135859

RESUME: PAUL B. HUMBURG
PRINCIPAL CHEMIST

EMPLOYMENT HISTORY

- 1986 to date: Principal Chemist, metaTRACE, Inc.
- 1984 to 1986: Inorganic Laboratory Manager, Envirodyne Engineers, Inc.
- 1977 to 1984: Environmental Chemist and Safety Manager, Envirodyne Engineers, Inc.
- 1975 to 1976: Teaching Assistant, University of Missouri-St. Louis

SUMMARY OF EXPERIENCE

Mr. Humburg is an experienced chemist who brings nine years of laboratory management and analytical spectroscopy experience to his position with metaTRACE, a new, sophisticated laboratory founded in 1986 in St. Louis, Missouri. Prior to joining metaTRACE, Mr. Humburg was associated with Envirodyne Engineers as Inorganic Laboratory Section Manager, supervising wet chemistry and instrumental analyses including spectroscopy (atomic absorption, ICP, etc.) His experience includes the following:

- Safety Manager for field and laboratory tasks associated with contamination surveys performed for the U.S. Army at Detroit Arsenal, St. Louis Area Support Center and the Riverbank, Cornhusker, and Louisiana Army ammunition plants.
- Served as Internal Safety Manager and Chairman, Safety Committee at Envirodyne; responsible for establishing and implementing safety program for high-hazard laboratory and instructing laboratory personnel in safety requirements for the handling, storage and disposal of hazardous wastes.
- Inorganic Analysis Manager for contamination surveys of twelve government installations for U.S. Army Toxic and Hazardous Materials Agency (USATHAMA).
- Extensive experience performing metals analysis on soils, sediments and water; conducted trace metal analyses associated with NPDES permit programs (thallium, silver, arsenic, selenium, antimony). Verification of discharge pollutants included analysis of turn-around deadlines.
- Project Chemist (metals analyses uses) for USEPA project for the development of effluent guidelines

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and standards of performance for various industrial categories.

- Accredited by State of Missouri for metals analyses in drinking water samples.
- Manager, Inorganic Analyses for hazardous waste monitoring programs at U.S. Department of Energy's Savannah River Plant in Aiken, South Carolina.
- Manager, Inorganic Analyses for U.S. Geological Survey project to analyze samples from Aberdeen Proving Ground, MD; analysis of samples from the Great Lakes region; and water quality testing programs conducted by the U.S. Army Corps of Engineers (St. Louis).
- Assisted with internal tracing procedures using dyes and a Perkin-Elmer 100 x-ray unit while stationed at the 21st General Hospital, Ft. Leonard Wood, Missouri.

EDUCATION

B.S., Chemistry, University of Missouri-St. Louis, 1977.

PROFESSIONAL DATA

- Member-American Chemical Society, Society for Applied Spectroscopy

RESUME: EUGENE M. WATSON
CHEMIST

EMPLOYMENT HISTORY

- 1986 to date: Chemist, metaTRACE, Inc.
- 1985 to 1986: GC Chemist, Gulf Coast Laboratories
- 1982 to 1984: Laboratory Assistant, Blackburn College

SUMMARY OF EXPERIENCE

Mr. Watson is an experienced chemist in the areas of gas chromatography, gas chromatography/mass spectrometry, and general wet chemistry. Specific examples of his proficiency are listed below.

- Performed extraction, analysis and documentation of volatile organic acids, base neutrals/acids, polychlorinated biphenyls, hydrocarbons and other organic compounds in matrices that included water, waste, soils, and foods.
- Performed dioxin analyses by GC/MS for metaTRACE USEPA contract for rapid response dioxin analyses; project required 16 hour turnaround of results.
- Performed gas chromatography analyses for Weldon Spring Sites Remedial Action Project.
- Experienced in performing analyses within guidelines of a strict quality assurance/quality control program that meets or exceeds USEPA Contract Laboratory Program requirements.
- Methodologies utilized include USEPA Methods 601, 602, 604, 624, and 625.
- Designed and implemented scheduling process for organic chromatography division.
- Conducted field sampling; collaborated on analytical research projects.
- Experienced in operation/maintenance of Hewlett-Packard 5890 and 5880 GC; Perkin Elmer 410 HPLC; Hewlett-Packard 5890 and 5995 GC/MS; Perkin Elmer Sigma 3B and 8410 GC; Tracor 565 GC; Varian 3700 GC; Tekmar LSC-2 and LSC-3 concentrators.

- Experienced in analysis of environmental samples using Alpha/Beta Proportional Counter.

EDUCATION

B.A., Biology (minor Chemistry), Blackburn College, 1984.

RESUME: ELAINE M. HOLLAND
RADIOCHEMIST; RADIATION SAFETY OFFICER

EMPLOYMENT HISTORY

- 1986 to date: Radiochemist, metaTRACE, Inc.
- 1980 to 1985: Chemist, Goodyear Atomic Corporation, Piketon, OH
- 1978 to 1979: Teacher, Waverly City Schools, OH

SUMMARY OF EXPERIENCE

Ms. Holland is an experienced Chemist formerly with the Goodyear Atomic Corporation in Piketon, Ohio, where she was responsible for performing routine chemical analyses and methods research and development. She trained personnel in proper analytical techniques and safe handling practices of radioactive and hazardous materials. Aside from her radiological chemistry duties at metaTRACE, she serves as the company's Radiation Safety Officer. Some of her accomplishments are as follows:

- Skilled in a wide range of analytical methods with over six years of experience in analytical techniques and instrumentation.
- Experienced in training personnel in accepted laboratory and radiological practices.
- Consolidated, edited and revised analytical procedures used in Chemical Analysis Department at Goodyear Atomic Corporation.
- Constructed, installed and operated state-of-the-art gamma spectrometer.
- Installed, calibrated and operated state-of-the-art inductively-coupled plasma spectrometer.
- Six years experience analyzing fissionable materials for specific isotopes and total activity; included an equal balance between general wet chemistry methodology and instrumentation (gamma spectrometry, alpha spectroscopy, counting techniques, liquid scintillation analysis).
- Performed radio-pharmaceutical analyses; experienced in handling curie levels of radioisotopes.
- Extensive experience in low-level alpha, beta and gamma radionuclide detection in environmental samples.

ELAINE M. HOLLAND (continued)

EDUCATION

B.S., Education (Science), Ohio State University, Cum Laude, 1978

PROFESSIONAL DATA/PUBLICATIONS

- Member, American Chemical Society
- Publication: "Comparison of Several Analytical Techniques for the Determination of Technetium in the Eluants of Commercially Available 99MO/99TC Radionuclide Generators", with M.E. Holland, W. R. Heineman and E. Deutsch, Int. Jour. Applied Rad. and Isotopes, Vol. 37, No. 2, pp. 165-171, 1986.

RESUME: ALLEN M. FIELD
ENVIRONMENTAL PROJECT MANAGER

EMPLOYMENT HISTORY

- 1987 to date: Environmental Project Manager, metaTRACE, Inc.
- 1985 to 1986: Equipment Evaluator/Master Equipment List Leadman, Illinois Power Company
- 1980 to 1983: Director Environmental/Right of Way Departments, Soyland Power Cooperative

SUMMARY OF EXPERIENCE

Mr. Field brings 5 years of technical experience to metaTRACE, Inc. He serves as Environmental Project Manager, acting as liaison between the laboratory and metaTRACE clients. Significant achievements in his career include the following:

- Project Manager for environmental analysis projects for industrial/governmental clients involving both inorganic and organic analyses; assures that all client requirements are followed and is responsible for the reporting of all results, QC procedures, etc.
- Obtained construction and operation permits for power plant and tranismission facilities; conducted public and interagency information meetings to gain acceptance of corporate projects.
- Provided liaison to federal, state and local regulatory agencies and coordination with architect/engineer firms to incorporate pollution control requirements.
- Selected power plant sites; performed appraisal services for property values; negotiated real estate acquisitions and managed corporate real estate holdings.
- Compiled and classified mechanical and electrical components and instrumentation utilizing design drawings, equipment lists, vendor manuals, plant modifications, purchasing and receiving records, and various nuclear codes and standards.
- Performed auditing and field verification of computer records and walking down plant systems to ensure that installed equipment complied with data base records, design standards and safety requirements

ALLEN M. FIELD (continued)

Education

M.S., Zoology, Eastern Illinois University, 1982.
B.S., Environmental Biology, Eastern Illinois University, 1974.

RESUME: RICHARD H. MANNZ
MANAGER, ENVIRONMENTAL PROGRAMS

EMPLOYMENT HISTORY

- 1986 to date: Manager of Environmental Programs, metaTRACE, Inc.
- 1985 to 1986: Program Manager, Envirodyne Engineers
- 1980 to 1985: Corporate Biologist, Peabody Coal Co.
- 1978 to 1980: Assistant Chemist, Peabody Coal Co., Central Laboratory
- 1978: Pharmacy Technician, Barnes Hospital, St. Louis, MO

SUMMARY OF EXPERIENCE

Mr. Mannz brings eight years of technical and laboratory experience to metaTRACE, Inc., a newly formed analytical laboratory in St. Louis, Missouri. As Manager of Environmental Programs, he is responsible for implementation and fulfillment of analytical contracts from government and private industry sources; direct projects to ensure that technical goals, quality assurance requirements, internal and external scheduling, and costs are coordinated to successfully complete a project. He also arranges preparation of final reports and invoices for services completed; coordinates with the laboratory manager, section managers and client project managers to meet both client and in-house goals. He most recently served as a Project Manager for Envirodyne Engineers. His experience includes the following:

- Project Manager for the Illinois Environmental Protection Agency Contract Laboratory Program for the analysis of samples from state and federal Superfund sites.
- Managed and coordinated all phases necessary in the DuPont Project SRP Groundwater Monitoring Program, a network of 180 wells sampled quarterly for groundwater monitoring programs.
- Project Manager for the laboratory analyses for a U.S. Navy program involving the characterization of three fuel station sites.

RICHARD H. MANNZ (continued)

- Corporate Biologist duties at Peabody Coal Company included producing environmental documents for various regulatory requirements; water chemistry monitoring and interpretation; aquatic and terrestrial taxonmic identification, interpretation and technical writeup; participated in planning, organizing and budgeting departmental activities.

- Mr. Mannz performed general inorganic laboratory analyses including atomic absorption, electrode analyses, gravimetric procedures and other environmental analytical procedures as an Assistant Chemist with the Peabody Coal Company, Central Laboratory in Freeburg, Illinois.

- Mr. Mannz has presented and published several scientific papers and a book on various environmental topics.

EDUCATION

M.S., Environmental Science, Southern Illinois University at Edwardsville, 1984.

B.S., Majors in Environmental Biology and Zoology/Chemistry Minor, Eastern Illinois University, 1977.

RESUME: CHRISTOPHER D. SCARPELLINO
QUALITY ASSURANCE MANAGER

EMPLOYMENT HISTORY

- 1988 to date: Quality Assurance Manager, metaTRACE
- 1982 to 1988: Senior Scientist, EG&G Idaho, Inc.
- 1978 to 1982: Research Assistant, Univ. of Iowa

SUMMARY OF EXPERIENCE

Mr. Scarpellino has 10 years of experience in environmental chemistry and engineering. His wide range of experience includes project management, quality assurance/quality control and research. Highlights of his career include the following:

- Served as Quality Assurance Officer for the EG&G INEL Hazardous Waste Site Evaluation Program, associated with Consent Order/Compliance Agreement between DOE-ID and EPA Region X; assisted in the development of computer-based data management system for chemical analytical data validation, verification and evaluation to satisfy requirements of EPA Contract Laboratory Program; reviewed analytical results, assisted in sampling and analysis plan development; provided oversight of field QA efforts.

- Task Manager of independent laboratory verification program for DOD demonstration project to evaluate electrical transformer PCB retrofill technologies designed to achieve reclassification of transformers to non-PCB status.

- Program Coordinator for EG&G SARA Title III Compliance Program to ensure compliance with Federal, state and local right-to-know regulations, including worker training and MSDS tracking systems, and hazardous materials inventory system.

- Program Manager for DOD Hazardous Waste Analysis Plan Update including detailed hazardous waste sampling and analysis plan development to meet EPA and State of California regulations; provided contractual guidance and subcontracting services for laboratory analyses, and modifications of hazardous waste inventory and worker right-to-know documentation systems.

- Provided technical review and evaluation of chemical sampling and analyses for DOD industrial waste collection system evaluation and DOD dioxin incineration program including full-scale EPA trial burn, and delisting of residual material.

CHRISTOPHER D. SCARPELLINO
(continued)

o Member, initial task force to determine RCRA compliance status of EG&G/INEL facilities.

EDUCATION

M.S., Civil and Environmental Engineering, University of Iowa, 1982.

B.S., Fisheries and Wildlife Biology, Iowa State University, 1977.

PROFESSIONAL DATA

Member, American Chemical Society (since 1978), American Society for Testing and Materials (since 1983).

RESUME: KENNETH J. BAUGHMAN
ASSISTANT VICE PRESIDENT
MANAGER, PROJECT ADMINISTRATION

EMPLOYMENT HISTORY

- 1987 to date: Assistant Vice President and Manager, Project Administration, metaTRACE, Inc.
- 1985 to 1987: Supervisor, Organic Analysis Group, Western Research Institute
- 1983 to 1985: Senior Scientist, Lockheed Engineering and Management Services Company
- 1980 to 1983: Scientist/Organic Analysis Coordinator, Radian Corporation
- 1979 to 1980: Laboratory Manager, Enviro-Med Laboratories, Inc.
- 1975 to 1979: Forensic Chemist, Louisiana State Police Crime Laboratory

SUMMARY OF EXPERIENCE

Mr. Baughman is an Assistant Vice President of metaTRACE, Inc., a new and highly sophisticated analytical laboratory in St. Louis, Missouri. He also holds the position of Manager of Project Administration with supervisory responsibilities for all metaTRACE Program/Project Managers.

He brings to metaTRACE 12 years of experience in GC, GC/MS and HRMS analytical procedures and methodology, high hazard analyses and laboratory quality assurance. His experience includes the following:

- Drafted and implemented USEPA's high concentration organic protocol and managed one of only three CLP laboratories to provide this service to EPA.
- Designed and developed a part-per-trillion dioxin/furan methodology and capability for GC/HRMS.
- Rewrote the USEPA Contract Laboratory Protocol for low/medium organics analysis.
- Served as technical expert during USEPA pre-award and post-award on-site laboratory evaluations.
- Served as USEPA (EMSL-LV) technical representative at numerous national EPA caucuses and conferences on analytical methods, protocol revision and data review

KENNETH J. BAUGHMAN (continued)

- Implemented and managed EPA CLP contract which included numerous Special Analytical Services (SAS) projects for specialized analyses.

- Performed complex chemical analyses utilizing both Finnigan and Hewlett-Packard GC/MS systems. Experienced in mass spectral interpretation, data review, quality control, data validation and reporting.

EDUCATION

B.S. Biology, University of New Mexico, 1974
Advanced Courses in Chemistry, University of Virginia, 1978.
Advanced Courses in Chemistry, University of Texas, 1980.
Numerous short courses, 1975-1984.

PUBLICATIONS

R.L. Spraggins, R.G. Oldham, K.J. Baughman and C.L. Prescott, "Organic Analysis Using High-Temperature Purge and Trap Techniques," Advances in the Identification and Analysis of Organic Pollutants in Water, Lawrence H. Keith ed., p. 747.

R.D. Cox, K.J. Baughman and R.D. Earp, "A Generalized Screening and Analysis Procedure for Organic Emissions from Hazardous Waste Disposal Sites," Management of Uncontrolled Hazardous Waste Sites, 1982, Third National Conference.

"A Comprehensive Scheme for Auditing Contract Laboratory Data-Military 105 D," K.J. Baughman, J.C. Fan, J.W. Fowler, F.C. Garner, K.S. Kumar and M.T. Homsher, Lockheed Engineering and Management Co., J.M. Moore and J.G. Pearson, US Environmental Protection Agency-Environmental Monitoring Systems Laboratory, Las Vegas, NV. Presented at American Society of Quality Control, Raleigh, NC, September 12, 1984.

L.P. Jackson, W.E. Blanton, S.L. Chong and K.J. Baughman, "Characterization of Solid Wastes from Conventional Coal Combustion Processes," 1986, US Dept. of Energy, Morgantown Energy Technology Center, Report of Investigations, Contract Number DE-AC21-84LC11059.

RESUME: . T. WILL SOLOMON
ASSISTANT VICE PRESIDENT

EMPLOYMENT HISTORY

- 1986 to date: Assistant Vice President, metaTRACE, Inc.
- 1984 to 1986: Manager of Laboratory Operations, Envirodyne Engineers, Inc.
- 1979 to 1984: Manager, Pesticide/Contaminant and Vitamin, Drug and Nutrient Laboratory; Hazardous Waste Manager; R&D Safety Manager; Radiation Safety Officer, Ralston Purina Company
- 1973 to 1979: Group Leader/Analytical Chemist, Ralston Purina Company

SUMMARY OF EXPERIENCE

Mr. Solomon brings 12 years of technical and laboratory management experience to metaTRACE, a state-of-the-art analytical laboratory in St. Louis, Missouri. He has extensive knowledge of organic and inorganic instrumental analyses, quality assurance protocols and laboratory safety. Most recently, he served as Operations Manager of the Envirodyne Engineers laboratories. His experience includes the following:

- Project Manager for metaTRACE USEPA contract for the rapid response analysis of dioxin; contract involves analysis of up to 100 samples per day by GC/MS with analyses completed within 16 hours of sample receipt.
- Manager, Organic Analyses for basin characterization studies and groundwater monitoring program at the U.S. Department of Energy's Savannah River Plant in Aiken, South Carolina.
- Coordinated laboratory analyses of samples collected at hazardous waste sites nationwide under USEPA Contract Laboratory Program.
- Organic Analysis Manager for samples collected during environmental contamination surveys at U.S. Army installations nationwide for the U.S. Army Toxic and Hazardous Materials Agency.
- Project Manager for dioxin analysis of samples collected at various Missouri sites for USEPA Region VII.

T. WILL SOLOMQN (continued)

- Manager of Ralston Purina pesticide/contaminant laboratory which included pesticide residues, PCBs, PBBs, Aflatoxin, priority pollutants, environmental residues and other miscellaneous fat soluble analyses.

- Developed and managed hazardous waste management program including the ordering, storage, distribution handling and disposal of hazardous materials; has working knowledge of local, state and federal regulations, including Department of Transportation requirements.

- Developed and implemented laboratory safety program (including medical surveillance) and emergency procedures.

EDUCATION

M.A., Business Administration, Webster University, 1980.
B.S., Chemistry, University of Missouri, 1971.

PROFESSIONAL DATA/PUBLICATIONS

- Member, Association of Official Analytical Chemists (Quality Assurance and Safety Committees), American Chemical Society.

- Past Member, Executive Committee, National Safety Council R&D Section; Advisory Board, National Safety Council, St. Louis Section.

RESUME: ROXANNE PATTERSON
RADIOLOGICAL SAMPLE PREPARATION

EMPLOYMENT HISTORY

- 1988 to date: Radiological Sample Preparation Supervisor, metaTRACE, Inc.
- 1985 to 1988: Supervisory Analyst, Radiochemistry, University of Iowa Hygienic Laboratory
- 1983 to 1985: Technician, Environmental Microbiology, University of Iowa Hygienic Laboratory
- 1979 to 1983: Technician, Department of Pathology, University of Iowa Hospitals/Clinics

SUMMARY OF EXPERIENCE

Ms. Patterson is an experienced radiochemistry supervisory analyst formerly associated with the University of Iowa Hygienic Laboratory in Iowa City, Iowa. Her experience includes the following:

- Conducted gamma spectroscopy analyses of samples under Nuclear Regulatory Commission contract.
- Performed radiochemical analyses of environmental samples for NRC, Iowa State Department of Natural Resources and private sector clients.
- Compiled radiochemical data; formulated reports of data to clients.
- Conducted nitrate analyses of drinking water samples using Technicon Autoanalyzer II.
- Performed microbiological, chemical and microscopic analyses of water and milk samples.
- Prepared specimens for hematology and chemical analysis.

EDUCATION

Iowa Methodist School of Nursing, Des Moines, IA, 1967-68.
University of Iowa, Iowa City, IA, 1982.

SUMMARY OF PROJECT EXPERIENCE

SUMMARY OF PROJECT EXPERIENCE

Procurement Activity/Contracting Officer
MK-Ferguson Company
(for US Department of Energy)
Weldon Spring, MO
Subcontract Administrator: Ken Lee (314)441-8086

Contract No./Type
3589-1002-1978/Unit Pricing-Not to Exceed

Award Cost/Final Cost
1) FY 87: $950,000/$420,000
2) FY 88: $1,226,000 not to exceed
3) FY 89: $700,000 not to exceed

Period of Performance
1) FY 87: 3/87-11/87
2) FY 88: 12/87-9/88
3) FY 89: 9/88-9/89

The MK-Ferguson Company is the Project Management Contractor for the US Department of Energy for the Weldon Spring Sites Remedial Action Project (WSSRAP). An extensive, ten-year, $397 million remediation program to decontaminate the site was begun in 1986. The Weldon Spring Site incorporates a mothballed uranium feed materials production plant, a nearby quarry and adjacent properties and environs. Actions will be directed toward remediating soils, sediments, waters and structures contaminated primarily by low levels of natural uranium and thorium, TNT, and asbestos.

metaTRACE was selected to analyze environmental samples from the site for chemicals, explosives and radiological contaminants so that MK-Ferguson can plan, monitor and certify cleanup actions. Large numbers of environmental samples have been analyzed for such parameters as natural uranium, isotopic thorium, radium 226 and 228, priority pollutants, TNT, DNT, and asbestos. metaTRACE has developed and maintains a rigorous quality assurance/quality control program for this project which is closely monitored by MK-Ferguson.

A unique aspect of this project has been massive data management requirements. metaTRACE developed and implemented a remote data transfer system to expedite the flow of data to the client and insure data quality. All quality assured analytical data in our Laboratory Information Management System (LIMS) computer is transmitted daily to the client's computer system via a modem. Thus, on a daily basis, the client has direct access to the most recent validated analytical results and is able to make rapid assessments of ongoing work and initiate field ch ry, during the course of on-site activities.

Procurement Activity/Contracting Officer
E.I. duPont de Nemours & Co., Inc.
Savannah River Plant, SC
Contracting Officer: M.B. Spletzer (803)725-2433

Contract No./Type
AX-843925/Indefinite Quantity

Award Cost/Final Cost
not to exceed $3,557,000/ work in progress

Period of Performance
5/88-5/91

metaTRACE was selected to provide sampling and analytical support to a series of different projects at the DOE's Savannah River Plant. The scope of work ranges from a background soil study to the analysis of samples from areas contaminated with constituents of both chemical and radiological origin. The analyses performed include the complete range of radiochemical parameters from fission products via gamma spectroscopy to the naturally occurring Uranium chain nuclides using alpha spectrometry; ICP and AA metals; physical characteristics; and Appendix VIII compounds. All analyses involve electronic transfer of data. The specific parts of this project are detailed below.

Release Order No. 1 - 7: Background Soils Study which involves the inorganic and radiochemical characterization of various sites and development of appropriate inorganic sampling protocol for metals analyses.

Release Order No. 8: Analysis of soils samples from the Separation F Area A-Line for volatile organics, metals and radiochemical parameters.

Release Order No. 9: Analysis of soil cores from the 716-A Motor Shop Seepage Basin and the D-Area Oil Basin for organic, inorganic and radiochemical parameters, including EP Toxicity Extraction and analyses.

Release Order No. 10: Analysis of soils from the Burning Rubble Pits for organic and inorganic analyses. All parameters required Contract Laboratory Program (CLP) Protocol for data generation ands reporting.

Release Order No. 11: Analysis of archived soil samples from the L-Area Oil and Chemical Basin for a full set of radiochemical parameters.

Release Order No. 12: Analysis of radioactively contaminated water samples from the F and H Area Seepage

Basins for physical, inorganic and radiochemical parameters. Gamma spectrometry data were required two weeks from sample receipt.

Procurement Activity/Contracting Officer
Law Environmental, Inc.
Kennesaw, GA
Project Manager: D. Collier Jackson (404)421-3400

Contract No./Type
87063/Unit Pricing

Award Price/Final Cost
$65,000/$65,000

Period of Performance
8/87-2/88

Law Environmental, Inc., under contract to the US Army Corps of Engineers, performed a remedial investigation to establish the extent of surface contamination at the Weldon Spring Training Area, Weldon Spring, Missouri. metaTRACE performed all chemical analyses on soil, sediment and surface water samples required for this investigation. Soil/sediment samples were analyzed for volatile organics, semi-volatile organics, nitroaromatics, sulfur, dioxin (2,3,7,8-TCDD isomer), DDT and RCRA metals. Surface water samples were analyzed for volatile organics, semi-volatile organics, nitroaromatics, nitrate, sulfate and RCRA metals.

Procurement Activity/Contracting Officer
US Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, MD
Contracting Officers Rep.: Mary Ann Ryan
(301) 671-3348

Contract No./Type
Contract No. DAAA15-87-D-0014/Indefinite Quantity

Award Cost/Final Cost
$10,000,000/ongoing

Period of Performance
8/87-8/92

The US Army Toxic and Hazardous Materials Agency (USATHAMA) has an ongoing requirement to identify and quantify products and byproducts which may be found on or near military installations as a result of past or ongoing manufacturing, demilitarization, testing, storage or disposal operations. The extent of specific contamin ntification of potential sources is importa to implement

or improve comprehensive cleanup programs. In addition, USATHAMA monitors the progress at installations where remedial investigations have been completed. metaTRACE is providing analytical laboratory services in support and implementation of various installation restoration programs. Under this contract, metaTRACE is analyzing soil, surface water, groundwater, sediment, and air samples to define the areas and level of contamination. The analytical data provided by metaTRACE is being used to determine the extent of contamination at installations, determine possible sources of contamination, and determine the potential for contamination migration. All data produced is of a quality which may be used in litigation.

Procurement Activity/Contracting Officer
USEPA
Washington, DC
Contracting Officer: Angelo Carasea (202)382-3115

Contract No./Type
Contract No. 68-01-7441/Indefinite Quantity

Award Cost/Final Cost
$7,800,000/ongoing

Period of Performance
7/87-7/92

metaTRACE was awarded the rapid response dioxin analysis contract for the USEPA. metaTRACE is analyzing environmental samples by HRGC/LRMS for the presence of dioxin to support USEPA Region VII remedial action programs. This contract calls for analyses to be completed within 16 hours of sample receipt and transmitted electronically to the USEPA Region VII Kansas City office. metaTRACE has analyzed soil samples at the rate of 100 per day with samples being received by 2:00pm with results transmitted electronically to the client by 6:00am the following morning.

Procurement Activity/Contracting Officer
Dames & Moore, Inc.
(for US Navy)
Bethesda, MD
Project Manager: Dr. Steve Lemont (301)652-2215

Contract No./Type
Not Applicable/Unit Pricing

Award Price/Final Cost
$120,000/$120,000

Period of Performance
3/87-11/88

Dames & Moore, under contract to Martin Marietta for the US Navy, is performing site contamination surveys at Naval and Air Force installations. Phase I involved a survey of the Great Lakes Naval Training Center near Chicago, IL. metaTRACE performed all chemical analyses required for this survey. The survey focused on six areas of concern at the training center and involved the analysis of groundwater samples from 52 monitoring wells for TDS, TOC, volatile organics (method 624), chloride, zinc, iron, lead, mercury, oil and grease, PCBs, chromium and tetraethyl lead. In addition, metaTRACE analyzed 86 soil samples for lead, zinc, chromium and volatile organics (method 624). This project required that metaTRACE receive laboratory certification from the Naval Energy and Environmental Support Activity (NEESA) in Port Hueneme, CA.

Procurement Activity/Contracting Officer
USEPA Contract Laboratory Program
Washington, DC
Project Officer: Angelo Carasea (202)382-3115

Contract No./Type
Contract No. 68-01-7417/Indefinite Quantity

Award Cost/Final Cost
$869,000/ongoing

Period of Performance
7/87-7/90

metaTRACE is a participant in the USEPA Contract Laboratory Program, performing GC/MS analysis of organics in multimedia samples. This three year contract involves the analysis of organics (priority pollutants, HSLs, pesticides/herbicides) in solid and liquid matrices using GC/MS and GC procedures.

Procurement Activity/Contracting Officer
Law Environmental, Inc.
(for US Army Corps of Engineers)
Kennesaw, GA
Project Manager: Louis Karably (404)421-3400

Contract No./Type
87063/Unit Pricing

Award Price/Final Cost
not to exceed $30,280/$30,280

Award Price/Final Price
$27,000/$27,000

Period of Performance
5/88-8/88

CBC Environmental Services was under contract to perform an investigation of potential groundwater contamination at a hazardous waste landfill in Wisconsin. metaTRACE performed Appendix IX organic analyses on a monthly basis for this investigation. Groundwater monitoring samples were analyzed for volatile organics, semivolatile organics, pesticides/PCBs and chlorinated herbicides.

Procurement Activity/Contracting Officer
Engineering-Science
Atlanta, GA
Project Manager: Jimmy Duncan/Robert Thoem (404)325-0770

Contract No./Type
Not Applicable/Unit Pricing

Award Price/Final Price
1) Michigan ANG: $50,000/$50,000
2) Chanute AFB : $100,000/$100,000

Period of Performance
1) Michigan ANG: 9/87-9/88
2) Chanute AFB: 12/87-6/88

Engineering-Science was under contract to the US Air Force and the Michigan Air National Guard to perform contamination investigations at two facilities. Martin Marietta Corporation provided quality assurance oversight for both sites: Chanute AFB (IL) and the Michigan Air National Guard Base. metaTRACE was under contract to Engineering-Science to perform all analytical aspects of the investigations. Analyses performed on water and soil samples include conventional priority pollutant analyses (volatiles, semi-volatiles, and metals. metaTRACE was successful in obtaining laboratory certification from Martin Marietta prior to performing these analyses.

Procurement Activity/Contracting Officer
Viar & Company
Alexandria, VA
Project Administrator: Tony Nesky (703)557-2490

AR401101

Contract No./Type
3791F/Unit Pricing

Period of Performance
8/87-6/88

Law Environmental, Inc. conducted a site assessment of the Fire Fighting Area/Drum Storage Area, Fort Bliss, TX. This investigation was performed for the US Army Corps of Engineers. metaTRACE performed all chemical analyses on soil samples collected from these areas. Soil samples were analyzed for purgeable aromatic hydrocarbons, purgeable halocarbons, barium, cadmium, chromium, lead, silver, arsenic, mercury and selenium.

Procurement Activity/Contracting Officer
EG&G Idaho, Inc.
Idaho Falls, ID
Project Officer: Larry Croft (617)924-9061

Contract No./Type
C87-131450/Fixed Price

Award Price/Final Price
$192,865/$192,865

Period of Performance
3/88-11/88

EG&G Idaho, under contract to the US Department of Energy, is responsible for the operation and management of the DOE's Idaho National Engineering Laboratory (INEL) in southeastern Idaho. Under subcontract to EG&G, metaTRACE was responsible for the collection and analysis of environmental samples from the Army Materials Technology Laboratory (AMTL) in Watertown, MA. Samples included surface soils, subsurface soils, sludges, water, composite dust samples and particulate air samples. metaTRACE analyzed additional samples collected from sediments, cores and water resulting from monitoring wells and geophysical survey coreholes. All sampling and analysis activities followed procedures established by the US Army Toxic and Hazardous Materials Agency (USATHAMA). USATHAMA certification was required prior to performing any analyses under this subcontract. Besides chemical parameters, metaTRACE analyzed samples for radiological parameters (gamma spectrum, gross alpha and pure beta emitters, and transuranics).

Procurement Activity/Contracting Officer
CBC Environmental Services
Oak Creek, WI
Project Manager: Sue Lipo (414)764-7005

Contract No./Type
NA/Unit Pricing

Award Price/Final Cost
$33,300/$33,300

Period of Performance
5/87 - 6/87

Viar is the Sample Management Office for the EPA Contract Laboratory Program (CLP). Through the Special Analytical Services (SAS) Program, metaTRACE analyzed soil, sludge and water samples, including many difficult matrices. All samples were analyzed for the full spectrum of organic and inorganic compounds, plus complete radiochemical analyses for natural series Uranium-Thorium nuclides and fission products. All work required CLP Data Package deliverables.

Procurement Activity/Contracting Officer
ERT Inc.
Concord, MA
Project Administrator: William Doerr (617)369-8910

Contract No./Type
88015/Unit Pricing

Award Price/Final Cost
$29,000/$33,850

Period of Performance
9/87 - 5/88

ERT contracted metaTRACE to provide full analytical support for the initial investigation of a contaminated ore producing site in Ohio. This was an extensive project, involving direct monitoring of radiation levels on site, surveys, air monitoring and the direction of all sample collection activities. Sample matrices included water, soil, air filters and solid ore, analyzed for Isotopic Uranium, Thorium, Radium, Lead and Polonium 210, with many samples analyzed on a rush basis. metaTRACE also participated in a joint study with the U.S. Nuclear Regulatory Commission (NRC) through Oak Ridge Associated Universities (ORAU). The purpose of the study was to validate metaTRACE's data by analyzing blind samples prepared by ORAU, and verify the results for NRC's approval.

Procurement Activity/Contracting Officer
Confidential Client

Contract No./Type
NA/Unit Pricing

Award Price/Final Cost
$101,215/$101,215

Period of Performance
2/88 - 3/88

Two major beverage manufacturers contracted metaTRACE to provide analytical support in response to potential contamination of consumer products. The suspected contaminant was Polonium 210, which is used in static eliminator guns for cleaning the cans prior to filling them with product. This project required developing methodologies appropriate to unusual matrices. All work was performed on an emergency basis, with results available in less than twenty four hours in many cases. Through metaTRACE's efforts, the manufacturers were able to certify their products free from radiological contamination and continue production.

Procurement Activity/Contracting Officer
Confidential Client

Contract No./Type
NA/Unit Pricing

Award Price/Final Cost
$8000/$8400

Period of Performance
10/87 - 11/87

Through an independent consultant, metaTRACE was contracted to provide analytical support on a site investigation for a major pharmaceutical manufacturer. Prior to beginning new construction, our client had to demonstrate to the Nuclear Regulatory Commission's satisfaction that previous work had not contaminated an adjacent area. A complete radiochemical soil investigation was performed, including isotopic analyses of the Uranium and Thorium series radionuclides.

Procurement Activity/Contracting Officer
E.I. duPont de Nemours & Co., Inc.
Savannah River Plant, SC
Contracting Officer: M.B. Spletzer (803)725-2433

Contract No./Type
AX-798814/Indefinite Quantity

Award Cost/Final Cost
not to exceed $125,000/$5,000

Period of Performance
9/87-2/88

metaTRACE was selected as the analytical subcontractor to duPont at the DOE's Savannah River Plant for the DOE (HQ) Environmental Survey project. As part of this survey, metaTRACE analyzed water; soil-sediment; sludge; waste; vegetation; crustaceans; deer bone, flesh and thyroid tissues; and raccoon bone, flesh, and thyroid tissues for various constituents. Parameters/methods included drinking water metals; TCLP metals; ICP metals; gross alpha, beta; gamma spectroscopy; tritium; 129-I; 99-Tc; 90-Sr, U(T); 14-C; HTO; SO_4; NO_3; Fl; Cl; CN; corrosivity; volatile organics; semi-volatile organics; TCLP extractable organics; pesticides; PCBs; etc.

Procurement Activity/Contracting Officer
Donahue, Rajkowski, Hansmeier
(for confidential client)
St. Cloud, MN
Project Manager: Mr. Paul Rajkowski (612) 251-1055

Contract No./Type
Not Applicable/Unit Pricing

Award Price/Final Price
$25,000/$25,000

Period of Performance
4/87-4/87

Under extremely fast-turnaround requirements, metaTRACE sampled and analyzed 18 groundwater and soil samples for various pesticides and herbicides for a pilot scale monitoring program to assess non-point groundwater contamination by agrichemicals. Three methods were utilized for these analyses: GC/MS, EPA 608 (fluorisil), and an internally developed method for chloramban analysis. All analyses were completed within 2 weeks.

Procurement Activity/Contracting Officer
Confidential Client
St. Louis, MO

Contract No./Type
Not Applicable/Unit Pricing

Award Price/Final Price
$21,000/$21,000

Period of Performance
3/87-3/87

A major St. Louis industrial concern re[illegible] round analysis of 32 soil samples to assess potential [illegible] ation

at a wood preserving facility. metaTRACE completed the analyses for pentachlorophenol in 72 hours. All analyses were conducted by GC/MS (EPA Method 8250) and included all internal quality control.

Procurement Activity/Contracting Officer
TRC Environmental Consultants, Inc.
(for Hamilton Standard Co.)
E. Hartford, CT
Project Manager: Eileen D'Amico (201)289-8631

Contract No./Type
Not applicable/Unit Pricing

Award Cost/Final Cost
$16,000/$16,000

Period of Performance
1/87-3/87

TRC Environmental Consultants conducted treatability studies and pilot plant investigations for the Hamilton Standard Company to evaluate the efficiency of a persulfate oxidation process for destroying organic compounds. Hamilton Standard is developing a waste treatment system for use in NASA's space station. metaTRACE analyzed standards prior to injection into the system and analyzed the final effluent for volatiles and semi-volatiles (by GC/MS). In addition, metaTRACE performed various GC analyses for alcohols, amines, phenols and phthalates; TOC; and other parameters by ion chromatography.

Procurement Activity/Contracting Officer
Viar and Company, Inc./USEPA
Alexandria, VA
Project Manager: Emile Boulos (202)382-7942

Contract No./Type
SAS-2914HQ/Unit Pricing

Award Cost/Final Cost
$23,100/$23,100

Period of Performance
5/87-9/87

metaTRACE participated in the EPA-sponsored method validation study of draft method 680, "Identification and Measurement of Pesticides and PCBs by Gas Chromatography/Mass Spectrometry." metaTRACE was one of seven labora
approximately 15 water and soil s
analyses will be used to calculat
from these

interlaboratory precision and accuracy statements for the method. The contract also required the utilization of EPA supplied Format B electronic data transfer software, to submit GC/MS data.

Procurement Activity/Contracting Officer
Alliance Technologies Corporation
Bedford, MA
Project Manager: Douglas Roeck (617)275-9000

Contract No./Type
I9037/Unit Pricing

Award Cost/Final Cost
$29,528/$29,528

Period of Performance
10/87-4/88

Alliance Technologies conducted a sampling and analysis program for the City of Fall River, MA municipal refuse incinerator in response to an Order by the Massachusetts Department of Environmental Quality Engineering (DEQE). The program called for sampling and analysis of flue gas emissions, residual ash, scrubber ash and spent scrubber water. metaTRACE analyzed samples for specific groups and isomers of polychlorinated dibenzodioxins/dibenzofurans (PCDD/PCDF). Data from these analyses were used to determine source compliance with DEQE's ambient guidelines for dioxin/furans and to evaluate whether special handling procedures were required for the ash and water discharged by the incinerator.

Procurement Activity/Project Manager
Lafser & Schreiber, Inc.
(for Continental Cement, Inc.)
St. Louis, MO
Project Manager: Fred Lafser (314)534-2266

Contract No./Type
Not Applicable/Unit Pricing

Award Cost/Final Cost
$20,000/$20,000

Period of Performance
3/87-7/87

Lafser & Schreiber was the consultant of record for the Continental Cement Company, who was se[illegible] a waste solvent supplement fuel process [illegible] MO facility. metaTRACE, under agreement [illegible]

Schreiber, conducted performance testing of organic blends and emissions to establish criteria for the destruction and removal efficiencies (DRE) of the system. This project involved the analysis of HCl, particulates, lead, mercury, beryllium and Principal Organic Hazardous Constituents (POHCs) of the process emissions.

Procurement Activity/Contracting Officer
Confidential Client

Contract No./Type
Unit Pricing/Indefinite Quantity

Award Cost/Final Cost
Not to exceed $30,000/$25,000

Period of Performance
7/87-6/88

metaTRACE was under contract to supply field sampling and analytical services in support of the client's routine quarterly RCRA groundwater monitoring and special hazardous waste remediation projects. The analyses included routine organic and inorganic chemical parameters as well as total dibenzodioxin and dibenzofuran analysis by GC/MS.

Procurement Activity/Contracting Officer
Confidential Client
St. Louis, MO

Contract No./Type
NA/Unit Pricing

Award Price/Final Price
$114,000/$114,000

Period of Performance
9/87-12/87

metaTRACE was retained by this industrial client to perform a pesticide analysis/soil persistence study. The client desired to determine the persistence in soil of a new, secret test product. metaTRACE analyzed 600 soil samples by GC in duplicate for this test product and supplied the client with both hard copy to meet FDA registration requirements and data in computerized format (tape). All analyses were performed under GLP (Good Laboratory Practice) guidelines. Results of this study are being used by the client to obtain FDA registration for their new product.

Procurement Activity/Contracting Officer
Confidential Client
St. Louis, MO

Contract No./Type
PO B000080/Fixed Price

Award Cost/Final Cost
$3,000/$3,000

Period of Performance
3/87-6/87

metaTRACE participated in an interlaboratory method validation study conducted by this industrial client. This study involved analyses performed on common agricultural herbicides by GC/MS. The duration of the study was approximately three months.

Procurement Activity/Contracting Officer
McDonnell Douglas Aircraft Corporation
St. Louis, MO
Project Manager: Mr. Robert Kaatman (314)895-5235

Contract No./Type
715024/Unit Pricing; Indefinite Quantity

Award Price/Final Price
$150,000/$150,000

Period of Performance
4/87-2/88

McDonnell Douglas Aircraft Corporation issued an analytical contract to metaTRACE to perform all laboratory analyses for water/wastewater, deposit samples, known and unknown hazardous and non-hazardous wastes, oil, coal, microbiological and/or radionuclides. In addition, metaTRACE performed monthly NPDES sampling of McDonnell Douglas outfalls (composite and grab samples).

Procurement Activity/Contracting Officer
E.C. Jordan Company
Portland, ME
Project Manager: Dr. Bruce Wallin (207)775-5401

Contract No./Type
None/Unit Pricing

Award Cost/Final Cost
$25,000/$25,000

Period of Performance
4/87-5/87

E.C. Jordan Company was retained to conduct a groundwater monitoring program at a landfill in the Eastern United States. This landfill is known to be the cause of groundwater contamination in the area, and the operators are under a court order to provide analytical data pertaining to groundwater contaminants. metaTRACE was under contract to E.C. Jordan to analyze groundwater samples for volatile organics, semi-volatile organics, PCBs, 2,3,7,8-TCDD, priority pollutant metals, and other inorganic and organic compounds. The court mandated that strict USEPA methodology and quality control be followed during this quick turnaround project.

Procurement Activity/Contracting Officer
Enviresponse/Alliance Technologies Corporation
Bedford, MA
Project Manager: Geoff King (201)906-6821

Contract No./Type
Unit Pricing/Indefinite Quantity

Award Cost/Final Cost
$350,000/$350,000

Period of Performance
7/87-1/88

Enviresponse/Alliance Technologies Corporation issued an analytical services contract to metaTRACE to perform a variety of chemical analyses in support of the Office of Toxic Substances (OTS) evaluation of the US Environmental Protection Agency's mobile incinerator system located at the Denny Farms Dioxin Site in McDowell, Missouri. Chemical analyses included metals, volatile organics, semi-volatile organics and total dibenzodioxin/dibenzofurans. metaTRACE provided 24 hour turnaround of analytical data for several critical samples during the test burn.

Procurement Activity/Contracting Officer
Confidential Client

Contract No./Type
NA/Time and Materials

Award Cost/Final Cost
$69,000/$69,000

Period of Performance
7/87-9/87

metaTRACE was under contract to a number of Principal Responsible Parties (PRP) to provide a quality control review and validation of both organic and inorganic data generated as part of the US Environmental Protection Agency's Contract Laboratory Program (CLP) from a superfund hazardous waste site located in the western United States. The data may be used during litigation, and expert witness testimony may be provided by one or more of the metaTRACE staff.

Procurement Activity/Contracting Officer
TRC Environmental Consultants, Inc.
Denver, CO
Project Officer: Stephen Bundy (303)792-5555

Contract No./Type
Not applicable/Unit Pricing

Award Cost/Final Cost
$7200/$7200

Period of Performance
2/87-3/87

TRC performed a preliminary hazardous waste site investigation for the Arizona Public Service power plant in Four Corners, New Mexico, suspected of being contaminated with chlorinated organic solvents. Shallow soil cores were taken on an extensive grid network. metaTRACE analyzed a large number of soil core sections for seven specific chlorinated compounds using GC/MS purge and trap techniques.

Procurement Activity/Contracting Officer
Alliance Technologies Corporation
(for New York Dept. of Environmental Conservation)
Love Canal, NY
Project Manager: Mr. Ed Paduto (617) 275-5444

Contract No./Type
Not Applicable/Unit Pricing

Award Price/Final Price
$110,000/$110,000

Period of Performance
3/87-5/87

Alliance Technologies Corporation issued an analytical contract to metaTRACE to perform total tetra through octa dibenzodioxin/dibenzofuran analyses in support of the joint technology and evaluation of a mobi lysis unit (incinerator) and its associat he Love

Canal Leachate Treatment Facility in Niagara Falls, New York. Four sets of modified Method 5 Sampling Train samples and number of waste feed samples were analyzed to calculate and determine the dioxin/furan destruction efficiencies (DRE) for the mobile unit. The entire project was under the direction of the New York State Department of Environmental Conservation (NYSDEC), the Hazardous Waste Engineering Research Laboratory (HWERL), the Office of Research and Development (ORD), and the US Environmental Protection Agency (USEPA). metaTRACE successfully underwent the NYSDEC certification process to participate in this program.

ALLIANCE
Technologies Corporation

STATEMENT
OF
QUALIFICATIONS

THIRD EDITION
AUGUST, 1989

PREPARED BY
CHEMICAL AND ENVIRONMENTAL TECHNOLOGY, INC.
102-A WOODWINDS INDUSTRIAL COURT
CARY, NORTH CAROLINA 27511
(919) 467-3090

GENERAL BUSINESS DESCRIPTION

Chemical & Environmental Technology, Inc. was formed in 1984 by Mr. John Ogle as an environmental consulting service for industry. As business developed, a need to provide analytical services to support the consulting aspect was recognized. In February, 1985, an environmental laboratory was created to provide this service. Since that time, the company has sustained an excellent growth rate, and presently, employs 16 chemists, technicians, and support staff.

By 1986, the Company had outgrown the space at its original location at 1903 N. Harrison Avenue in Cary, and moved to a new facility at 102A Woodwinds Industrial Court. This facility, which had 2000 square feet of floor space, was designed specifically for use as a laboratory. However, this space was quickly utilized and in 1988, an additional 2000 square feet of floor space was added to meet the demand of a growing work schedule. As a result of this expansion, the existing workload can be handled more efficiently, and will allow expansion for several years into the future.

SERVICES AND CAPABILITIES

Chemical & Environmental Technology, Inc. is an independent testing laboratory and consultant service, with special emphasis on environmental and chemical analysis. This service is offered to industry, municipalities and other governmental bodies, as well as the general public. The purpose of our Company is to offer an opportunity to have analytical problems characterized and solved effectively. Also, industry and municipalities are provided with a complete program of environmental monitoring and reporting, supported by fast and accurate test results.

Certification is maintained in North Carolina and South Carolina for the Safe Drinking Water Act (SDWA), and The National Pollution Discharge Elimination System (NPDES) programs. Our procedures meet or exceed federal programs, and our EPA based quality control program allows accurate representation of analytical results. In addition, we are a member of the American Council of Independent Laboratories.

The laboratory is comprised of three departments: Inorganic/General Chemistry, Organic Chemistry, and Microbiological Analyses. The Inorganic/General Chemistry Department offers the traditional wet chemistry parameters and metal analysis. This department performs standard chemical analysis by use of flame atomic absorption, flameless atomic absorption spectrophotometry by graphite furnace, total organic halides (TOX), total organic carbon (TOC), and other instrumental and wet procedures. The Organic Chemistry Department routinely does analyses on samples for volatilehalocarbons, purgeable

aromatics, petroleum fuel hydrocarbons, pesticides, herbicides, priority pollutants, and various hazardous waste mixtures. The instruments utilized provide gas chromatography/mass spectrometry (GC/MS), flame ionization, electron capture, nitrogen-phosphorus, and thermal conductivity gas chromatography, and infrared capabilities. Our Microbiological Department is capable of performing routine bacterial analyses, including quantitative differentiation of micro-organisms. Our newest service is the addition of bioassay to determine the effects of effluent on aquatic life.

In summation, Chemical & Environmental Technology is capable of providing a very broad spectrum of analyses, consultation, and services through the use of its sophisticated technology and highly trained staff. Company personnel are professionals trained in all aspects of laboratory methodology, safety, and quality control. In addition, staff members are capable of assisting the client in interpreting analytical results and providing guidance necessary to complete your project. Client satisfaction is achieved through the philosophy that each client is as important as the next.

ORGANIZATIONAL STRUCTURE AND SIZE

The following is the organizational structure of CET:

John M. Ogle	President
Kenneth L. Jesneck	Laboratory Manager
Terrie H. Litzenberger	Inorganics Manager
John E. Baur	Organics Manager

In an effort to enhance communication, we have asked our clients to directly contact the individuals responsible for their groups of analysis.

Currently, CET employs 16 people to meet our obligations to our clients. All employees have degrees in a science or related disciplines. Appendix I contains the resumes of key employees who are responsible for this scope of work.

TRAINING AND VERIFICATION OF ANALYSTS

To provide our clients with the best possible service, our analysts are carefully chosen. Our philosophy is to employ only those people with the qualities that are those of CET. Not only have minimum standards been set for academic backgrounds, our employees must exhibit the best professional attitude to both our clients and their work.

When an analyst is newly employed or promoted to a different position, a thorough training process takes place to ensure all methodologies will be followed. These bench chemists will be taught one-on-one with their supervisor for several days until both parties feel comfortable about the new person's ability. Afterwards, the new analyst will be

asked to analyze extra QA standards (known and duplicates) until a desired proficiency has been achieved. This process usually lasts approximately three months before the analyst returns to routine analysis.

Once the training process has been completed, each analyst must adhere to the provisions of the Quality Control Program. The merit evaluation of each employee contains a section on the quality of their performance. A review is conducted of the analyses that the employee has performed. Any deviations from standard protocol is noted and discussed. The QA/QC plan, however, is a daily activity that governs the daily analysis.

QUALITY ASSURANCE PROGRAM

I. Introduction

Quality assurance programs have two primary objectives. The first is to ascertain the level of quality on a routine basis (i.e. the precision of the analysis). The second is to control the quality of analysis (i.e. the accuracy of the analysis). This accountability and quality control is established to improve the quality of data being generated. As a result of this program, documented evidence is available to assure clients that a specified level of precision is achieved in the routine performance of measurements. This system also provides for the early warning of bias or deterioration of analytical precision.

II. Personnel and Organization

Responsibilities for quality assurance and quality control at various levels are as follows:

A. The analyst is responsible for sample analysis, standard curve preparation, preventative maintenance of equipment, data acquisition, and data reduction.

B. The Laboratory Manager is the Quality Assurance Officer and is responsible for validation of the individual analyst via written and practical performance evaluations, data reporting procedures, corrective actions, and review of data acquisition and data reduction.

C. The Quality Control Officer is responsible for overall implementation of the quality assurance plan, training of analyst, data evaluation, quality control reports, quality control procedures for specific methods, statistical analysis of quality control data, inter-laboratory performance audits, document control and revisions.

D. The Field Technician's duties include:

Sampling;

Determining (with the analyst) appropriate sampling equipment and sample containers necessary to minimize contamination;

Ensuring that samples are collected, preserved, and transported as specified in the workplan; and

Checking that all sample documentation (labels, field notebooks, chain-of-custody records, packing lists) is correct and transmitting that information, along with the samples, to the analytical laboratory.

III. Accountability

The accountability system is established to ensure that the data reported refers directly to the samples submitted. This system begins when the samples are collected.

The procedures indicated below are to be performed for all analysis. Specific instructions to particular analyses are given in the pertinent analytical procedures.

A. Field Quality Control

The initial step of field sampling is to determine what is being sampled and the parameters to be analyzed on the samples plan. Equipment is selected , checked for operational status, and calibrated. Decontamination of field equipment is mandatory before leaving the laboratory. Sample containers, preservation, and shipping containers are prepared as determined by the scope of work. Trip blanks will be generated at this time.

Once at the site, the activities start with a visual survey of the site. For ground-water monitoring, all wells are measured to depth of water before purging. Field measurements and conditions are noted as well as justifying any field actions contrary to the project plan. All information will be documented, including depth to water, well size, amount of water purged, conductivity and beginning & ending pH of water during purging, and any other field activity pertinent to field sampling. Chain-of-custody forms will be completed after sampling.

The purging of wells will be performed using a decontamination procedure for all field equipment when collecting samples from more than one well. Gloves will be worn at all times during sampling, and changed between well locations. All wells will be purged from 3 to 5 well volumes before sampling. The bailers will be lowered into

the groundwater slowly as not to create a disturbance to release volatile organics. The 3 to 5 well volumes will be waived if the well has been purged to dryness. Wells will be allowed to recharge before sampling.

When sampling begins, the order of collection is very important. Bailers will be lowered into the ground water to minimize volatilization. The samples for volatile organic compounds will be collected immediately followed by other organic compounds, heavy metals, inorganics, radiologic, and finally, bacteriologic parameters. Sample volume and preservation techniques are outlined in Appendix III. Duplicate samples will be collected as needed concurrently with the routine samples. One set of field blanks and equipment blanks per site will also be generated during sampling events.

Surface water samples may be collected by one of two methods, either grab or composite. The specific collection point is determined and located in reference to known points. Grab samples are collected in the following manner:

1) Hold the bottle near the base with one hand, and with the other, remove the cap.

2) Rinse the sample container with the water to be sampled prior to filling the container. The exception being when sample containers have had preservatives added.

3) Push the sample container rapidly into the water (mouth down) and tilt up towards the current to fill. A depth of about six inches is satisfactory. Great care should be taken to avoid breaching the surface while filling the container.

4) During low flow periods, move the container slowly through the water laterally. A pool may be scooped out of the channel and allowed to clear prior to sampling. Sampling can be done in this hole.

5) Lift the container from the water, and place the uncontaminated cap back on the container. Volatile organics sample should contain no head space.

6) Place the samples in shipping carton for transport to the Laboratory.

Composite samples are individual grab samples composited at some time frequency or flow rate. Samplers are installed as per manufacturer's instructions. Flow meters will have to be installed to convert flow rates into units in which autosamplers can interpret and then sample. The

suction hose is placed in the flow of the stream to be sampled. The samplers are packed with ice to keep the sample cool for the duration of compositing.

Post-field activities will include transit of samples to the Laboratory. At the Laboratory, samples are verified with Sample Custodian. Chain-of-custody sheets are signed by both parties transferring custody to the Laboratory. The field team will be de-briefed by the Field Technician for compliance to the project plan.

B. Sample Custodian

Sampling procedures and sampling protocol are generally the responsibility of the sample generator or client. When Chemical & Environmental Technology is responsible for providing sampling containers, it will be the responsibility of the Sample Custodian to insure that proper sampling bottles (i.e. glass or plastic) are correctly labelled and that appropriate preservatives are added to be consistent with the desired analysis. A letter of instruction outlining the sampling procedure, protocol and/or special precautions will accompany the sampling containers.

A list of the required sampling containers, handling procedures, and necessary preservatives is provided for each analysis to the Sample Custodian for reference.

Upon receipt of a sample, the Sample Custodian is responsible for insuring that an appropriate identification number is assigned to the sample. At this time the sample work form is filled out as to the date of receipt, and the submittor's name, address, and telephone number. The samples are sequentially numbered for internal reference, and each parameter to be analyzed is recorded.

The Sample Custodian will record the volume of the sample received, note any preservatives used, and note the condition of the sample. If the sample is to be split internally, it will be done at this time. Notation of the splitting will be recorded. The samples are stored in the environment control chamber in numerical sequence. The paperwork (sample submission form and attachments) is forwarded to the appropriate laboratory area. At least daily the Laboratory Manager reviews all incoming work and insures that the analytical requests enter the work in progress queue.

When particular analyses are to be conducted by an outside laboratory, the Sample Custodian will insure that a representative sample is taken in the appropriate volume, placed in an appropriate sample container, and preserved. The sample container is labelled as to the analyses requested, preservatives added, and special instructions,

if any. Appropriate warning labels as to acids, caustics, and other hazards are permanently affixed to the sample container. A shipping form is completed. This form will reflect the date of sampling, the date analysis is to completed, the shipping address, the return address, analyses to be conducted, volume of sample shipped, preservative code, and any pertinent special instructions or comments. One copy of the sample shipping form is sent with the samples. Shipping will be in accordance with State and/or Federal Department of Transportation regulations.

One copy of the sample shipping form will be attached to the sample submission form and another copy will be retained in the shipping book by the Sample Custodian. Results of analyses performed by subcontracted laboratories will be forwarded to the Laboratory Manager.

When Chain of Custody documentation is required or requested, said document will be initiated by the Sample Custodian. This document will accompany the sample submission form and will reflect the names of individuals handling the sample, the date and time that custody was transferred, and the reason for change of custody.

The individual analyst is responsible for conducting the required analyses in accordance with published methodologies, recording pertinent data, and calculating the results. These results are recorded on the appropriate data log book.

The Quality Control Manager is responsible for reviewing the reported results for completeness and accuracy. Upon completion of this review, the results are forwarded to the General Laboratory Manager who again reviews the results for completion and accuracy. The General Laboratory Manager then completes a preliminary report in the appropriate format. The final report that is returned to the client will always bear sample identification as submitted, internal identification number, the analytical results in appropriate units, a reference to the method of analysis, appropriate annotations, and the signature of the General Laboratory Manager or a Staff Chemist. A copy of the report and the analytical data that was accumulated during the analyses is retained on file. The actual samples will be archived for a minimum period of two weeks, unless otherwise specified by the originator or in cases involving litigation. In such cases, samples will be retained until final legal disposition has been determined.

C. Analytical Quality Control

1. Holding times of analyses are outlined in Appendix III.

2. A quality control program is only useful if it can be measured and documented. The following components of analytical quality control are related to the analytical batch. All quality control data and records required by this section shall be retained by the Laboratory and shall be made available to the client as appropriate. The frequencies of these procedures shall be as stated below or at least once with each batch series.

a. Blanks

Each batch shall be accompanied by a reagent blank. The reagent blank shall be carried through the entire analytical procedure. A reagent blank is an aliquot of analyte-free water or solvent analyzed with the analytical batch.

b. Duplicate Spike

A duplicate spike shall be analyzed with every analytical batch or once every ten samples, whichever is the greater frequency. Analytes stipulated by the analytical method, by applicable regulations, or by other specific requirements, must be spiked into the sample. Predetermined quantities of stock solutions of certain analytes are added to a sample matrix prior to sample extraction/digestion and analysis. Samples are split into duplicates, spiked, and analyzed. Percent recoveries are calculated for each of the analytes detected. The relative percent difference between the spikes is calculated and used to assess analytical precision. The concentration of the spike should be at the regulatory level or the estimate or actual method quantification limit.

Selection of the sample to be spiked and/or split depends on the information required and the variety of conditions within a typical matrix. In some situations, requirements of the site being sampled may dictate that the client, or sampling team, select a sample to be spiked and split based on a pre-visit evaluation or the on-site inspection. This does not preclude spiking a sample of its own selection as well. In other situations, the Laboratory may select the appropriate sample. The Laboratory's selection should be guided by the objective of the spiking, which is to determine the extent of matrix bias or interference on analyte recovery and sample-to-sample precision.

c. Surrogate Compounds

Every blank, standard, and environmental sample (including duplicate spikes) will be spiked with surrogate compounds prior to extraction or digestion. Surrogates shall be spiked into samples according to the appropriate analytical method. Surrogate spike recovery shall fall within the control limits set by the Laboratory (in accordance with procedures specified in the method or within ±20%) for samples falling within the quantification limits without dilution. Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates below the quantification limit; evaluation of analytical quality will then rely on the quality control embodied in the check, spiked and duplicate spike analysis.

d. Check Sample

Each analytical batch shall contain a check sample. The analytes employed shall be a representative subset of the analytes to be determined.

3. Determinations

a. Instrument Adjustment

Requirements and procedure are instrument and method specific. Analytical instruments shall be tuned and aligned in accordance with requirements which are specific to the instrumentation procedures.

b. Calibration

Analytical instrumentation shall be calibrated in accordance with requirements which are specific to the instrument and procedures employed.

4. Additional Requirements for Inorganic Analysis

Standard curves used in the determination of inorganic analyticals shall be prepared as follows:

Standard curves derived from data consisting of one reagent blank and a minimum of four concentrations shall be prepared for each analyte. The coefficient of correlation of all data points shall exceed 0.999. The standard curve shall be used with each subsequent analysis provided that the standard curve is verified by using at least one reagent blank and one check sample.

AR 7.1.23

5. Warning and Control Limits

The Quality Control Chemist will reduce all forms of data generated to the mean percent, the standard deviation, and the coefficient of variance. Warning limits are established as ± 1.5 times the standard deviation for the method. Action levels shall be taken as ± 2.0 times the standard deviation. If any point exceeds the action limit, or if two consecutive data points exceeds the warning limit, analysis of that parameter will be curtailed until the cause has been determined and corrective actions taken. When any three data points show a positive or negative bias, this will constitute a warning condition and the Quality Control Chemist will investigate. If five consecutive points show a positive or negative bias, the analysis of that parameter will be curtailed until the cause for the bias has been determined and corrective action taken.

IV. Laboratory Performance Evaluation

A rigorous evaluation to ensure quality control of analytical results is conducted. This evaluation includes submission of blind samples whose identity and results are known only to the Quality Control Officer. In addition, split samples are provided to determine accuracy of personnel. Also, spiked samples of submitted samples are incorporated in the evaluation. Reports of performance are issued monthly and discussed with all personnel.

In order to maintain certification, participation in several outside performance evaluation studies is mandated. These audits are designed to evaluate the quality of analyses as compared to the national average for those same procedures. These include the Environmental Protection Agency, the North Carolina Department of Environmental Management, and several industrial clients.

V. Quality Control of Equipment, Reagents, and Standards

Our investment in the quality of instrumentation is second only to our investment in the quality of our personnel. If reliable analytical results are to be obtainable, then it becomes imperative that each piece of analytical equipment be maintained in accordance with manufacturers specifications. A maintenance schedule for each analytical instrument has been developed. The maintenance schedule is in accordance with the manufacturers recommendation for preventive maintenance. Each analytical instrument is assigned an individual analyst whose responsibility it is to see that maintenance is performed in accordance with the maintenance schedule. To insure that the

maintenance schedule is followed, log entries as to the maintenance performed are entered into the equipment maintenance log book. The equipment maintenance log book is kept for each individual analytical instrument.

As glassware is also an integral part of the equipment, a rigorous cleaning procedure for all analytical glassware is maintained. The responsibility of the individual analyst is to insure that the glassware used in the performance of the analytical procedure is properly cleaned. To control the quality of glassware cleaning, blank samples are included in all analyses. The frequency of blank sampling is at least 10% or all samples. However, in some cases the frequency is much greater as dictated by the published procedure. The standards used for establishing calibration curves are purchased commercially and referenced to NBS Standards. Therefore, all standards used are NBS traceable standards. This policy is established in order to insure the accuracy of results that are reported. As the minimum requirement, a three point calibration curve will be used. One point being a blank or zero value and the remaining two points selected such that the analytical value of the sample will be bracketed. In the event that an analyte concentration is outside the calibration standard, an additional point must be included in the calibration curve. A record of calibration procedures will be maintained in a procedure notebook.

The calibration record will reflect the date of calibration, the analyst performing the analyses, reagents used in the procedure with the respective lot numbers, the standards used, the concentration of the standard, the slope factor, and the correlation coefficient for the agreement of standards used in calculating the slope factor. A minimum of one known standard is analyzed with each batch to verify curve calibration.

VI. Analytical Methods

The analytical methods are the published methods from the US Environmental Protection Agency, ASTM Methods, USP Methods, AOAC Methods, NIOSH Methods, and methods as published in Standard Methods for the Examination of Water and Wastewater, 15th edition. No deviations from these published methods are allowed except upon written notification from management. In such cases, the final report is annotated to reflect the change that was made and the reasons for making such change. Appendix IV lists the methodology.

RECORDS AND DOCUMENTATION

The most important document created for submittal to the Laboratory is the chain-of-custody. This document must include information such as site or project name, sample identif[illegible] time of

collection, number of sample containers, requested analysis, necessary remark, and signatures of samplers, transporters, and receiver in Laboratory with dates and times. The internal work order is generated by this document. Any change orders, including deletions and/or additions to required analysis, must be submitted in writing. Change orders telephoned must be followed by written communication before changes occurs. The original chain-of-custody will be returned with the results and a copy retained in a permanent file.

Reports will be submitted to include only the analysis requested by the chain-of-custody. The first section of the report will include a history of the samples from receipt to completion. Information presented will be a cross reference of client sample identification to a unique CET sample, the date received, and inclusive dates of analysis. The second part of the report will include the analytical results. The parameters will be listed with the corresponding results obtained for the particular sample or group of samples. Methodology and units will be referenced. Also, the analytical result section will list groups of analysis (such as Method 624) on a separate sheet with the date of analysis, detection limit, sample identification, and corresponding results of each compound.

Examples of chain-of-custody and reports can be found in Appendix VI. These are only a few of the type of reports; however, they are representative of a majority. If required, the Quality Control associated with the analysis can be included with the final report.

All data pertinent to the derivation of results of the analysis performed on the samples inclusive of a chain-of-custody will be maintained in an active file for one year. Access to that file will be limited only to the project manager and authorized agents of the client. Files will be archived in storage for a period of not less than five years unless required to retain for a longer period of time. At a minimum, both a hard copy of results and floppy disk will be used for storage of data.

ANALYTICAL CAPACITY AND SCHEDULING

I. Equipment and Glassware

Our Laboratory is fully equipped with all instrumentation necessary to fulfill this contract. The equipment list is as follows:

3 Gas Chromatographs with electronic capture, flame ionization, Nitrogen-Phosphorus, thermal conductivity, photo-ionization detectors.

1 ITD Gas Chromatograph/Mass Spectrometer with split/splitless injector

3 Purge and traps

4 Integrators or data stations

1 Atomic Absorption Spectrophotometer

1 Graphite Furnace

1 EP Toxicity extractor and pressure filter

1 TCLP extractor with zero head space

1 Sonic Dismembrator

12 Soxhlet extraction stations

Also, enough glassware is available to support phases of extractions, distillations, and digestions.

II. Personnel

Currently, the Organics department is directed by John Baur, while the Inorganics is directed by Terrie Litzenberger. Under their supervision are eleven analysts working two shifts. Field Sampling will be directed by Kenneth Jesneck.

III. Scheduling

A. Field Sampling

Field sampling can be performed within 48 hours of initial contact by Project Manager. However, the preferable schedule would be to sample within 5 days of notice.

B. Analytical

Standard analytic turnaround will be 14 calendar days from receipt of sample into Laboratory. Accelerated schedules can be accommodated by the following surcharge schedule:

Required Turnaround	Surcharge
24 Hours	3 times the normal fee
48 Hours	2 times the normal fee
5 Days	1.5 times the normal fee
14 days	Normal fee

We request at least a 24-hour notice before accepting samples requiring a 48-hour turnaround service.

REFERENCES

Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WPCF, 15th Edition, 1980

"Methods for Chemical Analysis of Water and Wastes", EPA 600/4-79-020, March, 1979

Federal Register, Vol 49, No. 209, October, 1984

"North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities", Solid Waste Management, Division of Health Services, SW-1001-87, 1987

"Handbook for Sampling and Sample Preservation of Water and Wastewater", EPA 600/4-82-029, September, 1982

"Test Methods for Evaluating Solid Wastes", SW-846, 3rd Edition, November, 1986

"Guidelines for Addressing Fuel Leaks", California Water Quality Control Board, September, 1985

"Handbook for Analytical Quality Control in Water and Wastewater Laboratories", EPA 600/4-79-019, March, 1979

APPENDIX I

RESUMES OF KEY PERSONNEL

KENNETH L. JESNECK

EDUCATION

North Carolina State University — Raleigh, North Carolina
B.S. in Civil Engineering

EXPERIENCE

1985 to Present — Chemical & Environmental Technology, Inc.
Cary, North Carolina
LABORATORY MANAGER

* Act as a consultant on environmental concerns and regulations
* Pilot plant, wastewater, and water facilities operation
* Prepare technical reports
* Data interpretation
* Direct the majority of activities for an environmental testing laboratory
* Management of projects
* Supervise eleven bench chemists

1984 to 1985 — Black & Veatch
Asheboro, North Carolina
LABORATORY TECHNICIAN

* Atomic absorption spectroscopy (flame and graphite furnace)
* Gas chromatography
* Wet chemistry using Environmental Protection Agency protocol

1983 to 1984 — Industrial and Environmental Analysts, Inc.
Cary, North Carolina
CHEMIST AND LABORATORY DIRECTOR

* Engineer-in-Training License
* Groundwater monitoring in accordance with the Resource Conservation and Recovery Act
* Supervised three bench chemists
* Atomic absorption spectroscopy
* Gas chromatography
* Wet Chemistry

1978 to 1983 — Moore, Gardner & Associates, Inc.
Asheboro, North Carolina
LABORATORY TECHNICIAN

* Drafting, pilot plant studies
* Assisted engineers on design of water and wastewater treatment facilities
* Surveying
* Atomic Absorption
* Gas Chromatography
* Wet Chemistry
* Sample and data collection

PROFESSIONAL SOCIETIES, HONORS, LICENSES

* Grade II Wastewater Treatment Plant Operator
* Grade C Water Treatment Facility Operator
* Member Ground Water Professionals of North Carolina

JOHN E. BAUR

EDUCATION

North Carolina State University — Raleigh, North Carolina
BS in Chemistry
Graduated 1980

EXPERIENCE

5/1988 to Present

Chemical & Environmental Technology, Inc.
Cary, North Carolina
ORGANIC CHEMIST

* Perform GC and GC/MS Analysis
* Supervise Organic Department; from receiving of samples through reporting the analysis results
* Implement and oversee all QA/QC
* Method Development
* Marketing for Organic Analysis

3/1986 to 5/1988

Chemical & Environmental Technology, Inc.
Cary, North Carolina
TECHNICIAN - PART-TIME UNIVERSITY STUDENT

* Performed wet chemistry tests involving distillation, titrations, & spectrophotometry
* Conducted sample preparation
* Quantified specific metal content by atomic absorption/emission analysis
* Worked with graphite furnace
* Performed organic extractions
* Operated gas chromatograph
* Gathered water, wastewater, asbestos/air field samples
* Compiled data and summary observations for official reports

April 1982

5/1984 to 9/1984

BCM Eastern
Plymouth Meeting, Pennsylvania
TECHNICIAN - STUDENT

* Performed solids analysis in the environmental laboratory

TERESA H. LITZENBERGER

EDUCATION

Western Carolina University — Cullowhee, North Carolina
BS in Environmental Health
Graduated 1980

EXPERIENCE

1985 to Present

Chemical & Environmental Technology, Inc.
Cary, North Carolina
ASSISTANT LABORATORY MANAGER

* In charge of all Inorganic Chemical Analysis; Atomic Absorption Spectroscopy, (flame & furnace), Wet Chemical Analysis, using all EPA procedures & Quality Control.
* Assistant Office Manager in data interpretation.
* Schedule daily work activities of Inorganic Chemists

1984 to 1985

ETOH, Inc.
Wilsons, Virginia
OFFICE MANAGER/QUALITY CONTROL OFFICER

* Maintained production records
* Complete shipping & receiving reports, and general office management
* Set up Laboratory and perform variety of chemical analysis for Quality Control in a Fuel Grade Ethanol facility

1983 to 1984

Black & Veatch
Asheboro, North Carolina
LABORATORY TECHNICIAN

* Wet chemistry utilizing Environmental Protection Agency protocol
* Microbiological analysis including membrane filter and most probable number

1980 to 1982

North Carolina Department of Agriculture
Food Drug Division
Bonlee, North Carolina
ANALYTICAL CHEMIST

* In charge of field aflatoxin laboratory for testing farmer's corn and feed

APPENDIX II

BAILER DECONTAMINATION PROCEDURES

(SW-1001-87)

BAILER DECONTAMINATION PROCEDURES

Teflon bailers are cleaned in the Laboratory using the following minimum cleaning techniques prior to ground water sample collection:

1. Phosphate-free soap and tap water wash
2. Tap water rinse
3. Deionized, distilled water rinse
4. 10% nitric acid rinse
5. Deionized, distilled water rinse
6. Methyl alcohol rinse
7. Deionized, distilled water rinse
8. Air dry
9. Wrap to prevent contamination before use (aluminum foil, shiny side out)

The bailer line which attaches to the teflon or stainless steel bailers should consist of either 1) teflon coated wire, 2) single-strand stainless-steel wire, 3) other monofilament line, or 4) nylon rope. In order to avoid contamination, a new segment of one of the above approved types of line should be used at each well.

APPENDIX III

REQUIRED CONTAINERS, PRESERVATION, TECHNIQUES, AND HOLDING TIMES

prescribed in Table II. Any person may apply for a variance from the prescribed preservation techniques, container materials, and maximum holding times applicable to samples taken from a specific discharge. Applications for variances may be made by letters to the Regional Administrator in the Region in which the discharge will occur. Sufficient data should be provided to assure such variance does not adversely affect the integrity of the sample. Such data will be forwarded by the Regional Administrator to the Director of the Environmental Monitoring and Support Laboratory in Cincinnati, Ohio for technical review and recommendations for action on the variance application. Upon receipt of the recommendations from the Director of the Environmental Monitoring and Support Laboratory, the Regional Administrator may grant a variance applicable to the specific discharge to the applicant. A decision to approve or deny a variance will be made within 90 days of receipt of the application by the Regional Administrator.

. . . . . .

TABLE II.—REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

Parameter No./Name	Container [1]	Preservation [2 3]	Maximum holding time [4]
Table IA—Bacterial Tests			
1-4, Coliform, fecal and total	P, G	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5]	6 hours.
5, Fecal streptococci	P, G	do	Do.
Table IB—Inorganic Tests			
1, Acidity	P, G	Cool, 4°C	14 days.
2, Alkalinity	P, G	do	Do.
4, Ammonia	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days.
9, Biochemical oxygen demand	P, G	Cool, 4°C	48 hours.
11, Bromide	P, G	None required	28 days.
14, Biochemical oxygen demand, carbonaceous	P, G	Cool, 4°C	48 hours.
15, Chemical oxygen demand	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
16, Chloride	P, G	None required	Do.
17, Chlorine, total residual	P, G	do	Analyze immediately.
21, Color	P, G	Cool, 4°C	48 hours.
23-24, Cyanide, total and amenable to chlorination	P, G	Cool, 4°C, NaOH to pH>12, 0.6g ascorbic acid [6]	14 days. [7]
25, Fluoride	P	None required	28 days.
27, Hardness	P, G	HNO_3 to pH<2, H_2SO_4 to pH<2	6 months.
28, Hydrogen ion (pH)	P, G	None required	Analyze immediately.
31, 43, Kjeldahl and organic nitrogen	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days.
Metals [8]			
18, Chromium VI	P, G	Cool, 4°C	24 hours.
35, Mercury	P, G	HNO_3 to pH<2	28 days
3, 5-8, 10, 12, 13, 19, 20, 22, 24, 26, 29, 30, 32-34, 36, 37, 45, 47, 51, 52, 58-60, 62, 63, 70-72, 74, 75, Metals, except chromium VI and mercury.	P, G	do	6 months.
38, Nitrate	P, G	Cool, 4°C	48 hours.
39, Nitrate-nitrite	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
40, Nitrite	P, G	Cool, 4°C	48 hours.
41, Oil and grease	G	Cool, 4°C, H_2SO_4 to pH<2	28 days.
42, Organic carbon	P, G	Cool, 4°C, HCl or H_2SO_4 to pH<2	Do.
44, Orthophosphate	P, G	Filter immediately, Cool, 4°C	48 hours.
46, Oxygen, Dissolved Probe	G Bottle and top	None required	Analyze immediately.
47, Winkler	do	Fix on site and store in dark	8 hours.
48, Phenols	G only	Cool, 4°C, H_2SO_4 to pH<2	28 days.
49, Phosphate (elemental)	G	Cool, 4°C	48 hours.
50, Phosphorus, total	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
53, Residue, total	P, G	Cool, 4°C	7 days
54, Residue, filterable	P, G	do	48 hours.
55, Residue, nonfilterable (TSS)	P, G	do	7 days
56, Residue, Settleable	P, G	do	48 hours.
57, Residue, volatile	P, G	do	7 days
61, Silica	P	do	28 days.
64, Specific conductance	P, G	do	Do.
65, Sulfate	P, G	do	Do.
66, Sulfide	P, G	Cool, 4°C add zinc acetate plus sodium hydroxide to pH>9	7 days
67, Sulfite	P, G	None required	Analyze immediately.
68, Surfactants	P, G	Cool, 4°C	48 hours.
69, Temperature	H, G	None required	Analyze.
70, Turbidity	P, G	Cool, 4°C	48 hours.
Table IC—Organic Tests [9]			
13, 18-20, 22, 24-28, 34-37, 39-43, 45-47, 56, 66, 68, 69, 82-85, 87, Purgeable Halocarbons	G, Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5]	14 days.
6, 57, 60, Purgeable aromatic hydrocarbons	do	Cool, 4°C, 0.008% $Na_2S_2O_3$, HCl to pH2 [10]	Do.
3, 4, Acrolein and acrylonitrile	do	Cool, 4°C, 0.008% $Na_2S_2O_3$, Adjust pH to 4-5 [11]	Do.
23, 30, 44, 48, 53, 54, 76, 77, 83, 85, 86, Phenols [12]	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction, 40 days after extraction.
7, 38, Benzidines [13]	do	do	7 days until extraction. [14]
14, 17, 48, 50-52, Phthalate esters [13]	do	Cool, 4°C	7 days until extraction, 40 days after extraction.
22-24, Nitrosamines [13 15]	do	Cool, 4°C, store in dark, 0.008% $Na_2S_2O_3$	Do.
78-80, PCBs [13] polychlorinated	do	Cool, 4°C	Do.
34, 55, 59, 63, Nitroaromatics and isophorone [13]	do	Cool, 4°C, 0.008% $Na_2S_2O_3$, store in dark	Do.
1, 2, 5, 8-12, 32, 33, 58, 59, 64, 65, 84, 88, Polynuclear aromatic hydrocarbons [13]	do	do	Do.
15, 16, 21, 31, 73, Haloethers [13]	do	Cool, 4°C, 0.008% $Na_2S_2O_3$	Do.
29, 35-37, 64-66, 81, Chlorinated hydrocarbons [13]	do	Cool, 4°C	Do.
87, TCDD [13]	do	Cool, 4°C, 0.008% $Na_2S_2O_3$	Do.
Table ID—Pesticides Tests			
1-70, Pesticides [13]	do	Cool, 4°C, pH 5-9 [16]	Do.
Table IE—Radiological Tests			
1-5, Alpha, beta and radium	P, G	HNO_3 to pH<2	6 months.

Table II Notes

[1] Polyethylene (P) or Glass (G)

APPENDIX IV

METHODOLOGY

METHODOLOGY

I. Inorganic

Inorganic Parameters	Standard Methods 15 Edition	EPA 1979	SW846 3rd Edition
Acidity	402 (4.d)	305.1	
Alkalinity	403	310.1	
Ash, Percent	209.E	160.4	
BOD (5-Day)	507	405.1	
BOD (20-Day)	507	405.1	
Bromide	405	320.1	
Carbon Dioxide	406B	N/A	
Chloride	407B	325.3	9252
Chlorine, Residual	408B	330.2	
Chlorine, Demand	409	N/A	
COD	508A	410.1	
Corrositivity	N/A	N/A	1110
Cyanide, Total	412B	335.2	9010
Cyanide, Free	412B	335.1	9010
Cyanide, Ammenable	412F	335.1	9010
Dissolved Oxygen	421B	360.2	
Flash Point (140 F)	N/A	N/A	1010
Flash Point, Actual	N/A	N/A	1010
Fluoride	413B	340.2	
Fluoride, Distillation	413A	340.2	
Formaldehyde	N/A	N/A	
Hardness, Total	314B	130.2	
Hardness, Ca or Mg	311C	242.1	
Moisture, Percent	N/A	N/A	
Nitrogen, Ammonia	417B	350.2	
Nitrogen, Kjeldahl	417D	351.3	
Nitrogen, Nitrate	418C	352.1	9200
Nitrogen, Nitrite	419	354.1	
Nitrogen, Total	****	*****	
Oil & Grease	503A	413.1	9070
pH	423	150.1	9040
Phenols	510B	420.1	9065
Phosphorus, Total	424F	365.3	
Phosphorus, Ortho	424F	365.3	

Inorganic Parameters	Standard Methods 15 Edition	EPA 1979	SW846 3rd Edition
Salinity	205	N/A	
Solids, Total	209A	160.3	
Solids, Total Volatile	209E	160.4	
Solids, Suspended	209D	160.2	
Solid,Suspended Volatile	209E	160.4	
Solids, Settleable	209F	160.5	
Solids, MLSS	209D	160.2	
Solids, MLVSS	209E	160.4	
Solids, Percent	N/A	N/A	
Solids, Dissolved	209B	160.1	
Specific Conductivity	20S	120.1	9050
Specific Gravity	213E	N/A	
Sulfates, Gravimetric	426A	375.3	
Sulfates, Turbidimetric	426C	375.4	9038
Sulfide	427D	376.1	9030
Sulfite	428F	377.1	
Surfactants (MBAS)	572A	425.1	
Total Organic Carbon	505	415.1	9060
Total Organic Halide	N/A	450.1	9020
Turbidity	214A	180.1	

II. Metals

	Flame Analysis			Graphite Furnace		
Parameter	Standard Methods	EPA 1979	SW-846	Standard Methods	EPA 1979	SW-846
Aluminum	303C	202.1	7020	304	202.2	N/A
Antimony	303A	204.1	7040	304	204.2	7041
Arsenic	N/A	N/S	N/A	304	206.2	7050
Barium	303C	208.1	7080	304	208.2	N/A
Beryllium	303C	210.1	7090	304	210.2	7091
Boron	404A	212.3	N/A	N/A	N/A	N/A
Cadmium	303A	213.7	7130	304	213.2	7131
Calcium	303A	215.1	7140	N/A	N/A	N/A
Chromium	303a	218.1	7190	304	218.2	7191
Chromium, Hex	303B	218.4	7196	N/A	N/A	N/A
Cobalt	303A	219.1	7200	304	219.1	7201
Copper	303B	220.1	7380	304	220.2	N/A
Iron	303A	236.1	7380	304	236.2	N/A
Lead	303A	239.1	7420	304	239.2	7421
Magnesium	303A	242.1	7450	N/A	N/A	N/A
Manganese	303a	243.1	7460	304	243.2	N/A
Mercury	303F	245.1	7470	N/A	N/A	N/A
Molybdenum	303C	246.1	7480	304	246.2	7481
Nickel	303A	249.1	7520	304	249.2	N/A
Potassium	303A	258.1	7610	N/A	N/A	N/A
Selenium	N/A	N/A	N/A	304	270.2	7740
Silver	303A	272.1	7760	304	272.2	N/A
Sodium	303A	273.1	7770	N/A	N/A	N/A
Thallium	303A	279.1	7840	304	279.2	7841
Tin	303A	282.1	7870	304	282.2	N/A
Titanium	303C	283.1	N/A	304	283.2	N/A
Vanadium	303C	286.1	7910	304	286.2	7911
Zinc	303A	289.1	7950	304	289.2	N/A

III. Organic Analysis

Organic Group	EPA Method Number SW-846
Purgeable Halocarbons	601 8010
Purgeable Aromatics	602 8020
Acrolein and Acrylonitrite	603 8030
Phenols	604 8040
Phthalate Esters	606 8060
Nitrosamines	607 8070
Organochlorine Pesticides and PCB's	608 8080
Nitroaromatics and Isophorone	609 8090
Haloethers	611 N/A
Chlorinated Hydrocarbons	612 8120
Purgeables	624 8240
Base/Neutrals and Acids	625 8270
Non-Halogenated Volatile Organics	N/A 8015
Organophosphorus Pesticides	N/A 8140
Chlorinated Herbicides	N/A 8150

Total Petroleum Hydrocarbons - See Appendix V

IV. Hazardous Waste Characterization

Parameters	Std. Method 15th Ed.	SW-846
EP Toxicity Leachate Extraction	N/A	1310
Metals	- See Metals -	
Organics	- See Organics -	
Corrositivity	N/A	1110
Ignitability	N/A	1010
Reactivity	N/A	1210
Toxic Characteristic Extraction	N/A	1330

V. Radiological

Parameters	Std. Method 15th Ed.	Sw-846
Gross Alpha	703	9315
Gross Alpha & Beta	703	9310
Radium 226	707	N/A
Radium 228 (Isotope)	707	9320

VI. Biological Analysis

Parameters	Std. Methods 15th Ed.	SW-846
Coliform, Total (48-hour)	908A	9131
Coliform, Fecal	909C	9132
Bioassay		
7-Day Chronic	N/A	N/A
Acute	N/A	N/A

APPENDIX V

TOTAL PETROLEUM HYDROCARBONS

ANALYTICAL PROCEDURES FOR THE DETECTION AND QUANTIFICATION OF TOTAL PETROLEUM FUEL HYDROCARBONS AND FUEL CONSTITUENTS

The following analytical procedures and analysis shall be used for the detection and quantification of petroleum hydrocarbons and fuel constituents. These techniques are to be followed when analysis is require for evaluation of either a suspected or confirmed tank leak as presented in the guidelines. These analytical techniques cover the full range of petroleum fuel hydrocarbons from gasoline (C_4 -C_{12}) to jet fuel (C_{10} -C_{16}), to diesel (C_9 -C_{22}) in solid matrix. Detection of complex hydrocarbon mixtures are best achieved using a Gas Chromatograph with a Flame Ionization Detector (GC/FID).

I. TOTAL PETROLEUM FUEL HYDROCARBONS ANALYSIS

(Low to medium boiling point hydrocarbons)
This includes the full range of gasoline. This technique may also be appropriate for military grade jet fuels.

A. Sample Preparation

Soil

Use EPA method 5030, Purge and Trap, (EPA manual SW-846, April 1984). Polyethylene glycol (PEG) or Methanol extraction can be used as a extracting solvent. Extractions are applicable for the analyses of both fresh or aged fuels..

B. Analysis

1. Chromatographic operations for detection of total petroleum fuel hydrocarbons without BTX distinction.

   Detector: Flame Ionization
   Column: 10 Percent SP-2100 on 80/100 Supelcort (8' x 1/8" glass column). Capillary columns may also be used as a substitute to improve separation.

II. TOTAL PETROLEUM HYDROCARBONS ANALYSIS

(High boiling point hydrocarbons)
This analysis includes the range of diesel motor fuels and commercial grade jet fuels.

A. Sample Preparation

Soil

Use EPA method 3550, Sonication Extraction, (EPA manual SW-846, April 1984). Acetone extraction with sample partitioning in hexane has been found to be an acceptable sample preparation, however other appropriate solvents may also be used.

B. Analysis

Chromatographic operations for detection of total petroleum fuel hydrocarbons.

Detector: Flame Ionization
Column: 10 Percent SP-2100 on 80.100 8' x 1/8" glass supelcoport. Capillary columns may also be used as a substitute to improve separation.

Typical Operating Conditions

Carrier Gas: Nitrogen or Helium at 30ml/min.
Injector Temperature: 250°C
Detector Temperature: 300°C
Column Temperature: 40°C hold for 3 minutes
10°C/min ramp rate to 300°C or until at least 95 percent of all components are eluted.

Quantification

Quantify Total Petroleum Fuel Hydrocarbons by intergrating all major peaks within the time period in which at least 95 percent of the recoverable hydrocarbons are eluted. Calibration shall be based upon an appropriate fuel standard representative of the suspect fuel.

If an appropriate sample for calibration does not exist, as in the case of an aged fuel, calibration

shall be done using a "non-aged" representative fuel standard.

Analysis (cont)

Typical Operating Conditions

Carrier Gas: Nitrogen or Helium at 30ml/min.
Injector Temperature: 250°C
Detector Temperature: 300°C
Column Temperature: 40°C hold for 3 minutes, 10°C/min ramp rate to 300°C or until at least 95 percent of all components are eluted.

Analysis (cont)

2. Chromatographic operations for detection of total petroleum fuel hydrocarbons with BTX distinction.

Detector: Photo Ionization in series with Flame Ionization.
Column: Carbopack B/3 percent SP-1500

Typical Operations Conditions

Carrier Gas: Nitrogen or Helium at 10ml/min.
Injector Temperature: 200°C
Detector Temperature: 250°C
Column Temperature: 100°C x 6 min. to 225°C at 10°C/min hold 25 min. or until at least 95 percent of all components are eluted.

Quantification

Quantify Total Petroleum Fuel Hydrocarbons by intergrating all major peaks within the time period in which at least 95 percent of the recoverable hydrocarbons are eluted. Calibration shall be based upon an appropriate fuel standard representative of the suspect fuel.

If an appropriate sample for calibration does not exist, as in the case of an aged fuel, calibration shall be done using a "non-aged" representative fuel standard.

Calibration should be established within the estimated range of contaminant levels within the sample, based on odor or sheen or on prescreening measurements (i.e., combustible gas meter, or I.R. method). Where "non-detectable concentrations" are reported, the level of detection shall not exceed 10 ppm for soil and 50 ppb for water.

Calibration should be established within the estimated range of contaminant levels within the sample, based on odor or sheen or on prescreening measurements (i.e., combustible gas meter, or I.R. method). Where "non-detectable concentrations" are reported, the level of detection shall not exceed 10 ppm for soil and 50 ppb for water.

III. Quantification of Benzene, Toluene, and Xylene (BTX)

A. Sample Preparation

1. Water
   Use EPA Method 602 or EPA method 5030 Purge and Trap, (EPA manual SW-846, April 1984).

2. Soil
   Use EPA method 602 or EPA method 5030 Purge and Trap, (EPA manual SW-846, April 1984).

B. Analysis

Use EPA method 602 or 8020, (EPA manual SW-846, April 1984).

IV. Quantification of Tetraethyl Lead

Use EPA method 601 or appropriate method in Recommended Methods for Analysis of Components in AB 1803, Pg. 301. (a), or any other Department Health Services analysis approved under the 1803 program.

V. Quantification of Tetraethly Lead

Use EPA method 7421 Atomic Adsorption/Graphite Furnace (AA/GF).

Results shall be reported as Total Lead.

a. Khalifa, Safy, Ph.D., Tamplin B.R. Ph.D., Spath, David, Ph.D., Recommended Methods of Analysis For The Organic Components Required For AB 1803. Department of Health Services, State of California, May 1985.

APPENDIX VI

CHAIN-OF-CUSTODY & ANALYTICAL REPORT EXAMPLES

CTE mical & Environmental Technology, Inc.
102-A Woodwinds Industrial Ct.
Cary, NC 27511

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME	NO. OF CONTAINERS							REMARKS
SAMPLERS: (Signature)									

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Field Files

CTE

Chemical & Environmental Technology, Inc.

ENVIRONMENTAL LABORATORY SERVICES

JOHN M. OGLE
PRESIDENT

P. O. BOX 12298
RESEARCH TRIANGLE PARK, N. C. 27709
PHONE (919) 467-3090
FAX (919) 467-3515

APRIL 19, 1989

Client:
Company:
Address:

Re: Project Information

SAMPLE HISTORY

CLIENT ID	CET SAMPLE	DATE RECEIVED	DATE ANALYZED
EFFLUENT	23966	3-30-89	3-31-89 TO 4-17-89

ANALYTICAL RESULTS-1

PARAMETER	METHOD-2	EFFLUENT
BOD	405.1	4
CYANIDE	335.3	<0.01
NITROGEN, AMMONIA	350.1	0.48
pH	150.1	6.5
SOLID, SUSPENDED	160.2	19
CADMIUM	213.2	0.094
CHROMIUM, TOTAL	218.1	0.006
COPPER	220.1	0.042
LEAD	239.2	0.001
MERCURY	245.1	0.0003
NICKEL	249.1	0.293
SILVER	272.1	0.01
ZINC	289.1	0.12

1 - ALL RESULT UNITS ARE EXPRESSED IN MG/L, EXCEPT
pH.....UNITS
2 - FEDERAL REGISTER, VOL 49, NO. 209, OCTOBER 26, 1984

CHEMICAL & ENVIRONMENTAL TECHNOLOGY

Terrie Litzenberger

TERRIE LITZENBERGER
ASSISTANT LABORATORY MANAGER

AR401153

THL/hws

Chemical & Environmental Technology, Inc.

ENVIRONMENTAL LABORATORY SERVICES

JOHN M. OGLE
PRESIDENT

P. O. BOX 12298
RESEARCH TRIANGLE PARK, N. C. 27709
PHONE (919) 467-3090
FAX (919) 467-3515

FEBRUARY 27, 1989

Client:
Company:
Address:

Re: Project Information

SAMPLE HISTORY

CLIENT ID	CET SAMPLE	DATE RECEIVED	DATE ANALYZED
MW-1	22550	2-3-89	2-22-89
MW-1-22'	22551	2-3-89	2-13-89 TO 2-23-89
SB-2-12'	22552	2-3-89	2-13-89 TO 2-20-89
SB-2-17'	22553	2-3-89	2-13-89 TO 2-20-89
SB-4-12'	22554	2-3-89	2-13-89 TO 2-20-89
SB-4-17'	22555	2-3-89	2-13-89 TO 2-20-89
MW-2-22'	22556	2-3-89	2-13-89 TO 2-20-89
MW-2-27'	22557	2-3-89	2-13-89 TO 2-20-89
SB-8-17'	22558	2-3-89	2-15-89 TO 2-20-89
SB-8-22'	22559	2-3-89	2-15-89 TO 2-20-89
SB-9-25'	22560	2-3-89	2-15-89 TO 2-22-89
HA-1	22561	2-3-89	2-15-89 TO 2-22-89
HA-2	22562	2-3-89	2-15-89 TO 2-22-89
HA-3	22563	2-3-89	2-15-89 TO 2-22-89

22551-22563
FEBRUARY 27, 1989

ANALYTICAL RESULTS-1

CLIENT ID	HYDROCARBON, HIGH (METHOD 3550)-2,3
MW-1-22'	134
SB-2-12'	413
SB-2-17'	<0.1
SB-4-12'	<0.1
SB-4-17'	<0.1
MW-2-22'	<0.1
MW-2-27'	<0.1
SB-8-17'	<0.1
SB-8-22'	<0.1
SB-9-25'	617
HA-1	422
HA-2	<0.1
HA-3	<0.1 **

1 - ALL RESULT UNITS ARE EXPRESSED IN MG/KG
2 - "GUIDELINES FOR ADDRESSING FUEL LEAKS", CALIFORNIA WATER QUALITY CONTROL BOARD, SEPTEMBER, 1985
3 - HYDROCARBONS IDENTIFIED AS VARSOL

**16 UNIDENTIFIED PEAKS

CHEMICAL & ENVIRONMENTAL TECHNOLOGY

John E. Baur

JOHN E. BAUR
ORGANIC CHEMIST

JEB/bws

BASE/NEUTRALS AND ACIDS
Analysis Method: 625
C&ET Sample: 22550

Client ID: MW-1 Date Analyzed: 2-22-89

BASE/NEUTRALS

Parameter	Detection Limit(ug/l)	Results(ug/l)
Acenaphthene	10	ND
Acenaphthylene	10	ND
Anthracene	10	ND
Benzo(a)anthracene	10	ND
Benzo(b)fluoranthene	10	ND
Benzo(k)fluoranthene	10	ND
Benzo(a)pyrene	10	ND
Benzo(ghi)perylene	10	ND
Bis(2-chloroethyl)ether	10	ND
Bis(2-choroethoxy)methane	10	ND
Bis(2-ethylhexyl)phthalate	10	ND
Bis(2-chloroisopropyl)ether	10	ND
4-Bromophenyl phenyl ether	10	ND
Butyl benzyl phthalate	10	ND
2-Chloronaphthalene	10	ND
4-Chlorophenyl phenyl ether	10	ND
Chrysene	10	ND
Dibenzo(a,h)anthracene	10	ND
Di-n-butylphthalate	10	ND
1,2-Dichlorobenzene	10	ND
1,3-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
3,3'-Dichlorobenzidine	10	ND
Diethyl phthalate	10	ND
Dimethyl phthalate	10	ND
2,4-Dinitrotoluene	10	ND
2,6-Dinitrotoluene	10	ND
Di-n-octylphthalate	10	ND
Fluoranthene	10	ND
Fluorene	10	ND
Hexachlorobenzene	10	ND
Hexachlorobutadiene	10	ND
Hexachloroethane	10	ND
Ideno(1,2,3-cd)pyrene	10	ND
Isophorone	10	ND
2-Methylnaphthalene	10	ND
Naphthalene	10	ND
Nitrobenzene	10	ND
N-Nitrosodi-n-propylamine	10	ND
Phenanthrene	10	ND
Pyrene	10	ND
1,2,4-Trichlorobenzene	10	ND

BASE/NEUTRALS AND ACIDS
Analysis Method: 625
C&ET Sample: 22550

ACIDS

Parameter	Detection Limit(ug/l)	Results(ug/l)
4-Chloro-3-methylphenol	10	ND
2-Chlorophenol	10	ND
2,4-Dichlorophenol	10	ND
2,4-Dimethylphenol	10	ND
2,4-Dinitrophenol	50	ND
2-methyl-4,6-dinitrophenol	50	ND
2-Nitrophenol	10	ND
4-Nitrophenol	50	ND
Pentachlorophenol	50	ND
Phenol	10	ND
2,4,6-Trichlorophenol	10	ND

ND - Not Detected
Federal Register, Vol. 49, No. 209, October 26, 1984.

APPENDIX VII

PRICE SCHEDULE

Chemical & Environmental Technology, Inc.
P. O. Box 12298
Research Triangle Park, N.C. 27709

Price Schedule

I. Inorganic Parameters	Detection Limit		Price
Acidity	1.0	mg/l	6.75
Alkalinity	1.0	mg/l	6.75
Ash, Percent	--------		11.00
BOD (5-Day)	1.0	mg/l	20.00
BOD (20-Day)	1.0	mg/l	25.00
Bromide	1.0	mg/l	15.00
BTU	-------		25.00
Carbon Dioxide	1.0	mg/l	7.75
Chloride	1.0	mg/l	7.00
Chlorine. Residual	0.01	mg/l	7.75
Chlorine Demand	0.01	mg/l	45.00
COD	1.0	mg/l	11.00
Corrositivity	----------		40.00
Cyanide, Total	0.02	mg/l	27.50
Cyanide, Free	0.02	mg/l	42.00
Cyanide. Amenable	0.02	mg/l	30.00
Dissolved Oxygen	0.1	mg/l	7.75
Flash Point (140 F)	--------		9.00
Flash Point, Actual	--------		11.00
Fluoride	0.05	mg/l	9.50
Fluoride, Distillation	0.05	mg/l	18.75
Formaldehyde	0.1	mg/l	42.00
Hardness, Total	1.0	mg/l	8.00
Hardness, Ca or Mg	1.0	mg/l	10.00
Moisture, Percent	--------		9.00
Nitrogen, Ammonia	0.02	mg/l	15.00
Nitrogen, Kjeldahl	0.02	mg/l	18.00
Nitrogen, Nitrate	0.01	mg/l	20.00
Nitrogen, Nitrite	0.01	mg/l	10.00
Nitrogen, Total	0.05	mg/l	38.00
Oil & Grease	1.0	mg/l	20.00
pH	--------		5.00
Phenols	0.001	mg/l	20.00
Phosphorus, Total	0.01	mg/l	20.00
Phosphorus, Ortho	0.01	mg/l	15.00

Salinity	1.0	mg/l	6.75
Solids, Total	1.0	mg/l	6.75
Solids, Total Volatile	1.0	mg/l	11.00
Solids, Suspended	1.0	mg/l	6.75
Solids, Suspended Volatile	1.0	mg/l	11.00
Solids, Settleable	0.5	ml/l	5.00
Solids, MLSS	1.0	mg/l	9.00
Solids, MLVSS	1.0	mg/l	11.00
Solids, Percent	--------		11.00
Solids, Dissolved	1.0	mg/l	9.00
Specific Conductivity	--------		5.00
Specific Gravity	--------		9.00
Sulfates, Gravimetric	1.0	mg/l	25.00
Sulfates, Turbidimetric	1.0	mg/l	9.00
Sulfide	0.1	mg/l	10.00
Sulfite	0.1	mg/l	9.00
Surfactants (MBAS)	0.001	mg/l	20.00
Total Organic Carbon	0.5	mg/l	30.00
Total Organic Halide	0.005	mg/l	65.00
Turbidity	0.01	NTU	5.00

II. Metals Analysis

NOTE: For soil samples, add $25.00 for digestion and/or sample preparation.

	Flame Analysis			Graphite Furnace		
Parameter	Det. Limit		Price	Det. Limit		Price
Aluminum	0.10	mg/l	8.00	0.003	mg/l	12.00
Antimony	0.20	mg/l	8.00	0.003	mg/l	12.00
Arsenic				0.001	mg/l	25.00
Barium	0.10	mg/l	8.00	0.002	mg/l	12.00
Beryllium	0.005	mg/l	8.00	0.0002	mg/l	12.00
Cadmium	0.005	mg/l	8.00	0.0001	mg/l	12.00
Calcium	0.01	mg/l	8.00			
Chromium	0.05	mg/l	8.00	0.001	mg/l	12.00
Chromium,Hexa	0.05	mg/l	8.00	0.005	mg/l	12.00
Cobalt	0.05	mg/l	8.00	0.001	mg/l	12.00
Copper	0.02	mg/l	8.00	0.001	mg/l	12.00
Iron	0.03	mg/l	8.00	0.001	mg/l	12.00
Lead	0.10	mg/l	8.00	0.001	mg/l	12.00
Magnesium	0.001	mg/l	8.00			
Manganese	0.0	mg/l	8.00	0.0002	mg/l	12.00
Mercury	0.0002	mg/l	25.00			
Molybdenum	0.10	mg/l	8.00	0.001	mg/l	12.00
Nickel	0.04	mg/l	8.00	0.001	mg/l	12.00
Potassium	0.01	mg/l	8.00			
Selenium				0.002	mg/l	25.00
Silver	0.01	mg/l	8.00	0.0002	mg/l	12.00
Sodium	0.002	mg/l	8.00	0.0002	mg/l	12.00

Thallium	0.10	mg/l	8.00	0.001	mg/l	12.00
Tin	0.80	mg/l	8.00	0.005	mg/l	12.00
Titanium	0.40	mg/l	8.00	0.010	mg/l	12.00
Vanadium	0.20	mg/l	8.00	0.004	mg/l	12.00
Zinc	0.005	mg/l	8.00			

III. Organic Analysis

Organic Group	Price
Method 601	100.00
Method 602	62.00
Method 603	50.00
Method 604	100.00
Method 606	125.00
Method 607	100.00
Method 608	150.00
Method 609	75.00
Method 610 (GC)	150.00
Method 611	75.00
Method 612	100.00
Method 624	155.00
Method 625	325.00
Method 8240	150.00
Method 8270	350.00
Total Petroleum Hydrocarbons	
Unknown Contaminate	120.00
Low Boiling Fraction	50.00
High Boiling Fraction	75.00
Drinking Water Pesticides and Herbicides	140.00
Trihalomethanes	35.00

GC/MS Prices upon request for any additional analysis

Note: These prices are for water analysis. Prices will be less if multiple methods are performed simultaneously on the same sample. For soils and solid samples, add $25.00 for preparation.

IV. Hazardous Waste Characterization

Parameters	Price
EP Toxicity Extraction	75.00
Metals	140.00
Organics	140.00
Corrositivity	40.00
Ignitability	25.00
Reactivity	75.00
Toxic Characteristic Extraction	100.00
Inorganic Scan	160.00
Gross Alpha	35.00
Gross Alpha & Beta	50.00
Radium 226	75.00
Radium 228 (Isotope)	100.00
PCB	
Oil	50.00
Water & Soil	75.00

V. Biological Analysis

Parameters	Prices
Coliform, Total (48-hour)	25.00
Coliform, Fecal	20.00
Bioassay	
7-Chronic	225.00
Acute	225.00

APPENDIX VIII

TERMS AND CONDITIONS

STANDARD TERMS AND CONDITIONS

1. **CLIENT SAMPLE DOCUMENTATION:** Chemical & Environmental Technology, Inc. requires written client work instructions with each sample to be analyzed. These instructions, at a minimum, shall include the following information: sample description analyses required, or other data pertinent to the sample that would be useful to laboratory personnel; name of technical contact, purchasing order number, billing address if different from mailing address and telephone number.

IN THE EVENT THAT THE SAMPLE(S) SUBMITTED CONTAIN HAZARDOUS/TOXIC SUBSTANCES, THE CLIENT SHALL ADVISE CHEMICAL & ENVIRONMENTAL TECHNOLOGY OF THIS FACT IN ITS WORK INSTRUCTIONS AND SHALL CLEARLY MARK EACH SAMPLE CONTAINER ACCORDINGLY.

2. **DELIVERY:** The normal testing period for is two (?) weeks from the date that the sample and work instructions are received by Chemical & Environmental Technology, Inc. Interim results may be obtained either verbally and/or by facsimile, with final report issued ?-? days afterwards.

Any sample delivered to the laboratory after regular business hours 3:00 p.m. Monday-Friday) will not be entered into the system until the next business day

3. **RUSH ANALYSES:** 'Expedited service is available for clients with an urgent need for test results. This service is offered with a surcharge on the list fee for the test(s) to be performed, subject to the approval of the responsible laboratory manager. The analytical time is for normal working days (Monday through Friday).

24 hours	200% Surcharge
48 hours	100% Surcharge
3 days	75% Surcharge
5 days	50% Surcharge

4. **PAYMENT TERMS:** Payment prior to the release of test data is required of all clients, except those with an approved and current account. Payment terms for clients with an established account is net 30 days AFTER WHICH A 1.5% PER MONTH SERVICE CHARGE IS ADDED TO THE UNPAID DELINQUENT BALANCE.

In the event that a delinquent account is turned over to a Commercial or Legal collection process, the client shall be liable for all reasonable costs and fees incurred by Chemical & Environmental Technology, Inc., to collect the amount owed.

5. **COLLECTION OF SAMPLES:** For those clients outside the range of the laboratory's pick-up service, Chemical & Environment Technology, Inc., will provide appropriate sample containers without charge, except that clients requesting expedited delivery of containers will be charged for this service as part of the invoice for analytical work performed. The client will be billed for unreturned sample containers as separate charge. It is the responsibility of the client to ensure proper sampling, and to bear the cost of forwarding samples to Chemical & Environmental Technology, Inc., in accordance with proper preservation a storage protocol. Chemical & Environmental Technology, Inc., will only be responsible for sample integrity if the sampling has been performed by its personnel.

6. **RETENTION OF SAMPLES:** Samples analyzed will be retained by Chemical & Environmental Technology, Inc., with the following schedule:

TYPE OF SAMPLE	RETENTION PERIOD
Potable Water	None
Wastewater & Sludge	? days
Foods - Perishables	? days
All other samples	14 days

All samples containing hazardous/toxic compounds, requiring special handling for disposal, shall be returned to the client with the test report for those samples.

7. **ORDER OF PRECEDENCE:** In the event of a conflict between the terms and conditions stated herein, and those which are part of the customer order, Chemical & Environmental Technology, Inc., standard terms and conditions are deemed to take precedence unless otherwise agreed to in writing by Chemical & Environmental Technology, Inc.

8. **WARRANTY AND LIMITATION OF LIABILITY:** CHEMICAL & ENVIRONMENTAL TECHNOLOGY, INC., WARRANTS ONLY THE ACCURACY OF THE TEST RESULT DATA FOR THE SAMPLE(S) ANALYZED. CHEMICAL & ENVIRONMENTAL TECHNOLOGY, INC., DISCLAIMS ANY OTHER WARRANTY EXPRESSED OR IMPLIED, INCLUDING THE FITNESS FOR INTENDED PURPOSE OR MERCHANTABILITY OF SAID DATA.

THE CLIENT ACKNOWLEDGES THAT IT HAS READ, UNDERSTANDS AND ACCEPTS THIS WARRANTY, AND AGREES THAT CHEMICAL & ENVIRONMENTAL TECHNOLOGY, INC., LIABILITY SHALL BE LIMITED TO THE RETESTING OF SAMPLES IF UPON REEXAMINATION OF THE DATA, CHEMICAL & ENVIRONMENTAL TECHNOLOGY, INC., IN ITS SOLE JUDGMENT, DETERMINES THAT THERE IS A DEFICIENCY IN THE DATA. THE CLIENT FURTHER AGREES THAT CHEMICAL & ENVIRONMENTAL TECHNOLOGY, INC., SHALL NOT BE HELD LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES IN CONNECTION WITH THE TEST RESULT D ICAL & ENVIRONMENTAL TECHNOLOGY, INC., SHALL BE INDEMNIFIED AND HELD HARMLESS AGAINST ANY THIF TION WITH THE TEST RESULTS DATA OR ITS USE BY THE CLIENT, UNLESS SUCH DAMAGES OR CLAIMS RESULT FRC & ENVIRONMENTAL TECHNOLOGY, INC.

AVTEX FIBERS FRONT ROYAL INC.
AVTEX FIBERS SITE

APPENDIX C
CONTRACTOR SAFETY PLANS

ADMINISTRATIVE ORDER
Docket No. III-90-01-DC

Prepared for U.S. Environmental Protection Agency
Hazardous Waste Management Division

Region III

November 7, 1989

AVTEX FIBERS FRONT ROYAL INC.
Kendrick Lane
P.O. Box 1169
Front Royal, Virginia 22630

APPENDIX G

CONTRACTOR SAFETY PLANS

This appendix contains safety plans specific to the activities of each on-site clean up contractor.

AVTEX FIBERS FRONT ROYAL INC.
AVTEX FIBERS SITE

WORK PLAN

HEALTH AND SAFETY PLANS

S. D. Myers includes a health and safety plan as pages 26-29 of the work plan for PCB cleanup; and Chemical Waste Management includes a health and safety plan as section 2.6 of the plan to remove hazardous waste in drums from the site; both are located in section 7 of the Work plan

ADMINISTRATIVE ORDER

Docket III-90 010-DC

Prepared for

U. S. Environmental Protection Agency

Region III

November 1989

AVTEX FIBERS FRONT ROYAL INC.
Kendrick Lane
P. O. Box 1169
Front Royal, Virginia 22630

Sample Site Safety Plan

A. SITE DESCRIPTION

Date November 6, 1989 Location Avtex Fibers, Front Royal, VA

Hazards Polychlorinated Biphenyls

Area affected Sub I-A, Northwest Dock Area, Compressor Room, Roof, Transformer Storage area, Rail water sewer system.

Surrounding population Approximately 12000

Topography Industrial site, Shenandoah River Valley, NorthWestern, VA

Weather conditions No major extremes of heat or cold are expected.

Additional information The plant is an ongoing industrial manufactuser of carbonized rayon. In addition, plant renovations are being completed.

B. ENTRY OBJECTIVES - The objective of the initial entry to the contaminated area is to (describes actions, tasks to be accomplished; i.e., identify contaminated soil; monitor conditions, etc.) Removal and disposal of PCB contaminated materials from affected areas, post cleanup sampling to ensure that all contamination has been removed.

C. ONSITE ORGANIZATION AND COORDINATION - The following personnel are designated to carry out the stated job functions on site. (Note: One person may carry out more than one job function.)

PROJECT TEAM LEADER Lynn Fritz

SCIENTIFIC ADVISOR Joe Kelly

SITE SAFETY OFFICER Dave Bichsel

PUBLIC INFORMATION OFFICER Lynn Fritz

SECURITY OFFICER Dave Bichsel

RECORDKEEPER Lynn Fritz/Dave Bichsel/Mark Roberts

FINANCIAL OFFICER Richard R. Heddleston

FIELD TEAM LEADER Dave Bichsel/Mark Roberts

FIELD TEAM MEMBERS

FEDERAL AGENCY REPS (i.e., EPA, NIOSH)

STATE AGENCY REPS

LOCAL AGENCY REPS

CONTRACTOR(S)

All personnel arriving or departing the site should log in and out with the Recordkeeper. All activities on site must be cleared through the Project Team Leader.

D. ONSITE CONTROL

(Name of individual or agency) has been designated to coordinate access control and security on site. A safe perimeter has been established at (distance or description of controlled area) Avtex provides perimeter security with fences and gaurd services. Exclusion zones have been established at each affected area.
No unauthorized person should be within this area.

The onsite Command Post and staging area have been established at S. D. Myers office/supply truck adjacent to Avtex laboratory building.

The prevailing wind conditions are N/A. This location is upwind from the Exclusion Zone.

Control boundaries have been established, and the Exclusion Zone (the contaminated area), Hotline, Contamination Reduction Zone, and Support Zone (clean area) have been identified and designated as follows: (describe boundaries and/or attach map of controlled area)

Data included in the work plan.

These boundaries are identified by: (marking of zones, i.e., red boundary tape - hotline; traffic cones - support zone; etc.)
All affected areas plus a three foot bufferzone are outlined with barrier tape or silt fencing.

8. HAZARD EVALUATION

The following substance(s) are known or suspected to be on site. The primary hazards of each are identified.

Substances Involved (chemical name)	Concentrations (If Known)	Primary Hazards (e.g., toxic on inhalation)
Polychlorinated Biphenyls	0-3000	
1-1-1	As purchased 100%	

The following additional hazards are expected on site: (i.e., slippery ground, uneven terrain, etc.) open trenches and slippery ground.

Hazardous substance information form(s) for the involved substance(s) have been completed and are attached.

9. PERSONAL PROTECTIVE EQUIPMENT

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

Location	Job Function	Level of Protection
Exclusion Zone	Excavation	A B C (D) Other
	Sewer Decontamination	A B C D (Other)
		A B C D Other
		A B C D Other
Contamination Reduction Zone		A B C D Other
		A B C D Other
		A B C D Other
		A B C D Other

Specific protective equipment for each level of protection is as follows:

Level A: Fully-encapsulating suit; SCBA; (disposable coveralls)

Level B: Splash gear (type); SCBA

Level C: Splash gear (type); Full-face canister respirator

Level D: Disposable Coveralls; Safety Glasses; Gloves; Shoe Protection

Other: See Steam-Kat site safety plan

The following protective clothing materials are required for the involved substances:

Substance (chemical name)	Material (material name, e.g., Viton)
Polychlorinated Biphenyls, 1-1-1	Sarnex Polyvinyl Alcohol

If air-purifying respirators are authorized, (filtering medium) is the appropriate canister for use with the involved substances and concentrations. A competent individual has determined that all criteria for using this type of respiratory protection have been met.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER AND THE PROJECT TEAM LEADER.

G. ONSITE WORK PLANS

Work party(s) consisting of various persons will perform the following tasks:

Project Team Leader	Lynn Fritz	Oversee entire cleanup operation
Work Party #1	S. D. Myers	Removal of contaminated soil from Sub 1-A, Transformer storage area, Northwest dock area
Work Party #2	Steam Kat	Removal of contamination from rain water sewer system
Rescue Team (required for entries to IDLH environments)		N/A
Decontamination Team		N/A

The work party(s) were briefed on the contents of this plan at _____.

H. COMMUNICATION PROCEDURES

Channel ____ has been designated as the radio frequency for personnel in the Exclusion Zone. All other onsite communications will use channel ____.

Personnel in the Exclusion Zone should remain in constant radio communication or within sight of the Project Team Leader. Any failure of radio communication requires an evaluation of whether personnel should leave the Exclusion Zone.

Verbal communications is the emergency signal to indicate that all personnel should leave the Exclusion Zone. In addition, a loud hailer is available if required.

The following standard hand signals will be used in case of failure of radio communications:

Hand gripping throat	Out of air, can't breathe
Grip partner's wrist or both hands around waist	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	OK, I am all right, I understand
Thumbs down	No, negative

Telephone communication to the Command Post should be established as soon as practicable. The phone number is 703-635-2141 Pager # ____.

I. DECONTAMINATION PROCEDURES

Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The standard level ____ decontamination protocol shall be used with the following decontamination stations: (1) ____
(2) ____ (3) ____ (4) ____ (5) ____
(6) ____ (7) ____ (8) ____ (9) ____
(10) ____ Other All locations

Emergency decontamination will include the following stations: ____
As required

The following decontamination equipment is required: ____
Open top drum for disposable clothing disposal

Normally detergent and water will be used as the decontamination solution. (If required)

J. SITE SAFETY AND HEALTH PLAN

1. Dave Michael is the designated Site Safety Officer and is directly responsible to the Project Team Leader for safety recommendations on site.

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2. Emergency Medical Care

Lynn Fritz, Dave Bichsel, Mark Roberts, [illegible] are the qualified EMTs on site. [illegible], at [illegible], phone [illegible] is located [illegible] minutes from this location. [illegible] was contacted at [illegible] and briefed on the situation, the potential hazards, and the substances involved. A map of alternative routes to this facility is available at [illegible].

Local ambulance service is available from [illegible] at phone [illegible]. Their response time is [illegible] minutes. Whenever possible, arrangements should be made for onsite standby.

First-aid equipment is available on site at the following locations:

First-aid kit	On site command post
Emergency eye wash	On site command post
Emergency shower	Throughout the plant site
(other)	

Emergency medical information for substances present:

Substance	Exposure Symptoms	First-Aid Instructions
PCB	Skin or Eyes	Wash Thoroughly
PCB	Inhalation	Remove to fresh air
1-1-1	Skin or Eyes	Wash Thoroughly
1-1-1	Inhalation	Remove to fresh air

List of emergency phone numbers:

Agency/Facility	Phone #	Contact
Police	Ext. 141	Guard Gate
Fire	"	"
Hospital	"	"
Airport	"	"
Public Health Advisor		

3. Environmental Monitoring

The following environmental monitoring instruments shall be used on site (cross out if not applicable) at the specified intervals.

Combustible Gas Indicator	- continuous/hourly/daily/other	N/A
O_2 Monitor	- continuous/hourly/daily/other	N/A
Colorimetric Tubes (type)	- continuous/hourly/daily/other	N/A
RMU/OVA	- continuous/hourly/daily/other	N/A
Other	- continuous/hourly/daily/other	
	- continuous/hourly/daily/other	

6. Emergency Procedures (should be modified as required for incident)

The following standard emergency procedures will be used by onsite personnel. The Site Safety Officer shall be notified of any onsite emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury in the Exclusion Zone: Upon notification of an injury in the Exclusion Zone, the designated emergency signal Verbal communication shall be sounded. All site personnel shall assemble at the decontamination line. The rescue team will enter the Exclusion Zone (if required) to remove the injured person to the hotline. The Site Safety Officer and Project Team Leader should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the Support Zone. The onsite EMT shall initiate the appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). No persons shall reenter the Exclusion Zone until the cause of the injury or symptoms is determined.

Personnel Injury in the Support Zone: Upon notification of an injury in the Support Zone, the Project Team Leader and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the onsite EMT initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, the designated emergency signal _____ shall be sounded and all site personnel shall move to the decontamination line for further instructions. Activities on site will stop until the added risk is removed or minimized.

Fire/Explosion: Upon notification of a fire or explosion on site, the designated emergency signal _____ shall be sounded and all site personnel assembled at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

Personal Protective Equipment Failure: If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure: If any other equipment on site fails to operate properly, the Project Team Leader and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on-site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

The following emergency escape routes are designated for use in those situations where egress from the Exclusion Zone cannot occur through the decontamination line: (describe alternate routes to leave area in emergencies) at the nearest established boundry all contaminated clothing shall be removed and left in the exclusion zone.

In all situations, when an onsite emergency results in evacuation of the Exclusion Zone, personnel shall not reenter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed.
3. The Site Safety Plan has been reviewed
4. Site personnel have been briefed on any changes in the Site Safety Plan.

5. Personal Monitoring

The following personal monitoring will be in effect on site:

Personal exposure sampling: N/A (describe any personal sampling programs being carried out on site personnel. This would include use of sampling pumps, air monitors, etc.)
Medical monitoring: The expected air temperature will be (60°F). If it is determined that heat stress monitoring is required (mandatory if over 70°F) the following procedures shall be followed:
(describe procedures in effect, i.e., monitoring body temperature, body weight, pulse rate)
weather reports/crew self monitoring to determine level of conscientiousness

All site personnel have read the above plan and are familiar with its provisions.

	(name)	(signature)
Site Safety Officer		
Project Team Leader		
Other Site Personnel		