Substituted Compounds by Micellar Electrokinetic Capillary Chromatography—M.M. BUSHEY, University of North Carolina, Chapel Hill, J.W. Jorgenson

- 4:25 (1429) The Separation of Plant Proteins by Capillary Zone Electrophoresis—R. BLAIN, American Cyanamid, R.A. Hartwick

- 4:45 (1430) Surface Modification in Capillary Zone Electrophoresis for the Control of Solute Adsorption and Electroosmotic Flow—R.A. HARTWICK, Rutgers University, P.B. Champlin

Characterization of Superconducting Materials and Other Solids

Thursday Afternoon, Room 263
 D. Chung, Presiding
 SUNY-Buffalo

- 1:30 (1431) Monochannel Versus Multichannel Detection in the Acquisition of the Micro-Raman Spectra of Superconducting Materials—T.D. SCHROEDER, Shippensburg University of PA, E.S. Elz, S.F. Pereles

- 1:50 (1432) Investigation of Oxygen Vacancies in YBa₂Cu₃O_{7-x} Superconductors Using Redox Chemiluminescence Detection—R.E. SIEVERS, University of Colorado, B.N. Hansen, E.A. McNamara, B.M. Hybertson, S.A. Monzka, R.M. Barkley

- 2:10 (1433) Characterization of Superconductors by TGA and High Temperature DTA—S.R. SAUERBRUNN, Du Pont Instruments, P.S. Gill, C.L. Jaworski

- 2:30 (1434) The Analysis of Trace Elements in New Superconducting Materials—F. BULMAN, Baird Corporation, R.R. Comtois

- 2:50 (1435) Selection of Rare Earth Spectral Lines for the Determination of Rare Earth Elements by ICP-AES—I.B. BRENNER, Jobin Yvon (ISA), G. Vial, J. McCormack, P. Grosdailon

THURSDAY PM

1415

SPECIATION OF URINARY ARSENIC INTO
OCCUPATIONAL AND DIETARY COMPONENTS:
METHODOLOGY ADAPTED TO ZEEMAN
FLAME ASS APPLICATION

S.J. DOMVILLE, L. DERJARLAIS, E. MADSEN,
Nerco Con Mine, Bag 2000, Yellowknife
Northwest Territories, Canada X1A 2M1

Arsenic trioxide, a by-product of the ore roasting process once utilized in our gold milling operation, is currently refined through an Arsenic Reclamation Plant at Nerco Con Mine, Yellowknife, Northwest Territories, Canada. In the process of solubilization and crystallization, employees are exposed to arsenic, primarily through respiration and ingestion.

Arsenic exposure is monitored through the analysis of urine, the most reliable route of arsenic elimination. The biological monitoring program requires collection of urine both before and after exposure periods within the Plant. The focus of the program is on:

- i) Peak exposures, for short-term health concerns; and
- ii) "body burden" for long-term health concerns. Body burden is interpreted (within our program) as an upward shift in a worker's baseline urinary arsenic level after consecutive exposure periods (Figure 1.)

There are many sources for arsenic in urine, other than occupational exposure. Effective management of the biological monitoring program identified the need for urinary arsenic "speciation". The ability to differentiate occupational (or inorganic) arsenic from other sources, primarily seafood, was developed within the Environmental Services Laboratory at Nerco.

TOTAL URINARY ARSENIC (Figure 1.)

DIRECT

The greatest responsibility of the biological monitoring program is to report, on a daily basis, total urinary arsenic levels. This is achieved (no preparatory steps required) by Zeeman Flame AAS. Arsenic levels are reported in terms of creatinine output, ($\mu\text{g As/gram creatinine}$) in order to reflect kidney function and total urine output.

TOTAL DIGEST

A complimentary method, using a rigorous oxidative digestion (sulfuric acid - persulfate) has now been developed. As well as a means of confirmation, this method provides improved precision and accuracy through the extraction of arsenic into a uniform matrix (nickelous nitrate).

OCCUPATIONAL (INORGANIC) ARSENIC ONLY (Figure 1.)

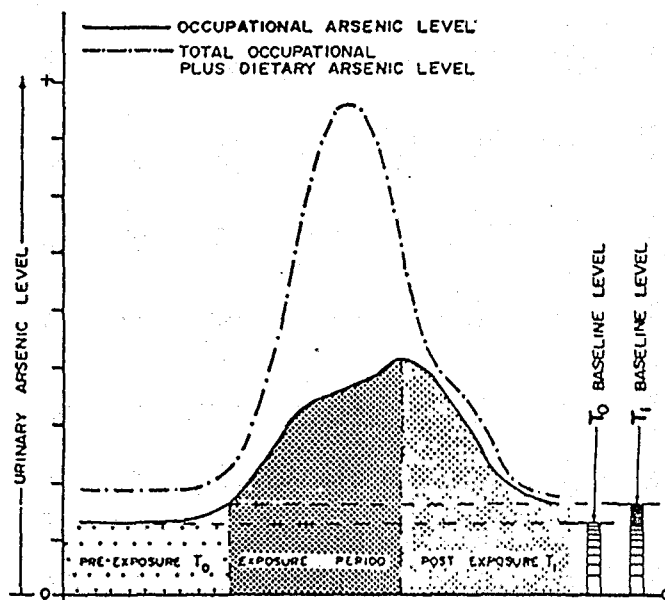
PARTIAL DIGEST

The "hydrolysable" arsenic fraction, representing occupational exposure, is differentiated from the "total" arsenic pool through an acid hydrolysis, potassium iodide reduction, solvent extraction, and back-extraction process. The dietary fraction, including arsenobetaine, is separated and removed at the solvent (toluene) extraction step. The monomethylarsonic acid and cacodylic acid species (methylated arsenic forms representing occupational exposure) are de-methylated through acid hydrolysis. Arsenic from these species is then reduced by potassium iodide, and extracted into toluene. Back-extraction into nickelous nitrate results in detection limits within the range of 30 - 50 $\mu\text{g As/Liter}$ of urine (using Zeeman Flame AAS).

Extensive quality control and interlaboratory comparison, for both "total" and "occupational" arsenic determinations, have provided employees of the Arsenic Reclamation Plant with a high level of confidence in our analytical performance and program management.

FIGURE 1.

URINARY ARSENIC SPECIATION



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