QUALIFICATIONS

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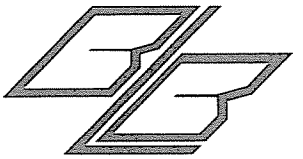

BLASLAND, BOUCK & LEE, INC.

ENGINEERS & SCIENTISTS

PHASE II REMOVAL ACTION

Frontier Chemical - Royal Avenue Site

Niagara Falls, New York

July 1994

Qualifications

Phase II Removal Action

Frontier Chemical - Royal Avenue Site
Niagara Falls, New York

July 1994

BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

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I. Introduction

A. Company Overview

Blasland, Bouck & Lee, Inc. (BB&L) was incorporated in 1984 by 12 professionals headquartered in Syracuse, New York. Their goal was to establish a nationally recognized source of creative solutions to a broad range of environmental engineering and scientific problems. Today, the Firm employs more than 500 engineers, scientists, and technical support personnel in 15 offices throughout the United States. Regional offices focus special attention on serving local clients, but generally remain national in client base. All offices operate without geographic limitation.

An industry leader, BB&L is ranked 105th on Engineering News Record's 1994 list of Top 500 Design Firms. Much of the success and growth of the Firm is due to its proven success in conducting large, multifaceted projects. This is primarily the result of a corporate management philosophy that facilitates effective communication and coordination between specialized company divisions performing different project functions.

Staffing

BB&L's multidisciplinary staff offers clients a comprehensive source of environmental engineering and scientific expertise. The firm's engineering staff includes civil/environmental, sanitary, chemical, electrical, mechanical, structural, and geotechnical engineers. Our scientific staff includes hydrogeologists, geochemists, soil scientists, biologists, environmental toxicologists, atmospheric scientists, industrial hygienists, chemists, and statisticians. Other staff members include architects, surveyors, draftsmen, and construction managers. State-of-the-art technical field and office equipment, computer modeling capabilities [including Geographic Information Systems (GIS)], and access to on-line data bases enable our staff to serve our clients coast-to-coast both cost-effectively and efficiently.

Regional Offices

Our regional offices offer comprehensive environmental services and provide support to other offices. While these offices focus special attention on serving local clients, they generally remain national in client base. BB&L has regional offices in:

- Rochester, New York
- Islandia, New York
- Middletown, New York
- White Plains, New York
- Boca Raton, Florida
- Columbus, Ohio
- Cranbury, New Jersey
- Durham, North Carolina
- Irvine, California
- Miami, Florida
- Orlando, Florida
- Philadelphia, Pennsylvania
- Pittsburgh, Pennsylvania
- Tampa, Florida

B. Services Offered

The Firm offers a broad spectrum of services to address the wide-ranging environmental compliance needs of our clients.

- Hazardous Waste Management Services
- Hydrogeologic Services
- Chemical/Petroleum Storage Services
- Environmental Compliance
- Agricultural Chemical Services
- Solid Waste Management
- Air Monitoring and Modeling
- River-Related Services
- Wastewater Engineering
- Facilities Engineering
- Environmental Training
- Construction Management
- Mapping and Surveying
- Health, Safety, and Industrial Hygiene Services
- Litigation Support

Our scope of practice is more fully detailed in Section II.

BB&L provides multidisciplinary hydrogeologic/ environmental and engineering consulting services to clients throughout the United States, its territories, and in Europe. These clients include Fortune 100 and other industrial companies, major municipalities, law firms, financial institutions, and utilities. Representative lists of our industrial and legal clients is presented below.

Industrial Clients

Allied-Signal, Inc.
Aluminum Company of America
American Cyanamid Company
Amoco Oil Company
BASF Corporation
Chevron U.S.A., Inc.
The Coastal Corporation
Dow Chemical Company
Eastman Kodak Company
E.I. du Pont de Nemours & Company
Exxon Company U.S.A.
General Electric Company
Georgia-Pacific Corporation
International Paper
Mobil Oil Corporation
Monsanto Chemical Company
Rockwell International Corporation
The Sun Company
United Technologies Corporation
Westinghouse Electric Corporation

Law Firms

Nixon, Hargrave, Devans & Doyle
Caldwalader, Wickersham & Taft
Foley & Lardner
Jones, Day, Reavis & Pogue
McKenna, Conner & Cuneo
Shea & Gould
Williams & Connolly

II. Scope of Service

BB&L specializes in providing high quality, high value engineering design and scientific services. The following sections describe our main service areas.

Hazardous Waste Management Services

BB&L has demonstrated the capabilities and expertise necessary to develop technically feasible and cost-effective remedial programs at a variety of sites through the successful management and control of hazardous/toxic materials. Our staff includes some of the nation's foremost professionals in the remediation of sites contaminated with PCBs, organic solvents, polynuclear aromatic hydrocarbons (PAHs) and other petroleum constituents, metals, and pesticides.

Our goal is to provide clients with work products and negotiation skills that will achieve and maintain regulatory compliance while protecting their interests. As a result, BB&L produces and delivers, on a timely basis, quality work products that consistently meet the high standards of our industry. We have successfully worked within project teams composed of outside legal counsel and several consultant groups, and served project management committees made up of multiple potentially responsible parties (PRPs). Our long-standing positive working relationships with upper-level regulatory agency personnel throughout the country allow us to conduct negotiations in a strong yet non-adversarial manner.

Our services include overall project coordination, work plan development, environmental site assessments and facility audits, removal actions, remedial investigations/feasibility studies (RI/FS), environmental permitting, consent order negotiation, risk assessment, remedial design, construction administration, operations/maintenance plans, post-closure reports, and reviewing and preparing formal opinions/comments on post-remedial action plans (PRAPs) and records of decision (RODs). We have significant relevant experience in all phases of CERCLA/SARA, HSWA/RCRA, and TSCA, as well as individual state regulations.

Through the use of project teams composed of remedial, chemical, and civil engineering experts, as well as geologists, hydrogeologists, scientists, and other technical support personnel, BB&L is able to identify and evaluate potential environmental risks, assess potential remedial options, select the most appropriate and cost-effective alternatives, and design a comprehensive remedial program. Remedial alternatives are based on scientifically defensible data and projections and may include removing hazardous materials to designated disposal locations, designing engineering controls on site, or implementing institutional or regulatory controls.

Services

- Consent Order Negotiation
- Remedial Investigations/Feasibility Studies (RI/FS)
- Hydrogeologic Investigations and Ground-Water Monitoring Programs
- Endangerment Assessment/Risk Analysis
- Water, Air, and Soil Sampling
- Air Toxics Monitoring, Investigation, and Permitting
- Environmental Permitting (RCRA, CERCLA, TSCA, NPDES, etc.)
- Facility Siting
- Environmental, Management, and Regulatory Compliance Audits
- Design of Site Remediation/Closure Measures
- Design of Process Modifications to Reduce or Eliminate Hazardous/Toxic Wastes
- Construction Administration and Inspection for Remediation/Closure Programs
- Hazardous Waste Treatment Facility Design
- New and Anticipated Regulatory Impact Evaluations (SARA)
- Contaminated Ground-Water and Aquifer Restoration Design

Engineering Design

In response to today's environmental and economic challenges, BB&L offers comprehensive Remedial Design/Remedial Action (RD/RA) services adapted to our client's specific needs. We offer an experienced source of "conventional" design and construction management services, and, in conjunction with our affiliated construction companies, we offer a "design/build" approach, where design and construction are closely integrated for more complete control over cost, time schedules, technical aspects, and quality of service.

Typical remedial design projects involve a number of initial activities, including review of available data, development of design parameters, negotiations with regulatory agencies, and

preparation of basis of design documents. Throughout this initial phase, BB&L stays in close contact with the client(s), attorneys (if necessary), and regulatory agencies to allow for the formal and informal exchange of ideas, presentation of findings, and the time-efficient development of an acceptable basis of design.

Completion of a basis of design that fulfills the project goals initiates the detailed design activities. Whether the project involves ground water/surface water treatment, aquifer restoration, soil remediation, or implementation of other control measures, BB&L technical personnel work effectively in the technical aspects of remedial design. Typically, the products of this effort, including detailed contract drawings and specifications, are utilized for obtaining competitive bids from prospective contractors.

Once actual construction has begun, BB&L provided shop drawing review, dispute resolution, on-site engineering and oversight, preparation of any change orders, and review of contractor payment requests. In all manners possible, we serve as the owner's on-site representative overseeing the rapid and cost-effective completion of the work.

In conjunction with our affiliated construction companies, BB&L can also provide cost-effective, professionally managed "turnkey" services for sensitive projects, or where continuity of the project team is critical. As with the conventional approach to RD/RA, the turnkey approach begins with a basis for design that meets the client's project goals, prepared by our staff of design experts. Substantial savings can be realized by consolidating the design and construction phases of the activities, through the use of one of our affiliated construction companies.

Treatability Studies

Treatability testing is also frequently necessary, based upon analytical results obtained from waste streams. Treatability testing may include bench-scale and pilot-scale tests to either determine the effectiveness of a particular water treatment process or to help define the basis of design. BB&L personnel have extensive experience in conducting field-scale pilot tests for a variety of chemical, physical, and biological water treatment processes. We also have in-house facilities to conduct bench-scale testing, as appropriate. In addition, if circumstances require, we can call upon the expertise of academic and vendor contacts with whom we have successfully worked with in the past to supplement our project team.

Environmental and Waste Sampling

BB&L routinely assists clients with waste characterization and disposal issues. Services range from characterizing waste via sampling and analysis, to finding solutions for routine solid waste and waste stream issues, to the identification of appropriate TSDFs for wastes generated during manufacturing operations, as well as waste site cleanup programs. Characterization efforts have involved specifying the proper sampling and analytical procedures to determine the most technically feasible and cost-effective treatment and/or disposal option or facility for complicated wastestreams.

BB&L's experienced staff characterizes wastes and waste streams, and determines appropriate management options to ensure regulatory compliance and to minimize future liabilities. Through this scrutiny and control of wastes, we allow clients to avoid applying hazardous waste disposal requirements to non-hazardous wastes, thus reducing handling and disposal/treatment costs by reducing the volume of hazardous waste generated at a site.

Other Waste Testing

BB&L's extensive experience in field investigations has allowed us to develop expertise in a variety of field testing methods. Our expertise in these field testing methods, developed in response to the needs of our clients, often provides cost and time savings.

X-Ray Fluorescence

BB&L is one of the few consultants capable of performing field analysis for metals using an X-Ray Fluorescence (XRF) Analyzer. An XRF Analyzer bombards a solid sample with X-Ray radiation. Every metal will fluoresce at a particular wavelength when saturated with such radiation. The XRF measures the intensity and wavelength of the energy fluoresced from the sample and, thus, can accurately determine metals concentrations in a sample in less than one-half hour.

BB&L owns an XRF analyzer and recently utilized it to test on-site soils for lead concentrations before and after a removal action for a PRP group at the Clinton/Bender site in Buffalo, New York. The use of the XRF allowed BB&L to turn around samples in less than one-half hour, and to immediately direct the remedial contractor to undertake additional work as necessary at each sample location. This approach saved the Clinton/Bender PRP group thousands of dollars in analytical costs and contractor stand by time.

EnSys Immunoassay-Based Field Testing Kit

Enzyme-linked immunosorbent assay (ELISA) technology has been recently adapted by EnSys, Inc. to detect environmental contaminants. Employees at several of BB&L's offices (including the Rochester, New York office) are certified by Ensys Corporation to perform immunoassay field screening of liquid and solid samples for a variety of analytes. ELISA is based on the binding capabilities of target contaminants and enzyme conjugate compounds with specific antibodies. The performance of these EnSys methods has been proven by comparison of hundreds of sample analyses to laboratory results. These data formed the basis for the recent USEPA approval (by SW-846 Organic Methods Work Group for Inclusion into SW-846) of several immunoassay-based methods developed by EnSys. BB&L is proficient and has extensive field experience with the following EnSys methods:

USEPA Draft Method	Analytes Detected
Method 4010	Pentachlorophenol
Method 4020	Polychlorinated Biphenyls (PCBs)
Method 4030	Petroleum Hydrocarbons (TPHs)
Method 4035	Polyaromatic Hydrocarbons (PAHs)
Method 8515	Trinitrotoluene

These immunoassay tests for field screening provide the following benefits:

- They are analyte specific;
- They are accurate and precise;
- The sample analysis is rapid (<30 minutes); and
- They are not significantly affected by sample composition;

Hydrogeologic Services

Hydrogeologic investigations are an integral part of the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Environmental Cleanup Responsibility Act (ECRA), the Toxic Substance Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and the Clean Water Act (CWA). These regulatory programs require detailed assessments which unravel the complexities of ground-water movement and ground-water quality.

BB&L utilizes its extensive hydro-geologic expertise in a wide variety of projects for industrial and municipal clients. Hydrogeologic investigations are performed for environmental assessment programs, corrective action programs for contaminated aquifers, facilities permitting, petroleum and chemical spill remediation programs, RI/FS, landfill design, and CERCLA and RCRA programs. In keeping with the Firm's business philosophy, all hydrogeologic projects are designed in terms of efficiency, defensibility of data, and cost-effectiveness.

BB&L's hydrogeologic expertise is also applied to water supply development, excavation dewatering for construction projects, the design and installation of ground-water heat pump systems, and mining and land reclamation projects.

Services

- Site-Specific Hydrogeologic Characterization
- Ground-Water Modeling
- Geographic Information Systems (GIS)
- Aquifer Testing
- Monitoring Well Siting, Design, and Installation
- Recovery Well Siting, Design, and Installation
- Ground-Water Quality Determination
- Geophysical Surveys
- Contaminant Plume Delineation
- Contaminant Source Identification
- Aquifer Mapping
- Public Water Supply Development
- Injection Well Siting and Design
- Ground-Water Monitoring

Chemical/Petroleum Storage Services

BB&L offers a complete program for the effective management of bulk liquid storage for underground and aboveground storage tanks.

Services

- Design of New and Modified Storage Facilities
- Spill Investigation, Cleanup, and Aquifer Remediation
- Regulatory Compliance Programs for Storage Facilities
- Risk Assessment, Environmental Auditing, and Loss Prevention Recommendations
- Ground-Water Monitoring and Spill Detection Systems
- Storage Tank Closure and Removal
- Spill Prevention Control and Countermeasure (SPCC) Plan Development
- Testing of Underground Storage Tanks
- Construction Engineering

Environmental Compliance

Blasland, Bouck & Lee, Inc., has been involved in all aspects of compliance with federal and state requirements for permitting, funding, and approval of a wide range of projects. Our experienced staff of engineers, geoscientists, ecologists, and support personnel provide the expertise necessary to assist clients in the scoping and preparation of Environmental Impact Statements and Environmental Assessment Forms, in responding to public and regulatory agency comments, and in providing expert testimony and litigative assistance.

In support of air pollution control and Prevention of Significant Deterioration (PSD) permit applications, BB&L's air quality impact analysis capabilities include access to the full range of the USEPA-recommended screening and refined modeling techniques that are used in regulatory air quality programs. Performance of an air quality impact analysis employs a hierarchical approach in which conservative screening techniques are first used to eliminate, where possible, the need to perform resource-intensive refined modeling. Refined models are next employed, however, if results of screening modeling indicate potential contravention of air quality standards.

In addressing permit requirements, BB&L's meteorologists and air pollution control engineers and specialists provide the necessary resources. Our meteorologists have performed several dispersion modeling studies to assess the significance of expected air quality impacts. Our air pollution control engineers have experience in conducting design work necessary to demonstrate achievement of top-down Best Available Control Technology (BACT) and Lowest Available Emission Rate (LAER) air pollution control requirements. Finally, our air pollution control specialists have experience in developing protocols for source compliance tests and providing specifications for Continuous Emission Monitoring (CEM) systems.

BB&L also has extensive experience in wastewater and stormwater discharge permit application preparation and negotiations, under National Pollutant Discharge Elimination System (NPDES) and state pollutant discharge regulations. We have assisted several major municipal and industrial clients with discharge to surface water and discharge to ground water permits, and our personnel are fully experienced in developing and implementing management strategies and programs that help ensure compliance at a minimal cost, including drainage and source identification, flow patterns and quantities, sampling protocols, and negotiations with regulatory agencies regarding permit limitations. The goals of such negotiations are to achieve the lowest acceptable and effective level of treatment while complying with water quality standards and regulations, and to secure only the necessary levels of monitoring frequencies and reporting requirements. The ultimate objective of this approach is to assist in reducing the clients' expenditures for meeting permitting requirements.

BB&L also provides complete permitting services for solid waste management facilities -- from approval for facility construction and operation to state, local, and federal permits for activities such as development in or near wetlands, surface water discharges, and air emissions. Our combined capabilities in engineering and the geosciences allow us to develop permit application materials in the form of engineering design plans, hydrogeologic and engineering reports, environmental impact analyses, and supporting documentation.

BB&L provides permitting assistance and fee negotiation for general industrial facility permits. We work with contractors and state, local, and federal officials to coordinate building permits; land use permits; road, highway access, and right-of-way permits; sanitary sewer connections, septic systems, and water use permits; demolition permits; aboveground and underground bulk storage tank system permits; floodplain and wetlands disturbance permits; and certificates of occupancy. We also perform environmental assessments, write environmental impact statements, and prepare Spill Prevention Control and Countermeasures (SPCC) plans in support of facilities permits.

Agricultural Chemical Services

Working directly with agricultural manufacturers throughout the nation and in Europe, BB&L designs and implements monitoring programs which satisfy regulatory requirements. BB&L scientists are led by a team of nationally recognized experts who specialize in the distinctive hydrogeologic investigations associated with agricultural chemical applications. BB&L's field staff is particularly adept at achieving ground-water monitoring protocols within the detailed framework of requirements necessary for product registration.

The BB&L team provides knowledgeable, responsive client support in all phases of agricultural ground-water monitoring:

- Detailed prospective and retrospective monitoring programs which follow required Good Laboratory Practices.
- Design and implementation of large-scale ground-water and surface water monitoring programs for agricultural chemicals.
- Environmental project direction, including coordination between technical and regulatory aspects of agricultural chemical detections.
- Application of modeling techniques to predict movements of agricultural chemicals in soil and ground water.
- Negotiation with federal and state regulatory agencies on behalf of clients.

Services

- New Product Registration
- Product Reregistration
- Product Defense
- Product Stewardship

Solid Waste Management

BB&L provides a full range of solid waste management project engineering services, from planning stages through design and construction administration.

BB&L personnel have completed a number of projects for municipalities and industrial clients involving the initial planning and facility siting aspects of solid waste management. Our project experience in this area includes several landfill, transfer station, and/or resource recovery facility siting projects.

Our project experience in sanitary landfill projects includes the full range of engineering and scientific services; from permitting and design, to remediation closure and construction administration. Our solid waste project team has also been involved with a number of landfill-related projects, including planning, design, and/or construction administration of leachate storage and transmission facilities, sanitary sewer lines, maintenance and office facilities, etc. Our solid waste engineering project teams, supported by our complete staff of hydrogeologists, toxicologists, surveyors, and scientists provide the expertise necessary to meet the most difficult project demands.

BB&L personnel have been involved in a number of projects requiring planning, permitting, and environmental impact assessment of resource and/or materials recovery facilities. Our solid waste project team is supported by an experienced staff of air toxics/air pollutant modeling experts, mechanical/electrical/ structural engineers, ecologists, and toxicologists/industrial hygienists, who bring the necessary disciplines to our resource recovery facility projects.

Services

- Engineering Design
- Permitting
- Facility and Program Planning
- Facility Closure and Remediation
- Hydrogeologic Services
- Construction Quality Assurance
- Construction Management
- Environmental Monitoring and Operations Support

Air Monitoring and Modeling

Although air toxics considerations have long played a role in CERCLA and RCRA actions, an increased awareness in air pollution issues by the public, together with recently enacted Clean Air Act (CAA) Amendments, have heightened the need for comprehensive air investigations. BB&L has the professional resources in place to meet the air services needs of its clients in a timely and technically sound manner.

Services

- Ambient Air Monitoring:
  - Full Complement of Traditional Techniques
  - Remote Optical Sensing
- Air Quality Dispersion Modeling
- Air Permitting
- Air Pathway Analyses
- Baseline Emission Estimates
- Continuous Emissions Monitoring (CEM) Consulting and Design

River-Related Services

BB&L's environmental engineers, hydrologists, and scientists contribute multidimensional skills to provide the technical expertise necessary for development, execution, and interpretation of authoritative sediment/water column investigations. We have performed comprehensive investigations which have included the following efforts:

- Water column monitoring to assess daily and seasonal concentration loads and trends of constituents of concern;
- Water column flow-dependent monitoring to assess target implications during low, base, and storm flow events;
- Sediment monitoring for organic constituents by depth and sediment characteristics;
- Sediment sampling and geo-chronological dating; and
- Sediment trap monitoring to assess sedimentation rates.

The investigations also included the collection and interpretation of the physical, chemical and biological parameters necessary to support the goals of the RIs. As a result of the varied sites at which we have performed RI activities, we have effectively sampled all types of media (sediment,water, sludge, air, construction materials, biota, and pure product phases).

In addition to these civil engineering strengths, BB&L has established a nationwide reputation in the investigation and remediation of contaminated sediments found in rivers, harbors, lakes, and wetlands. Our capabilities in this area, while including traditional RI/FS and sediment sampling activities, extends to evaluation studies of both established and innovative remedial alternatives. As such, we have performed or are currently performing bench- and pilot-scale treatability studies for a variety of treatment technologies, including sediment remediation techniques, as well as on-site or in-situ bioremediation.

Wastewater Engineering

BB&L provides complete engineering services for wastewater treatment and conveyance. We develop cost-competitive, energy-efficient programs that are designed to perform effectively and to be easily operated with minimal maintenance requirements. Our professional engineers are experienced in applying the latest technologies in wastewater collection, treatment, pumping, and transmission systems. The full range of our consulting services includes treatability studies, pilot testing programs, process design, construction administration, and plant start-up assistance. With respect to wastewater conveyance, we offer expertise in infiltration/inflow (I/I) analyses; sewer system evaluation surveys (SSES); combined sewer overflow (CSO) abatement; industrial pretreatment programs; pumping stations; collection and interceptor sewers; sewer outfall pipelines; and small and large diameter force mains.

BB&L also provides litigation support, expert testimony, and permitting assistance on behalf of clients. In the areas of facilities planning, process design, and water quality impact analysis, our efforts have resulted in the efficient resolution of regulatory enforcement proceedings and the satisfactory conclusion of negotiations for necessary environmental permits.

Services

- Facilities Planning/Construction/Start-Up
- Wastewater Characterization and Treatment
- Pretreatment Studies
- Treatment Process Evaluations

- Combined Sewer Overflow (CSO) Studies
- Infiltration/Inflow (I/I) Investigations
- Sewer System Evaluation Surveys (SSES)
- Sludge Management Programs
- Waste Treatability Investigations
- Comprehensive Sewerage Studies
- Storm Water Management
- Water Supply and Treatment
- Water Storage and Distribution

Facilities Engineering

BB&L's facilities engineering team provides technical support services. Technical disciplines available to our clients include structural engineering, geotechnical engineering; electrical engineering, mechanical engineering, chemical process engineering, civil/site work engineering, HVAC engineering, and construction administration.

BB&L provides industrial clients with a full range of services ranging from planning through start-up. In the area of facilities engineering, the firm provides structural/ architectural evaluations of existing buildings for rehabilitation, space utilization, new loading requirements, code requirements, and planning and conceptual development for new facilities. To determine the adequacy of existing equipment and the selection of new equipment, power system studies, which typically include short circuit analysis, load flow analysis, protective relays and device coordination studies, and low voltage profile analysis are performed. Buildings systems evaluation involves the survey of lighting, power, heating, ventilation, air conditioning, plumbing, and special systems such as fire alarm, telephone, and sound systems. Engineering evaluations include analyses of physical systems for adequacy, efficiency, maintainability, aesthetics, or compliance with codes, and the development of recommendations for corrective action.

BB&L also performs siting studies and site evaluations for proposed or expanding facilities. Complete design capabilities are provided by the firm, and our in-house staff will perform engineering calculations and prepare specifications, construction drawings, and contract documents.

Environmental Training

BB&L has performed analyses of training needs for various companies and has developed and performed comprehensive training programs for compliance with OSHA and USEPA regulatory training requirements, including HAZWOPER 24-hour and 40-hour courses and 8-hour refresher and supervisory courses, Hazard Communication, and RCRA. For these programs, we developed and presented training sessions and developed comprehensive course manuals and Train-the-Trainer programs. Programs have been developed to specifically address each client's needs and business. BB&L can also assist with training programs which, although not required by regulation, can help achieve overall facility compliance. Following are several representative training projects with which the Firm is involved.

Construction Management

Construction management services are designed to reduce costs and ensure on-time project completion. These goals are consistently achieved by the Firm's design engineers, who coordinate with our staff of construction engineers, field inspectors, and field technicians. BB&L design teams produce detailed contract drawings and specifications for use in soliciting bids from prospective contractors. The Firm assists clients in reviewing the bids and selecting a contractor.

Once actual construction has begun, we provide shop drawing review, dispute resolution, on-site engineering and inspection, preparation of any change orders, and review of pay requests. In all manners possible, we serve as the owner's on-site representative overseeing the rapid and cost-effective completion of the work. The Firm also has the capability to provide turnkey design/construct services via our affiliated subsidiary, BBL Environmental Services, Inc.

Mapping and Surveying

Blasland, Bouck & Lee, Inc., provides comprehensive surveying and mapping services through a group of licensed personnel trained in the most modern methods and equipment. Our staff surveyors also have CFR 1910.120 hazardous waste site worker training and extensive experience in RI/FS and remedial design.

Our surveying field equipment includes geodetic total stations with electronic data collectors, precision theolites, electronic distance-measuring units, automatic levels, and all necessary miscellaneous equipment. In the office, the staff uses modern drafting equipment and IBM personal computers equipped with state-of-the-art surveying and CAD software. All mapping procedures are automated, so data is available to clients in digital formate. The firm's surveying and drafting divisions are computer-integrated, facilitating rapid and accurate data transfer and information flow. This minimizes duplication of effort and provides more productive results for our clients.

BB&L's full range of surveying and mapping services includes:

- Geologic Surveys
- Photogrammetric Mapping
- Hydrography
- Design Surveys
- Construction Layout

Health, Safety, and Industrial Hygiene Services

BB&L offers comprehensive industrial health and safety services to meet a variety of needs ranging from OSHA compliance at industrial plants to the development of Health and Safety Plans for hazardous waste remediation projects. Regardless of application, industrial hygiene and safety services focus on the recognition, evaluation, and control of injury/illness causative factors. Services include program development and review, accident investigation, response to employee/union complaints, industrial hygiene evaluation, safety and health training, ventilation evaluation, noise assessments, new standards implementation, and compliance auditing.

Regulatory management audits are conducted by senior-level personnel and are designed to assess and analyze existing facility programs and operations to identify the root causes of potential injury/loss. Using these analyses, BB&L works with industrial clients to develop new policies and procedures to enhance existing programs. The management audit focuses on overall program implementation and effectiveness to identify and evaluate key program components which require management attention and support. Regulatory management audits result in a uniform approach to safety, health, and procedural effectiveness within a facility, ensuring comprehensive and cost-effective compliance.

Litigation Support

BB&L provides litigation support to clients and their legal representatives for cases involving environmental issues. Because of their extensive technical and scientific experience and expertise, our senior personnel are often called upon to conduct environmental investigations to gather evidence, review and evaluate data and findings prepared by other consultants, and provide expert witness testimony.

III. Qualifications and Experience

As a firm of environmental specialists, BB&L has demonstrated the capabilities and expertise necessary to develop technically feasible and cost-effective remedial programs through the successful management and control of hazardous and toxic materials. Our staff includes some of the foremost professionals in the remediation of sites contaminated with polychlorinated biphenyls (PCBs), organic solvents, petrochemicals, and agricultural chemicals. We have successfully coordinated project teams composed of outside legal counsel and several consultant groups, and we have managed situations involving multiple potentially responsible parties (PRPs). Our long-standing positive working relationships with upper-level regulatory agency personnel allow us to conduct negotiations in a strong yet non-adversarial manner. Our goal is to provide clients with work products and negotiation skills that will achieve and maintain regulatory compliance while protecting their interests. As a result, BB&L produces and delivers, on a timely basis, work products which meet the high standards of our industry.

Our services include overall project coordination, work plan development, removal action oversight, remedial investigations/feasibility studies (RI/FS), environmental permitting, consent order negotiation, risk assessment, remedial design, construction administration, operations/maintenance plans, post-closure reports, and reviewing and preparing formal opinions/comments on post-remedial action plans (PRAPs) and records of decision (RODs). We have significant relevant experience in all phases of CERCLA/SARA, HSWA, TSCA, and RCRA, as well as New Jersey's ECRA and other state regulations. Our RCRA corrective action services include negotiating 3008(h) permits, developing work plans for and implementing RCRA facility investigations (RFIs) and preparing RFI reports, and implementing corrective measure studies (CMSs). Our staff also includes individuals experienced in conducting RCRA Training Programs for all levels of personnel and in implementing Right-To-Know and Hazardous Communications System Requirement.

Our project experience includes work at approximately 50 federal and state Superfund sites across the United States. Contaminants of concern at these sites include petrochemicals, solvents, heavy metals, PCBs, insecticides, and caustic chemicals. Sites include active and inactive industrial manufacturing plants, abandoned scrapyards, recycling facilities, residential areas, major waterways, wetlands, and landfills.

For many of the hydrogeologic and hazardous waste projects completed at Superfund sites, we have provided our clients with expertise in regulatory negotiations and expert testimony. Our extensive experience in these areas include: consent order negotiations with United States Environmental Protection Agency (USEPA) regions 1, 2, 3, 4, 5, and 6; development and negotiation of work plans for remedial investigations/feasibility studies for industrial clients; and expert testimony in cases involving ground-water contamination in several states. All BB&L remedial investigation project teams are managed by professionals who have specialized in CERCLA compliance and thus have an excellent working knowledge of federal and state regulations.

Through the use of project teams composed of remedial, chemical, and civil engineering experts, as well as geologists, hydrogeologists, and other technical support personnel, BB&L is able to identify and evaluate potential remedial options, select the most appropriate and cost-effective alternatives, and design a comprehensive remedial program. Remedial alternatives are based on scientifically defensible data and projections and may include removing hazardous materials to designated disposal locations, designing engineering controls on site, or implementing institutional or regulatory controls. Currently, BB&L is actively involved in more than 20 remediation projects. The remainder of this section presents brief descriptions of representative projects BB&L has performed.

Representative Projects

Project Name and Location: Project Coordination Services for Drum Removal Action, Batavia Landfill Superfund Site, Batavia, New York

Client Reference: Mr. Kevin Earley
Unisys Corporation
2476 Swedesford Road
Paoli, Pennsylvania 19301
Phone: (215) 993-7210

BB&L Principal: Edward R. Lynch, P.E., Executive Vice President

Project Manager: William B. Popham, Vice President

Project Start: 1991 **Project Completion:** 1991

Approximate Costs: $600,000

Project Objectives, Methods, and Technical Details:

BB&L was retained to perform project coordination and removal action oversight activities for an emergency drum removal action undertaken at a landfill Superfund site in western New York. The removal action was initiated in response to an Administrative Consent Order issued by the U.S. Environmental Protection Agency (USEPA). BB&L developed and implemented the USEPA-approved work plan for the project and assisted the PRP group in selecting subcontractors to complete necessary remedial actions.

Site preparation activities initiated in April 1991 included equipment and personnel mobilization as well as the construction of drum staging areas. Drums were extracted from four specific on-site locations; those containing waste materials were inventoried, photographed, and overpacked as required by the Consent Order. Once overpacked, the drums were transferred to a final drum staging area for Hazardous Characterization ("HAZCAT") activity. Empty drums discovered at the four site locations were crushed and staged in roll-off containers.

HAZCAT activities included sampling and analysis of waste materials for bulking purposes. Materials were bulked into three categories. All solids, including visually contaminated solids, were bulked into open-top roll-off containers. Water and aqueous liquids were pumped into a 1,500-gallon holding tank, and flammable liquids and/or oils were pumped into DOT-approved drums. Waste profiles and subsequent analytical data were submitted to treatment, storage, and disposal facilities (TSDFs) to receive approval for proper disposal.

All site work has been performed primarily in "Level B" Personnel Protective Equipment (PPE). Continuous air monitoring was executed to establish the hazardous content (if any) of the ambient air. Furthermore, a heat stress program was initiated to ensure worker safety during activities at the site. Ongoing coordination with USEPA and PRP representatives has resulted in successful progression of work efforts.

Final "off-site" disposal volumes are estimated at 300-yd^3 of bulked solids (hazardous waste), four 30-yd^3 roll-off containers of crushed drums, and 2,500 gallons of bulked hazardous waste liquids. In addition, approximately 600 drums have been removed from the site. Demobilization activities were completed in June 1991.

Representative Projects

Project Name and Location: Removal Action Oversight Services, Envirotek II Superfund Site, Tonawanda, NY
Client Reference: Ms. Jean McCreary, Attorney at Law
Nixon, Hargrave, Devans & Doyle
Clinton Square
P.O. Box 1051
Rochester, New York 14603
Phone: (716) 263-1611
BB&L Principal: William B. Popham, Vice President
Project Manager: William T. McCune, Manager
Project Start: 1990
Project Completion: 1993
Approximate Costs: $2.1 M
Project Objectives, Methods, and Technical Details:

BB&L provided technical services to several participating responsible parties (PRPs) in conjunction with a removal action at this Superfund site in western New York. The 2.5 acre site, located within a 65-acre industrial park, was leased by a permitted treatment, storage, and disposal facility (TSDF), and operated from August 1981 to June 1989 for solvent recovery. An Administrative Order of Consent between the U.S. Environmental Protection Agency (USEPA) and the PRP group was issued in May 1990.

Approximately 1,200 abandoned product and waste drums were encountered on site, in addition to several storage tanks, process vessels, and other equipment formerly used in solvent recovery operations. Several hundred generation waste and process waste samples, as well as laboratory reagent chemicals, were also found abandoned in a building which had housed an on-site laboratory. All of the discovered samples and reagents, as well as compressed gas cylinders once used in the operation of analytical equipment such as gas chromatographs, were inventoried, lab-packed, and disposed off site.

BB&L assisted the remediation contractor and USEPA with site preparation activities, including site stabilization. All leaking and potentially leaking drums and uncontainerized hazardous materials which appeared to be unstable were overpacked and stored for future disposal. After the site was stabilized, drums were transported to a newly constructed drum staging area, segregated by generator and contents based on existing labels and markings, and prepared for sampling. This particular area held approximately 800 drums. The remaining drums were temporarily stored in other staging areas on site.

Upon completion of drum staging activities, BB&L requested that representatives from several TSDFs visit the site to evaluate the various waste streams for acceptance into their disposal facilities. This resulted in the development of site-specific drum sampling and analysis procedures which ultimately reduced analytical costs required for disposal.

Because of the organic nature of the drummed wastes, fuels blending was utilized as the primary disposal method. Of the approximately 1,200 drums on site, 900 were transported to facilities with fuels blending capabilities.

Remediation of three waste pits in a hangar area adjacent to one of the facility buildings was also included during the project. Pit 1 contained contaminated soils and debris, as well as several buried drums. Pit 2 contained a contaminated oil/water mixture, sludge, as well as submerged drums. Pit 3 also contained a contaminated oil/water mixture and sludge; however, no discarded drums were encountered here. In addition, Pit 3 included an adjoining pit (3A) which contained several storage vessels. Due to the age of the facility and lack of site drawings, the physical dimensions and contents of these pits were unknown.

During removal activities, an additional pit was discovered. This pit contained suspicious liquids and sludges which the USEPA confirmed to contain high levels of organic contaminants requiring remedial action. Overall remedial activities included pit and trench soil/debris removal, pit and trench contamination, and material disposal including 165,000 gallons of wastewater, 250 yards of soil, and 310 yards of debris.

Removal activities were successfully completed by BB&L and the retained subcontractors in early November 1990, ahead of anticipated schedule,

resulting in savings estimated between 1 and 1.5 million dollars for the PRP group.

Representative Projects

Project Name and Location: Clinton/Bender Site Removal Action, Buffalo, New York
Client Reference: David A. Paley, Manager, Site Remediation
Allied Signal, Incorporated
101 Columbia Road
Morrison, New Jersey 07962-1139
Phone: (201) 455-3302
BB&L Principal: William B. Popham, Vice President
Project Manager: Thomas P. Hasek, Associate
Project Start: 1992
Project Completion: 1994
Approximate Costs: $1.2M
Project Objectives, Methods, and Technical Details:

In 1992, the Clinton/Bender Potentially Responsible Parties (PRP group) retained BB&L to provide professional services for the development and implementation of a work plan for a removal action associated with a site containing lead-contaminated soils at a residential/business site located in the city of Buffalo, New York. The project was required to satisfy a Unilateral Order under Section 106 (106 Order) issued to the PRP group by the United States Environmental Protection Agency (USEPA).

BB&L initiated the project by preparing a detailed removal action work plan to comply with the terms of the 106 Order. The work plan addressed the site history and required removal action, including an overall site assessment prior to construction activities. The initial assessment phase included a site survey task, which included preparation of a topographic map and establishment of a site coordinate grid map, residential and business property appraisal assessment, structural inspections and evaluation of buildings/structures on site, and precharacterization of site soils for lead contamination from the surface to a depth of 4 feet.

The work plan also included a removal action plan detailing excavation and backfilling procedures for approximately 4,500 tons of site soil, provisions for site security, equipment and personal decontamination procedures, temporary waste storage and staging procedures, and waste characterization transport and disposal procedures. A detailed Sampling and Analysis Plan (SAP) to be initiated during removal action activities was prepared, along with a Quality Assurance Project Plan (QAPP), and a Site-Specific Health and Safety Plan (HASP).

Additionally, the work plan included a design for constructing a low-permeability asphalt cap and grading plan for the adjacent property, the primary source of the lead contamination, to prevent future migration of lead to the site from stormwater runoff. The design included a drainage system to collect stormwater runoff through a series of asphalt-paved drainage channels, catch basins, manholes, and PVC pipe routed into an existing municipal storm sewer.

Following USEPA approval of the work plan, BB&L was responsible for preparing bid/contract documents, assisting with selection of a remedial contractor, negotiating and obtaining a BPDES permit to discharge all site drainage and decontaminated water into the POTW in lieu of off-site disposal, preparing discharge tracking documentation for the POTW when discharging site drainage and decontamination water, preparing a Maintenance and Protection of Traffic Work Plan to protect traffic and pedestrians during construction activities, and preparing a crawl space remediation work plan, which included the placement of a cap over lead-contaminated soils within a confined space. BB&L performed construction administration, which included tracking and approving all contractor invoices and charge orders, monitoring and implementing site health and safety, and overseeing all construction activities associated with the work plan.

BB&L was also responsible for the collection of all field samples, including precharacterization, confirmatory, and verification soil samples; decontamination/waste water samples; waste characterization soil samples; and imported backfill and topsoil samples. In addition, BB&L coordinated all off-site laboratory analyses.

While preparing the work plan, BB&L successfully negotiated the use of an X-ray fluorescence analyzer with the USEPA. The analyzer was used as a field screen for all precharacterization, confirmatory, and verification soil samples, which reduced the overall

costs and time associated with off-site laboratory analysis.

Throughout the project, BB&L coordinated all activities with the USEPA on-site representatives. BB&L submitted weekly progress reports to the USEPA, which included off-site laboratory results, a summary of weekly construction activities, and anticipated scheduling for the following week's activities.

BB&L prepared a final report summarizing all removal action activities conducted at the site and verifying that all requirements of the 106 Order have been fulfilled.

Representative Projects

Project Name and Location: Clinton/Bender Site Interior Housedust Removal Action
Client Reference: David A. Paley, Manager, Site Remediation
Allied Signal, Incorporated
101 Columbia Road
Morrison, New Jersey 07962-1139
Phone: (201) 455-3302
BB&L Principal: William B. Popham, Vice President
Project Manager: Thomas P. Hasek, Associate
Project Start: 1993
Project Completion: ongoing
Approximate Cost: $200,000 (billed to date)
Project Objectives, Methods, and Technical Details:

In 1993, the Clinton/Bender Potentially Responsible Parties (PRP Group) retained BB&L to provide professional services for the development and implementation of a work plan for a removal action associated with the lead-contaminated interiors of 10 residences and one business located in the city of Buffalo, New York. The project was required to satisfy and administrative order on consent (AOC) issued to the PRP Group pursuant to Section 106 (a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §9606 (a).

BB&L provided technical guidance and support to the PRP Group during AOC negotiations with the USEPA and other involved state regulatory agencies. BB&L prepared and submitted a Work Plan that defines the activities necessary to perform a comprehensive interior housedust abatement for the residences on the site. The Work Plan, which was approved by the USEPA in January, 1994, addressed the following:

- Interior housedust abatement activities, including: documentation of existing site conditions through home surveys; pre-abatement activities; abatement activities; disposal procedures; post-cleaning sampling; and site restoration.
- Sampling and Analysis Plan;
- Quality Assurance/Quality Control;
- AOC reporting requirements;
- Project schedule; and
- Site Health and Safety Plan

Interior housedust abatement activities commenced in February 1994, with BB&L providing project coordination, project management, health and safety coordination, on-site engineering, and on-site analytical services, including X-ray fluorescence analysis of housedust and paint surfaces. The project in ongoing, with an expected completion date in 1995.

Representative Projects

Project Name and Location: Pre-Design Investigation, Byron Barrel and Drum Superfund Site, Byron, New York

Client Reference: Mr. Richard Manning
Coltec Industries
430 Park Avenue
New York, New York 10022
Phone:(212) 940-9625

BB&L Principal: William B. Popham, Vice President

Project Manager: Frank M. Kozak, Manager

Project Start: 1993

Project Completion: ongoing

Approximate Costs: $350,000

Project Objectives, Methods, and Technical Details:

The Byron Barrel and Drum Site is a former drum disposal area. In 1984, 219 drums were removed from two areas on the site. During the RI/FS following the removal, subsurface contamination was found to include chlorinated aliphatic compounds, lead, and chromium. In 1989, the United States Environmental Protection Agency (USEPA) issued a Record of Decision (ROD) for the Byron Barrel Superfund Site. The remedy specified in the ROD includes extraction and treatment of ground-water, reinjection of treated ground water to the aquifer, and soil flushing to address volatile organic and inorganic contaminants.

BB&L was retained by the Byron Barrel and Drum Superfund Site Potentially Responsible Parties (PRP) group to complete a pre-design investigation. The scope of work for this project includes a site survey; assessment of existing monitoring points; installation of fifteen monitoring wells and sixteen soil borings; performance of two 72-hour stepped pump tests; installation of staff gauges; ground-water sampling for laboratory analysis of volatile organic compounds, inorganic parameters, and total and dissolved metals; soil sampling and analysis for total lead, total chromium, hexavalent chromium, and TCLP lead and chromium; percolation testing; and on-site water treatment with air stripping and carbon adsorption.

The ground-water hydraulics evaluation will include ground-water flow modeling to plan and design the proposed stepped pumping tests. The simulation of the site conditions will be an iterative process that will consist of development a model of the site prior to the pump test and a re-evaluation or recalibration of the model based on the interpretation of pump test data. During the subsequent remedial design, a calibrated ground-water flow model will be utilized to simulate ground-water capture zones for various extraction/ reinjection options and to identify an appropriate configuration for hydraulically controlling and remediating ground water at the site.

Using the data gathered during the investigation, BB&L will evaluate the aquifer using the conceptual two-dimensional hydrogeologic model, and will evaluate the physical and chemical characteristics of the soils as related to proposed treatment options. While soil quality data will be used to assess the viability of consolidating soil from the two source areas into one area for subsequent treatment, the information from the pre-design investigation is to be incorporated into a pre-design data summary report that addresses the necessity and feasibility of including a Treatability Study as part of the remedial design.

BB&L identified an extremely attractive cost savings option for consideration during the pre-design investigation. BB&L proposed to use the temporary treatment system required for the pump test for the performance of treatability testing (in essence performing a pilot test), as opposed to returning to perform subsequent treatability testing as specified in the remedial design work plan.

Performing the treatability testing (pilot testing) during the pump tests will significantly reduce costs associated with the design of a ground-water treatment system. Because the ground-water treatment system for the remedial design has already been specified in the Record of Decision (metals removal by pH adjustment/air stripping/ carbon adsorption), using these units during pump testing will eliminate the need for future treatability and bench-scale testing.

Representative Projects

Project Name and Location: Closure of Aboveground Storage Tanks, McKesson Corporation Bear Street Facility, Syracuse, NY

Client Reference: Mr. Robert D. Ritchie, P.E., Director Environmental and Engineering
McKesson Corporation
28th Floor, Room 2850
One Post Street
San Francisco, California 94104
Phone: (415) 983-8450

BB&L Principal: Edward R. Lynch, P.E., Executive Vice President

Project Manager: David J. Ulm, Associate

Project Start: 1988

Project Completion: 1990

Approximate Costs: $225,000

Project Objectives, Methods, and Technical Details:

BB&L was contracted by the McKesson Corporation to develop a Resource Conservation and Recovery Act (RCRA) Closure Plan to verify the decontamination protocol of 11 aboveground storage tanks ranging in size from 400,000 to 4.2 million gallons located at an inactive hazardous waste storage facility.

The facility, located in Syracuse, New York, was originally used as a terminal for the distribution of bulk petroleum products and later used for the distribution of bulk chemical products. Operations at the site were discontinued in 1981.

The Closure Plan included review of past above-ground tank decontamination efforts; implementation of the procedure for verification of decontamination of the aboveground storage tanks; removal of distribution facilities associated with the storage tanks; and performance of a perimeter air monitoring program during distribution facilities removal.

The New York State Department of Environmental Conservation (NYSDEC) approved the Closure Plan and BB&L proceeded with the project. Following completion of the plan, results were submitted to the NYSDEC. Based on the results, the aboveground storage tanks were determined to be decontaminated.

After closure, BB&L developed contract documents for removal of the aboveground storage tanks. BB&L also provided bidding assistance, construction management and oversight, and closure certification.

Representative Projects

Project Name and Location: Underground Storage Tank Management Program, Westchester County Department of Public Works, Westchester County, New York
Client Reference: Westchester County Department of Public Works
Westchester County, New York

Phone:
BB&L Principal: Mr. Kenneth Modico,
Project Manager: Mr. Keith Furey,
Project Start:
Approximate Costs: $8.5 M
Project Completion: Ongoing

Project Objectives, Methods, and Technical Details:

The federal and state regulations regarding underground storage tanks (USTs) have been revised to include requirements for corrosion resistance, leak detection and containment, spill and overfill control, and proper installation. All USTs are to be in compliance by 1998.

In response to the new regulations and the 1998 deadline, Westchester County's Department of Public Works has implemented a five-year UST Management Program to replace approximately 260 existing tanks (with capacities greater than 550 gallons) with new tanks that comply with the more stringent regulations. BB&L has been retained to provide engineering services for the program, including: an update of the UST inventory data base, tank prioritization based on available data, design of removal/abandonment and replacement of USTs, and construction management for UST replacement contracts.

In order to update the inventory, BB&L performed field visits to verify tank locations. The field visits involved physical inspection to locate tanks and piping, as well as discussions with the site personnel.

Each replacement tank utilized all the latest technology in piping, inventory control, and alarm systems. The design specified double-wall steel, fiberglass-coated tanks for each tank on the inventory and included flexible piping to eliminate additional bends and splices in the fuel oil supply, containment and return piping, and vent piping. In addition, complete electrical and instrumentation for overfill/spill protection, inventory control, and leak detection systems for the interstitial space in the tanks was provided. Also included were excavation, sheeting and backfill, contaminated soil remediation, and ground-water considerations.

The first year of the program encompasses 26 tanks at 13 different sites. Tanks range from 550 to 10,000 gallons and are so widely varied that BB&L has been required to specify and design replacement systems for gasoline, diesel, and heating fuel utilization. One tank, due to its location inside a parking garage, will require in-place abandonment and installation of the new tank in a remote location. Other tanks require adaptation of existing vaults and extensive ground-water considerations.

The construction administration phase of this program requires that BB&L aid in the advertisement for bid and selection of the contractor. Contract specifications and drawings are being completed, and all drawings are being generated on a CADD system. Construction of the first 26 began in May 1993, and BB&L provided construction management services, as well as shop drawing review, throughout the construction phase.

The second year of the program began in May 1994. The second year provides for design of 15 tanks located at 5 sites, ranging in size from 275 to 1,000 gallons.

Representative Projects

Project Name and Location: Engineering Oversight of Drum Removal Actions, Consent Order Site, Confidential Client, Central Florida
Client Reference: Due to a confidentiality agreement, client information for this project cannot be disclosed.
BB&L Principal: Doyle E. Cottrell, P.E., Senior Vice President
Project Manager: Dane C. Wren, P.E., Manager
Project Start: 1992
Project Completion: ongoing
Approximate Costs: $150,000 to date
Project Objectives, Methods, and Technical Details:

Used drums are cleaned and refurbished at this facility, which has operated for approximately 25 years. Drums accepted by the facility have contained a variety of substances, the most predominant being petroleum products. Ground-water contamination by heavy metals, pesticides, and volatile organics was discovered during a series of compliance inspections in the mid-1980s. As a result, the facility is under Consent Order by the Florida Department of Environmental Regulation (FDER) and was the focus of several investigations documented in reports submitted to the agency in 1988 and 1991.

In 1992, BB&L conducted a geophysical investigation using an EM-31 proton precession magnetometer to determine if drums were buried at the site. The investigation was conducted in response to FDER concerns related to accidental discovery of buried drums during installation of a water main associated with reconstruction of the facility after a fire. Those drums, some of which contained hazardous waste, were found in an area identified as uncontaminated in the prior Consent Order investigations.

Subsequently, BB&L, acting on behalf of the facility owner, prepared an exploratory excavation and removal work plan, obtained approval from FDER to implement the plan, solicited bids from qualified response contractors, and provided oversight of removal actions at 13 anomalous areas identified in the geophysical survey. Fifteen drums in various stages of decomposition were discovered, including six which contained liquids or residues that required overpacking. Oversight activities included on-site observation services during excavation activities; written and photographic documentation; and preparation of a report to FDER following conclusion of the removal action.

A key issue associated with the drum removal action was the approximate date of drum burial, which was necessary to determine whether the site is subject to regulation under the Resource Conservation and Recovery Act (RCRA). Markings and labels evident on the drums and other metal debris excavated from the site, as well as interviews with long-term employees, were used to develop a position which was justified to FDER in the report.

BB&L is providing ongoing consulting services necessary to assess the extent of soil and ground-water contamination associated with both drum discoveries, as well as to respond to FDER questions regarding the conclusions of previous site investigations (which were conducted by others) in light of this new information. These services have included work plan development, sampling, and data evaluation, as well as assisting the client and legal counsel with regulatory agency negotiations.

Representative Projects

Project Name and Location: RCRA Facility Investigation/Corrective Measures Study, Safety-Kleen Corporation, Hebron, Ohio

Client Reference: Mr. Scott Davies
Senior Environmental Manager
1000 North Randall Road
Elgin, Illinois 60123
Phone: (708) 697-8460

BB&L Principal: Henry R. Stonerook, P.E., Associate

Project Manager: Kevin D. Svitana, P.G., Manager

Project Start: 1992

Project Completion: ongoing

Approximate Costs: $150,000

Project Objectives, Methods, and Technical Details:

Safety-Kleen Corporation retained BB&L to implement a RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS) at their solvent recycling facility in Hebron, Ohio, in accordance with a RCRA Corrective Action Consent Order between USEPA Region 5 and Safety-Kleen. The 13-acre facility is an industrial park that is bordered on one side by the South Fork of the Licking River. Volatile organic compounds (VOCs) have been detected in soils and ground water, and the impacts are widespread across the site. In addition, ground-water discharges to the river water and sediments.

BB&L implemented an RFI and developed an addendum to the RFI that focused on determining impacts of VOCs released from leaking underground storage tanks (USTs) and a fire that occurred at the site. Since the site had undergone major reconstruction following the fire, little information was available on previous site utilities and structures. An integral part of the RFI was recreating subsurface conditions so that ground-water migration paths could be more accurately predicted and ground-water controls could be better implemented. In addition, USEPA demanded that an off-site investigation be conducted, which lead to a conflict with an off-site property owner who did not want to grant site access. BB&L negotiated on behalf of Safety-Kleen to gain site access and obtained approval.

Upon completion of the RFI, BB&L negotiated with USEPA Region 5 to use Interim Corrective Measures (ICMs) as pilot studies while developing the CMS and CMS Work Plan for the site. Currently, BB&L is developing the CMS Work Plan and operating the

ICMs. The ICMs consist of placing an impermeable barrier and recovery sumps to collect ground water that is currently migrating into a surface-water body.

BB&L also performed a bioassay of the stream and compared the data collected to normal populations for Central Ohio streams. The results indicated that, despite impacted ground-water inflow to the South Fork of the Licking River, there was no adverse affect on populations that were present in the stream.

By developing the ICM as pilot studies for the CMS, BB&L allowed Safety-Kleen a longer period of time to prepare the CMS program and gather the data necessary to assess the effectiveness of expanded ICMs for full-scale corrective measures for the site. In addition, BB&L established a ground-water monitoring program that has been ongoing since the initiation of RFI/CMS activities. The ground water is being monitored to assess migration paths that are associated with utility excavations and UST vaults, as well as diffused migration through more permeable sediments.

In addition to implementing the RFI work plan, BB&L revised a UST closure plan completed by another consultant for the removal of three RCRA-permitted USTs at the facility. BB&L utilized RFI and ground-water monitoring data to revise the closure plan to address post-closure of the unit and applicable post-closure monitoring requirements. BB&L then resubmitted the certification of closure to the Ohio EPA on behalf of Safety-Kleen. The Ohio EPA approved both the tank closure certification and post-closure work plan. This is significant because the Ohio EPA has approved very few closure plans for RCRA facilities.

Representative Projects

Project Name and Location: Health and Safety Oversight/Hazardous Waste Management, New York City Department of Environmental Protection, New York, New York
Client Reference: Mr. Cyprian Cox
NYCDEP Department of Hazardous Waste Management
59-17 Junction Boulevard
First Floor L
Corona, New York 11368
Phone: (718) 595-4659
BB&L Principal: John B. Taylor, Jr., Vice President
Project Manager: John B. Taylor, Jr., Vice President
Project Start: 1990
Project Completion: ongoing
Approximate Costs: $4.2 M
Project Objectives, Methods, and Technical Details:

BB&L was retained by the New York City Department of Environmental Protection (NYCDEP) to provide environmental services relating to the construction of dewatering facilities at the Wards Island Water Pollution Control Plant (WPCP). Construction at the WPCP had been delayed, and the project schedule had fallen seven weeks behind. BB&L mobilized quickly, preparing a site-specific health and safety plan within three days of contract award, to help move the project back on schedule. BB&L's ongoing role at Ward's Island includes: development, monitoring, and implementation of health and safety, planning and implementation of soil and water handling and disposal during site activities; and development and implementation of a remedial action plan.

Health and safety planning has included the preparation of a site-specific health and safety plan (HASP) which addresses construction activities associated with existing on-site hazards, protection of the public and the off-site environment, and the possible exposure of construction workers, engineers, visitors, and NYCDEP employees to potentially hazardous materials on site. BB&L's Site Safety Officer is responsible for implementing the HASP, monitoring the air quality during construction activities, determining if work can continue based on the established exposure guidelines promulgated by OSHA and NIOSH and outlined in the HASP, and implementation of required mitigative actions.

A plan was developed to provide for the handling and disposal of excavated material in accordance with New York City, state, and federal regulations. This document addressed alternatives for removal and disposal of materials on site and off site, and for combinations of alternatives based on project schedule, cost, and protection of human health and the environment.

A Site Assessment conducted prior to commencement of work indicated that potential hazardous materials may be encountered during construction of the new facilities and that site soils, ground water, and soil gas have levels of contamination exceeding New York City guidelines for petroleum hydrocarbons. Additionally, it was discovered that nine underground fuel oil storage tanks and associated piping existing on site may be the cause of petroleum-contaminated soils. Thus, a Remedial Action Plan was prepared to address the decommissioning and removal of USTs, tightness testing of other USTs at the facility, and remediation of petroleum-contaminated soils and ground water.

Representative Projects

Project Name and Location: Underground Storage Tank Replacement, Nassau County Department of Public Works, Nassau County, New York

Client Reference: Mr. Ken Arnold
Program Coordinator
Nassau County Department of Public Works
Division of Hazardous Waste Services
425 Salsbury Park Drive
Westbury, New York 11590
Phone: (516) 571-9600

BB&L Principal: Robert J. Kukenberger, P.E., Senior Vice President

Project Manager: Sharon L. Robinson, P.E., Senior Project Engineer

Project Start: 1990 **Project Completion:** ongoing

Approximate Costs: $350,000

Project Objectives, Methods, and Technical Details:

Federal, state and local regulatory agencies have tightened their technical requirements for Underground Storage Tanks (USTs) with regard to UST management. These regulations have established four basic compliance goals that UST designs are to be based upon. They are as follows:

- Corrosion-Resistant Construction
- Leak and Containment Systems
- Spill and Overfill Controls
- Proper Installation

In response to the regulations, BB&L was retained by Nassau County's Department of Public Works to design fiberglass, double-walled underground fuel oil storage tanks at various site locations within Nassau County.

We have completed two of four existing contracts with Nassau County. The third contract is currently in the construction stage and the fourth contract is in the design stage.

The new tanks replace existing steel tanks. In accordance with current regulations, our designs include fiberglass-reinforced plastic tanks, fuel oil supply, return, containment, and vent piping layouts. Complete electrical and instrumentation provisions for leak detection and overfill/spill protection are also designed.

Nassau County also required BB&L to prepare tank removal and abandonment plans for the existing steel tanks. The plans include provisions for deactivating the existing piping and the removal, disposal, and abandonment of the existing tanks, as required. One site allowed for in-place abandonment since it was not practical for removal of the tank, due to the existing site limitations.

Contract specifications and drawings, completed on a CADD system, detailing the design components by which the tank installations will follow, are prepared. BB&L assists Nassau County with the bidding process by answering any questions from contractors.

Blasland, Bouck & Lee also providing shop drawing review and construction administration services during the construction phases of each project. Completion of construction for the ongoing UST design contract is scheduled for December 1995.

Representative Projects

Project Name and Location: Consent Order Investigation and Site Closure, Truck Leasing and Maintenance Facility, Confidential Client, Combee Road, Lakeland, Florida

Client Reference: Due to a confidentiality agreement, client information cannot be disclosed for this project.

BB&L Principal: Doyle E. Cottrell, P.E., Senior Vice President

Project Manager: Amanda Shearer, Manager

Project Start: 1993

Project Completion: ongoing

Approximate Costs: $80,000

Project Objectives, Methods, and Technical Details:

BB&L assisted the owner of a truck leasing and maintenance facility with eliminating several environmental problems that were delaying the sale of the facility to another company. These problems concerned an industrial septic system and six underground storage tanks, which represented two distinct regulatory issues and were dealt with under the jurisdiction of three divisions of two separate regulatory agencies.

The industrial septic system was the subject of a Consent Order negotiated with the Industrial Waste Section of the Florida Department of Environmental Protection (FDEP), Southwest District. The system consisted of a 1,200-gallon industrial septic tank, oil and grease interceptor, and associated drainfield for the facility, which comprised an office, three-bay maintenance area, and one-bay truck wash situated on approximately 2.4 acres. Floor drains in the maintenance and truck wash bays drained to the oil and grease interceptor, then to the septic tank and drainfield. A Warning Letter issued following an FDEP investigation of the site stated that runoff of seepage water from the drainfield flowed across a parking lot and into a county stormwater ditch located along Combee Road. The purpose of the Consent Order investigation was to determine whether operation of the industrial septic system had impacted soil and ground water in the vicinity.

BB&L personnel prepared and gained FDEP approval for a Preliminary Contamination Assessment Plan (PCAP) that proposed the removal of the industrial septic tank and oil and grease interceptor, plus excavation of the drainfield and associated soils. By conducting soil sampling and analysis prior to preparation of the PCAP, it was possible to identify the contaminants of concern to determine disposal options and to limit the list of analytical parameters and associated cost during subsequent assessment activities.

In addition to proposing closure of the industrial septic system, the PCAP provided for the simultaneous excavation and removal of the former pump islands and six USTs, including two 12,000-gallon diesel, one 10,000-gallon diesel, one 10,000-gallon unleaded gasoline, one 4,000-gallon motor oil, and one 2,000-gallon waste oil tanks. Simultaneous closure of the tanks, which was completed under the regulatory jurisdiction of the Polk County Public Health Unit (PCPHU) Storage Tank Division, averted the cost of multiple site mobilizations and permitted assessment activities to satisfy the requirements of both the Consent Order and Florida petroleum regulations (Florida Administrative Code Chapter 17-770) without duplicate efforts. In addition, accelerated implementation of actual closure activities allowed the intended new owner to take occupancy of the site on a lease basis pending final regulatory disposition of these environmental matters.

BB&L provided oversight during site closure activities, which were documented in a Storage Tank Closure Report submitted to PCPHU and a Preliminary Contamination Assessment Report (PCAR) submitted to FDEP. The results of subsequent soil, groundwater, and hydrogeologic assessment activities were documented in the Consent Order PCAR and in a Contamination Assessment Report (CAR) prepared for the UST portion of the project under FAC Chapter 17-770 guidelines. Based on findings of limited petroleum contamination associated with the former industrial septic system, the PCAR recommendation for no further action was approved by FDEP Southwest District, and the Consent Order case was closed. Limited contamination was identified near the former pump island area, as reported in the CAR submitted to the FDEP Southwest District UST Division, and a request for Monitoring Only status is pending regulatory review.

Representative Projects

Project Name and Location: Design of Closed Loop Wastewater Treatment System, West Virginia
Client Reference: Due to a confidentiality agreement, client information cannot be disclosed for this project.
BB&L Principal: Edward R. Lynch, P.E., Executive Vice President
Project Manager:
Project Start: 1988
Project Completion: 1988
Approximate Costs: $100,000
Project Objectives, Methods, and Technical Details:

A Fortune 500 company made a business decision to relocate a profitable manufacturing operation from a plant located in Oklahoma to a plant in West Virginia. The manufacturing operation consisted of large process manufacturing equipment and associated appurtenances.

BB&L was contracted to design a closed loop treatment system for two wastewater streams exiting the equipment to save money on water supply and wastewater disposal costs. One waste stream, referred to as "mold water," is an oily water used to cool cast iron form molds. The second waste stream, referred to as "Cullet quench water," is used to quench hot waste glass generated during normal operation.

The waste process system designed, consisted of the following units: Coalescing Media Oil Water Separator to remove tramp oil and grease; Solid Settling Tanks to remove solids and glass fines; Shell and Tube Heat Exchanger to transfer excess heat to cooling water; and Forced Air Evaporative Cooling Tower to remove excess heat from the cooling water.

BB&L provided construction management services during construction and startup services during system startup. The system has been in operation since the Spring of 1988.

Representative Projects

Project Name and Location: Remedial Investigation/Feasibility Study, American Cyanamid Company, Bound Brook, New Jersey

Client Reference: Dr. Ray Hillard
American Cyanamid Company
Manager, Environmental Services
Easton Turnpike, Building No. 40
Bound Brook, New Jersey 08805
Phone: (201)560-2000

BB&L Principal: Andrew N. Johnson, P.E., Executive Vice President

Project Manager: James A. Schnitzer, Manager

Project Start: 1988

Project Completion: ongoing

Approximate Costs: confidential (multi-million dollar)

Project Objectives, Methods, and Technical Details:

BB&L has completed a remedial investigation program (RI) for American Cyanamid Company on 16 on-site lagoons and the 575-acres comprising their Bound Brook, New Jersey facility. Presently, BB&L is completing preparation and implementation of the Feasibility Study work plans for the on-site lagoons and accompanying areas of the manufacturing facility work plans. The remedial investigations and feasibility studies are being conducted in accordance with Federal SARA and New Jersey Superfund programs. Also, these investigations and studies are being completed to fulfill the requirements of a RCRA Corrective Action Permit.

At one time, this facility was the largest organic chemical manufacturing plant in the nation. The on-site lagoons, which cover approximately 135 acres, contain tars from process operations, as well as sludges generated from an on-site wastewater treatment facility. The production area at one time contained over 80 production and support service buildings, over 400 tanks and process vessels, and over seven miles of underground sewers.

BB&L has completed an extensive sampling and analysis program on the lagoons to characterize and classify the contents of these impoundments. The characterization efforts were focused on developing the data necessary to evaluate practical remedial actions for these lagoons as part of the Feasibility Study. Similarly, the soils investigation in the production area focused on characterizing the nature and extent of soils contamination for the purpose of developing data to allow the evaluation of practical remedial actions during the Feasibility Study.

In addition to the completion of the RI/FS work efforts, BB&L is also working with Cyanamid on the construction and operation of an on-site, RCRA-permitted landfill, encompassing approximately 20 acres and having a capacity of 450,000 cubic yards. The permitted landfill facility (referred to as Impound 8) was conceptually developed and designed for the closure of three on-site lagoons and for possible future use associated with implementation of remedial actions for the 16 other on-site lagoons and contaminated soils. The Impound 8 program provides a practical, economical, and acceptable approach for the disposal of complex waste material mixtures and residues from treated sludge. The use of Impound 8 is playing a key role in the development of remedial actions, as part of the FS.

Throughout the course of the project, the project team, consisting of members of BB&L staff and Cyanamid's staff, have worked closely with the New Jersey Department of Environmental Protection (NJDEP) and the United States Environmental Protection Agency (EPA), who are responsible for the admission of this project.

Representative Projects

Project Name and Location: Moreau Federal Superfund Site, Town of Moreau, New York
Client Reference: Mr. Paul W. Hare
Remedial Project Manager
Corporate Environmental Programs
General Electric Company
1 Computer Drive South
Albany, New York
Phone: (518) 458-9108
BB&L Principal: Edward R. Lynch, P.E., Executive Vice President
Project Manager: Donald F. Sauda, Manager
Project Start: 1984
Project Completion: ongoing
Approximate Costs: $875,000
Project Objectives, Methods, and Technical Details:

The Moreau site was reportedly operated between 1958-1968 as a disposal facility for waste materials generated by the General Electric Company (GE). The waste materials disposed of are reported to include: scrap liquids, Polychlorinated Biphenyls (PCBs), scrap oils, sludge, and miscellaneous scrap.

In 1968, the Moreau site consisted of an evaporative lagoon (60-feet long, 30-feet wide, 3-feet deep) and approximately 50 to 100 drums of waste materials located adjacent to the evaporative lagoon.

In 1975, the New York State Department of Environmental Conservation (NYSDEC) was advised, during the General Electric Company-NYSDEC PCB Hearings, that the Moreau site had been used as a final disposal site for PCBs.

Pursuant to the September 20, 1980 Agreement with the NYSDEC, GE designed and constructed a containment system at the site to encompass the evaporative lagoon. BB&L personnel performed field investigations, evaluated alternatives, and prepared final design documents for the containment system. The containment system consisted of a soil bentonite cut-off wall (100-feet deep) and a 4½-foot clay cap over the lagoon area. The off-site concerns associated with the site resulted in it being listed as a federal Superfund site in 1983.

Since December 1985, GE has maintained and monitored the containment system pursuant to the Agreement and in accordance with a NYSDEC- and USEPA-approved maintenance and monitoring program. In January 1991, the USEPA expressed concerns regarding the monthly water-level measurements which had indicated that the water-level elevation inside the containment system was significantly higher than the aquifer outside the system and requested that GE submit a plan to lower the water-level inside the containment area.

BB&L developed a Containment System Pre-Design Investigation Work Plan (PDI Work Plan), which was submitted to the USEPA. The Work Plan included activities to evaluate the hydraulic capacity and ground-water quality of the containment system. The Work Plan was carried out, and the results were documented in the Containment System Pre-Design Investigation Report (PDI Report), dated February 5, 1993, prepared by BB&L.

The PDI Report included post-enhancement performance criteria, an operational target for enhancement of the containment system, and nine enhancement alternatives, with recommendations as to the preferred enhancement alternative.

The USEPA and NYSDEC agreed that the preferred enhancement alternative is on-site treatment of VOCs, followed by transportation of the treated ground water to the wastewater treatment plan at GE's Fort Edward, New York facility for treatment for PCBs and subsequent discharge to a surface water pursuant to a State Pollutant Discharge Elimination System (SPDES) permit.

BB&L prepared the contract drawings, materials and performance specifications, and construction/start-up plan for the containment system enhancement; these documents were submitted to the USEPA and NYSDEC and approved in October 1993.

BB&L is currently providing construction administration services. Construction activities are scheduled to begin in Spring of 1994 and conclude in June of 1994.

Off-site issues included TCE contamination of residential wells and a spring supply for a nearby village. In 1985, BB&L provided design and construction follow-up services for an air stripper to remove TCE to less than detectable levels in the spring supply prior to normal village water treatment.

In 1989, BB&L prepared a Water Service Area Report in response to an Administrative Order entered into in 1983 by GE and the USEPA; the USEPA's Record of Decision (ROD) issued July 1987; and a Consent Decree between the United States and GE entered in September 1988 by the United States District Court for the North District of New York. These required GE to provide an alternate water supply from the Village of South Glens Falls to approximately 100 residents whose well water was affected or may be potentially affected by the ground-water contaminant plume at the GE Moreau site. By contract dated February 1, 1989, between the village of South Glens Falls and GE, the village agreed to serve these residents.

BB&L prepared permit application documents, plans and specifications, and provided construction follow-up for the water system transmission and distribution piping along several roadways. By January of 1990, all residents were being serviced with water supplied from the village of South Glens Falls.

Representative Projects

Project Name and Location: Ground-Water Remedial Design, Fulton Terminals Superfund Site, Fulton, NY

Client References:

David Williams, Esq.
Cadwalader, Wickersham & Taft
1333 New Hampshire Avenue N.W.
Washington, D.C. 20036
Phone: (202) 862-2200

Mr. Mark Valentine
de maximis, inc.
P.O. Box 90348
Knoxville, Tennessee 37990
(615) 691-5052

BB&L Principal: Edward R. Lynch, P.E., Executive Vice President

Project Managers: Gary R. Cameron, Vice President; Lowell W. McBurney, P.E., Manager

Project Start: 1992 **Project Completion:** Ongoing

Approximate Costs: $800,000

Project Objectives, Methods, and Technical Details:

The Fulton Terminals Site is a former tank terminal located in Fulton, New York, where asphalt material, solvents, and other liquid hazardous wastes were stored in tanks and drums prior to shipment for off-site disposal.

Removal activities were undertaken by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) in 1985. These activities consisted of the excavation and off-site disposal of approximately 300 cubic yards of highly contaminated soil, the removal of the remaining tanks on site, and the abandonment of a storm sewer pipe leading to the adjacent Oswego River. The USEPA performed a supplemental RI/FS, which recommended the remedy ultimately adopted in the ROD--low-temperature thermal desorption of on-site soils above the water table and withdrawal, treatment, and reinjection of ground water.

BB&L was initially hired by the PRP group to provide comments on the draft ROD. BB&L was subsequently hired again to prepare a Sampling, Analysis, Monitoring, and Implementation Plan and a Remedial Design Work Plan for both the soil and ground-water aspects of the remedy. The firm also prepared bid documents for the selection of a soil treatment vendor to provide "design-build" capabilities.

BB&L is currently designing the ground-water withdrawal, treatment, and reinjection system. Pre-design activities entailed modeling ground-water flow in the aquifer underlying the site using QUIKFLOW software to determine the optimum location of pumping and reinjection wells. Following the modeling effort, a pump test was performed to verify the hydraulic parameters used as input to the model, as well as to allow the collection of ground-water samples for chemical analysis in support of treatment system design. A treatability study was also identified to determine the most efficient method of pretreatment to remove naturally occurring metals in ground water withdrawn from the site. Another significant issue related to ground-water recovery is the apparent connection of the aquifer of interest with the Oswego River and the obvious need to design the pumping and reinjection system to minimize the collection of river water.

This project is currently in the intermediate design phase; however, issues identified during the pre-design investigation have resulted in the further re-evaluation of source area alternatives as they relate to the anticipated period of ground-water recovery and treatment. During the investigation, BB&L discovered previously undetected contaminants in a low-permeability, saturated silt and clay layer underlying the site. This layer was not targeted for cleanup in the ROD, but would act as a continuing source of constituents impacting the ground water if left unremediated. Because excavation of this material would require extensive dewatering and difficult construction, BB&L performed a Focused Feasibility Study of alternative remedies for this silt and clay layer.

The Focused Feasibility Study identified, among other alternatives, an in-situ, hot-air steam stripping (HASS) alternative to remove contaminants in the silt and clay layer. Through this technology, steam and hot air are injected directly into the ground to vaporize and strip volatile and semivolatile organics. A mixing auger loosens and homogenizes the soil during the stripping process. Off-gases produced by the treatment technique are captured at the surface through the use of a shroud to which a vacuum is applied; the gas is condensed and treated using a vapor-phase carbon adsorption system. HASS can be

applied to both saturated and unsaturated soils, at depths of up to 30 feet.

BB&L gained approval from the USEPA and oversaw a pilot-scale test of the HASS technology in November 1993; the technology proved effective in significantly reducing the concentration of contaminants in the saturated silt and clay layer. BB&L prepared a final report discussing the effectiveness of HASS at the site and submitted it to the agency.

Representative Projects

Project Name and Location: Curcio Scrap Metal Superfund Site RI/FS, Confidential Client, Saddlebrook, New Jersey

Client Reference: Carel Conrad, Ph.D.
Manager, Environmental Affairs
Consolidated Edison of New York, Inc.
4 Irving Place
New York, New York 10003
Phone: (212) 460-2424

BB&L Principal: Tyler E. Gass, , C.P.G., PHg, Executive Vice President

Project Manager: Vita A. DeMarchi, Senior Project Hydrogeologist

Project Start: 1988 **Project Completion:** 1991

Approximate Costs: $600,000

Project Objectives, Methods, and Technical Details: Underground Storage Tank

The Curcio Scrap Metal Superfund site consists of a scrap metal recycling yard that received and scrapped transformers containing PCB oil.

USEPA Region II divided the site into two operable units, one for soil and one for ground water.

BB&L completed the Remedial Investigation for soils and ground water and a Focused Feasibility Study for soils. A Record of Decision for soils was issued in 1991.

The objectives of the RI were to delineate the nature and extent of surficial and subsurface soil contamination at the site; characterize ground-water quality; evaluate and identify the potential for off-site migration of chemical constituents in ground water and identify whether separate ground-water flow zones exist in the upper and lower overburden aquifer beneath the site; and perform sediment sampling in storm drains to determine whether chemical constituents migrated via surface runoff from the scrapyard soil.

The Remedial Investigation identified impacts to both ground water and soil. Approximately 1,700 cubic yards of soil containing PCBs, metals, and volatile organic compound was delineated. As part of the RI, BB&L utilized an on-site mobile laboratory to facilitate in-field evaluation.

Based on an evaluation of the data collected during the RI, USEPA requested that an expedited Response Action be performed to address on-site soil. In response, BB&L performed a Focused Feasibility Study.

Remedial alternatives evaluated in the Focused Feasibility Study included no action, surface capping, in-situ soil vitrification, on-site stabilization/solidification, land disposal, and incineration.

The USEPA selected excavation and off-site incineration as the remedial alternative for soils in the Record of Decision. Remediation of the soils has been completed, and further investigation on Operable Unit 2 ground water is currently under review.

Representative Projects

Project Name and Location: Remedial Design/Construction Administration, Port Washington L-4 Landfill, North Hempstead, New York

Client Reference: Mr. Paul M. Roth
Commissioner, Solid Waste Management
802 West Shore Drive
Port Washington, New York 11050
Phone: (516) 944-8159

BB&L Principal: Tyler E. Gass, , C.P.G., PHg, Executive Vice President
Project Manager: Stanley J. Sucharski, Manager
Project Start: 1993 **Project Completion:** ongoing
Approximate Costs: approximately 1.6M billed to date

Project Objectives, Methods, and Technical Details:

The Port Washington L-4 Landfill is an inactive, 55-acre site in the Town of North Hempstead, New York, which was formerly used for the disposal of municipal solid waste. As a result of the reported disposal of industrial wastes in the 1970s and 1980s, the site was included on the United States Environmental Protection Agency's (USEPA's) National Priorities List. BB&L was retained by the town to provide remedial design and construction management services in accordance with a Consent Order between the USEPA and the town, which required the implementation of the site remedial action program specified in the USEPA's Record of Decision.

BB&L generated a Project Operations Plan, which established detailed protocols for carrying out each component of the remedial action program, to ensure coordination among different subprograms and among the different contractors responsible for portions of the overall project. The operations plan included a detailed Management Plan, a Health and Safety Plan, and a Quality Assurance/Quality Control Plan, prepared in accordance with USEPA standards.

BB&L conducted the necessary field studies to design a landfill capping and closure system, design a ground-water capture/treatment system, and rehabilitate the landfill gas control system. These studies included slope stability analysis, field surveys for leachate seeps and vectors, and gas quality and soil gas pressure tests. The ground-water capture/treatment studies included monitoring well installation, sampling for contaminants, water-level monitoring, test well installation, aquifer testing, ground-water flow modeling, and treatability studies, as well as a pilot study on volatile organic compound (VOC) stripping.

Using these data, BB&L is preparing an Engineering Design Report setting forth the criteria for three remedial design projects: landfill capping and closure, ground-water capture/treatment, and post-closure operation and maintenance.

The Town of North Hempstead maintains an existing methane gas control system at the Port Washington Landfill. Methane gas is produced by the degradation of the buried garbage mass in landfills. To prevent this naturally-occurring gas from moving into areas surrounding the landfill, the Town maintains a series of gas extraction wells along the western perimeter of the landfill. After these gas extraction wells withdraw methane gas from beneath the surface, the gases travel through a system of above ground pipelines and a continuously operating blower system and are ultimately destroyed in landfill gas combustion units and flares. The existing system includes two parallel series of extraction wells which form an effective barrier against off-site movement of the subsurface gas. In addition, the Town performs frequent measurements for subsurface gas along the perimeter. These measurements have shown that the existing gas control system is effective in preventing off-site movement of the gas.

In an agreement with the USEPA and the NYSDEC, the Town of North Hempstead is undertaking a project to rehabilitate and improve the existing methane gas control system. This project consists of the replacement of the aboveground piping, as well as the installation of several new gas extraction wells in an area near Wakefield Avenue. The purpose of this project is to increase the efficiency and reliability of the existing system to further protect the community.

BB&L prepared the contract documents for rebuilding and expanding the existing landfill gas migration control system. BB&L's construction manager is assisting the Town of North Hempstead in administering the construction contract and is providing on-site construction QA/QC. BB&L is also preparing the Closure Plan and design documents for the capping and closure, and will prepare the design documents for ground-water remediation.

The Town intends to maximize its eligibility for reimbursement of response costs incurred in the performance of the obligations of the Consent Decree from the State of New York pursuant to Title 3 of the Environmental Quality Bond Act ("EQBA"). BB&L has assisted the Town in securing this funding and has taken the lead in community relations issues.

BB&L is responsible for carrying out a public information program to inform the public of the progress of the remedial action project, and to provide opportunity for public comment and address concerns at public meetings.

Representative Projects

Project Name and Location: Interim Remedial Measures and Remedial Investigation/Feasibility Study, Confidential Client, Cobleskill, NY

Client Reference: Due to a confidentiality agreement, client information cannot be disclosed for this project.

BB&L Principal: Edward R. Lynch, P.E., Executive Vice President
Project Manager: David J. Ulm, Associate
Project Start: 1992
Approximate Costs: $1 M
Project Completion: ongoing

Project Objectives, Methods, and Technical Details:

This site is an active salvage business which recovers and resells mechanical parts and materials from various types of equipment. Between 1978 and the mid-1980s, PCB transformers were purchased by the site operator and transported to the scrapyard. The transformers were disassembled within the electrical equipment area to recover copper components, which were then resold. During the scrapping operations, transformer dielectric fluid containing polychlorinated biphenyls (PCBs) may have been released from the transformers to the ground surface.

In June 1983, personnel from the NYSDEC Bureau of Enforcement and Criminal Investigation (BECI) collected samples of soil in the electrical equipment area, sediment and water from the quarry pond, and sediment from the quarry pond outlet channel. Results for the samples collected by BECI indicated that PCBs were present in soils, sediment, and surface water at the site. Due to the presence of PCBs identified at the site by the BECI sampling, the site is currently listed by the NYSDEC as a Class 2 Inactive Hazardous Waste Site. In response to a lawsuit filed by the State of New York Attorney General, the client and scrapyard owner have entered into a Consent Order to address the presence of PCBs and other chemical constituents in environmental media at the site.

In 1989, the client performed an initial investigation of soils, sediments, surface water, and ground water at the site. Analytical results indicated that PCBs were present in soils, sediments, and surface water; metals in soils, sediment, and surface water.

In 1991, the client undertook several Interim Remedial Measures (IRMs) to deal with the presence of PCBs in environmental media at the site.

BB&L oversaw IRMs at the site between August 1992 and September 1993. These IRMs included:

1. Installation of a temporary, 400 gpm water treatment system to drain the on-site quarry pond to facilitate debris removal;

2. Removing the debris identified at the bottom of the quarry pond during the August 1991 underwater reconnaissance;

3. Erecting a fence to restrict access to the site;

4. Removing and cleaning scrap metal and debris located on the ground surface at the site for relocation off site or for disposal;

5. Installing silt fencing along the western perimeter of the site to eliminate off-site transport of silt potentially containing PCBs; and.

6. Designing a long-term pump and treatment system for the quarry pond to eliminate the off-site discharge of surface water containing PCBs.

The client also retained BB&L to conduct a comprehensive RI/FS to determine the presence and extent of chemical constituents in soils, sediment, surface water, and ground water on site; determine the presence and extent of chemical constituents in sediments and surface water downstream of the quarry pond outlet channel; determine whether additional IRMs are necessary to address conditions at the site; provide data for a baseline risk assessment; and provide data for preparation of a FS to determine appropriate remedial action for implementation on or off site, as necessary.

The results of the Phase I RI indicated the presence of separate-phase oil containing PCBs on the ground-water surface in the bedrock beneath the site.

Representative Projects

Project Name and Location: Engineering Oversight for Removal Action at Quanta Resources Superfund Site, Syracuse, New York

Client Reference: Mr. Gerry Amber
Ford Motor Company
Dearborn, Michigan
Phone: (313) 327-4646

BB&L Principal: Edward Lynch, P.E., Executive Vice President

Project Manager: Gary R. Cameron, Vice President

Project Start: 1991 **Project Completion:** 1993

Approximate Costs: $60,000

Project Objectives, Methods, and Technical Details:

This federal Superfund site is an abandoned waste oil processing facility. Waste oils were brought to the site from various facilities and dehydrated, filtered, and treated through various methods, and canned for resale. The site was reportedly operated as an oil processing facility from the 1920s until 1981, when it was abandoned.

The waste handling operations at the site consisted of 52 aboveground storage tanks with capacities ranging from 225 to 35,000 gallons, four underground storage tanks with capacities ranging from 10,000 to 22,000 gallons, and two below-grade sumps. In addition, the site contained 77 drums of unknown waste present throughout the site.

The United States Environmental Protection Agency (USEPA), at the request of the New York State Department of Environmental Conservation (NYSDEC), began an investigation of the site in early 1990. The USEPA identified oils, oil/water mixtures, caustics, and acids present in the on-site tanks. Analysis of samples taken from these tanks identified the presence of barium, lead, chromium, strontium, and volatile organic compounds including 1,2 dichloroethane, ethylbenzene, 2-methyl-napthalene, naphthalene tetrachloroethylene, toluene, and xylene. In addition, polychlorinated biphenyls (PCBs) and asbestos-containing materials were identified at the site. Through its Emergency Response Cleanup Service (ERCS) contractor, the USEPA developed a plan for the removal of wastes present at the site. The scope of work for the removal action includes the removal and disposal of all wastes contained in drums, sumps, and tanks; the dismantling, decontamination, and disposal of all tanks; the removal and disposal of asbestos identified at the site; and the removal and disposal of contaminated soil.

The USEPA identified 25 potentially responsible parties (PRPs) and notified those parties of their potential liability for the cost of the USEPA removal effort. The PRPs, which include international as well as local corporations, have offered to finance the USEPA removal action; terms of the offer are presently being negotiated. The PRPs in turn retained BB&L to provide engineering oversight of the removal action being conducted by USEPA's ERCS contractor. The purpose of the engineering oversight is to observe, document, and critique actions being performed by the USEPA and its subcontractors. BB&L's scope of work includes: providing on-site observation services during the removal action activities to audit significant work activities; maintaining detailed written records of activities being conducted at the site; photographing work in progress; providing monthly written progress reports to update the update on current project status and tentative project schedule, and to inform the PRPs of any activities which may result in future PRP liability at the site, such as spills which may occur during the removal action.

BB&L's on-site observer met regularly with USEPA's on-scene coordinator throughout the duration of the project to discuss project status and obtain available documentation such as analytical data and budget updates.

BLASLAND, BOUCK & LEE, INC.
REPRESENTATIVE EXPERIENCE
FEDERAL SUPERFUND SITES

Client/Project/Location/Agency	Contaminants	Site Size	Issues of Concern	Remedial Investigation	Feasibility Study	Remedial Design	Construction Engineering	Remediation	Status
1. Airco Plating Site Miami, FL Airco Plating, Inc. (EPA Region 4)	Metals, VOCs	1 acre	Soil, ground water	Completed (By Others)	Underway (By BBL[1] personnel)	Fall 1993	Fall 1994	To be determined.	FS complete.
2. American Cyanamid Site Bound Brook, NJ American Cyanamid Company (EPA Region 2)	Oils, organics	16 lagoons totalling 130 acres; 200 acres of soils	Ground water, soils, sludges	By BBL	By BBL	Pending	Pending	Various strategies for different lagoons. Includes select removal of sludges for chemical recovery and sale, containment using horizontal underdrain; secure landfill for other sludges.	RI work completed. FS work in progress. Some remediation underway.
3. Anchor Chemical Site Hicksville, NY K.B. Company	Volatile organics	1.5 acres	Ground water, soils	By BBL and Others	Pending	Pending	Pending	Pending.	RI complete.
4. Applied Environmental NY Shore Feasibility Site Teitelbaum & Hiller, P.C. (EPA Region 2)	Volatiles, metals, PCBs	12 acres industrial site	Ground water, surface water	By BBL[1] personnel	By Others	By Others	By Others	Pending.	Feasibility Study in progress.
5. Batavia Landfill Batavia, NY (EPA Region 2)	Unknown	35 acres	Unsecured hazardous waste in drums	Pending	Pending	Pending	By BBL	Completed.	BBL retained to prepare Removal Action of hazardous waste. Removal Action completed.
6. Bennett's Quarry, Bloomington, IN Westinghouse (EPA Region 5)	PCBs	6 acres	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel and Others	By Others	By Others	Site handled under Consent Decree. BBL personnel assisted with preliminary remedial measures.	Consent Decree signed in 1985, currently subject to congressional review.
7. Carroll & Dubies Site Port Jervis, NY Jones, Day, Reavis & Pogue (EPA Region 2)	Volatiles, semi-volatiles, organic compounds	3 acres	Ground water	By BBL	By BBL	Pending	Pending	Pending.	Remedial Investigation in progress.
8. CECOS International Niagara Falls, NY (EPA Region 2)	Organics	575 acres	Soils, ground water	By BBL and Others	Pending	By BBL and Others	Pending	Pending.	BBL retained to perform RCRA Remedial Action/ Corrective Measures Study.

[1]By BBL personnel signifies through previous employment.

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BLASLAND, BOUCK & LEE, INC.
REPRESENTATIVE EXPERIENCE
FEDERAL SUPERFUND SITES

Client/Project/Location/Agency	Contaminants	Site Size	Issues of Concern	Remedial Investigation	Feasibility Study	Remedial Design	Construction Engineering	Remediation	Status
9. Cedar Creek Cedarburg, WI Mercury Marine Corp. (WDNR)	PCBs	6 miles, river and 4 impoundments	Fish advisory for PCBs	By BBL	By BBL	By BBL	Pending	Pending.	RI/FS being developed; Removal Action on one impoundment planned.
10. Clothier Disposal Site S. Granby, NY Clothier PRP Group	PCBs, CPAHs	5 acres	Residual soil contamination	By Others	By Others	By Others	By BBL	Containment using soil cover; long-term monitoring.	Remedial Action complete.
11. Confidential Site (EPA Region 2)	PCBs	6 miles of river	Fish advisory for PCBs	By BBL and Others	By BBL	By BBL	Pending	FS pending; phase 2 of RI.	
12. Curcio Scrapyard Saddle Brook, NJ Confidential Client (EPA Region 2)	PCBs, organic solvents	1 acre	Ground water, soils	By BBL	By BBL	Pending	Pending	Pending.	RI/FS complete. ROD under negotiation.
13. Envirotek II Site Tonawanda, NY Nixon, Hargrave, Devans & Doyle (EPA Region 2)	Unknown	2.5 acres	Drums, pit liquids and solids, select soils, and laboratory wastes	Pending	Pending	Pending	Pending	Removal of drums, liquids and solids from two pits, and laboratory wastes.	BBL retained to perform Removal Action for unsecured hazardous waste and preliminary site investigation. Removal com-pleted and Interim Remedial Measure (IRM) underway.
14. Fulton Terminal Site Fulton, NY Cadwalader, Wickersham & Taft; for Fulton Terminal Steering Committee (EPA Region 2)	Volatile organics	5 acres	Ground water, soils	By Others	none	By BBL	Pending	Pending.	BBL conducting design of the ground-water remedy.
15. Goldisc Recordings, NY WTM Management (EPA Region 2)	Volatiles	20 acres	Ground water	By BBL[1] personnel	By Others	By Others	By Others	Pending.	Negotiating Feasibility Study.
16. Industri-Plex 128 Woburn, MA Stauffer Chemicals (EPA Region 1)	Metals, volatiles	300 acres industrial	Ground water, soil	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	By Others	Ground-water recovery and treatment; capping.	ROD issued.

[1]By BBL personnel signifies through previous employment.

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BLASLAND, BOUCK & LEE, INC.
REPRESENTATIVE EXPERIENCE
FEDERAL SUPERFUND SITES

Client/Project/Location/Agency	Contaminants	Site Size	Issues of Concern	Remedial Investigation	Feasibility Study	Remedial Design	Construction Engineering	Remediation	Status
17. Kalamazoo River Kalamazoo, MI Kalamazoo River PRP Group (EPA Region 5)	PCBs	35 miles of river and multiple land-based sites	Ground water, surface water, sediments, biota	By BBL	By BBL	Pending	Pending	Pending.	Work Plans under agency review.
18. Kentucky Avenue Well Field Horseheads, NY Westinghouse Electric Corporation (EPA Region 2)	VOCs (TCE), metals, hardness	Major aquifer	Ground water	By Others	By Others	By BBL ongoing	Pending	Ground-water recovery and treatment at two sites (700 gpm and 1,400 gpm)	BBL also retained to perform technical review and prepare comments regarding EPA-sponsored RI/FS. Completed.
19. Lemon Lane Landfill Bloomington, IN Westinghouse (EPA Region 5)	PCBs, municipal trash	11 acres	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel and Others	By BBL	By BBL	Site handled under Consent Decree. BBL personnel assisted with preliminary remedial measures.	Consent Decree signed in 1985; currently subject to congressional review.
20. Little Lake Butte des Morts Neenah, WI P.H. Glatfleter Company (WDNR)	PCBs	42-acre sediment deposit	Fish advisory for PCBs	By BBL	By BBL	Pending	Pending	Inlake CDF or armoring.	RI/FS complete; out for public comment in fall 1993.
21. McCarty's Pacific Hide & Fur Pocatello, ID U.S. Army Corps of Engineers (EPA Region 10)	PCBs, metals	10 acres	Contaminant migration off site via air or ground water	By Others	By BBL[1] personnel	By PRPs	By PRPs	Solidification.	Remedial design complete.
22. Moreau Site Town of Moreau, NY General Electric (EPA Region 2)	PCBs, TCE	1 acre, including lagoon and drum area	Ground-water discharge to active public water reservoir and water supply wells.	By BBL[1] personnel	By BBL[1] personnel	By BBL	By BBL	In-situ containment with cut-off wall and cap. Also ground-water recovery and air stripping. Also provision of water supply to affected home owners.	Remediation complete.
23. Munisport Landfill North Miami, FL (EPA Region 4)	Leachate, ammonia	30 acres	Ground water, surface water	By Others	By Others	By BBL	Pending	Pending.	Remedial Design underway. Remedial Design Work Plan implemented.
24. Neal's Dump Bloomington, IN Westinghouse (EPA Region 5)	PCBs, municipal trash	1 acre	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel and Others	By BBL	By BBL	Site handled under Consent Decree. BBL personnel assisted with preliminary remedial measures.	Consent Decree signed in 1985, currently subject to congressional review.

[1]By BBL personnel signifies through previous employment.

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BLASLAND, BOUCK & LEE, INC.
REPRESENTATIVE EXPERIENCE
FEDERAL SUPERFUND SITES

Client/Project/Location/Agency	Contaminants	Site Size	Issues of Concern	Remedial Investigation	Feasibility Study	Remedial Design	Construction Engineering	Remediation	Status
25. Neal's Landfill Bloomington, IN Westinghouse (EPA Region 5)	PCBs, municipal trash	20 acres	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel and Others	By BBL	By BBL	Site handled under Consent Decree. BBL personnel assisted with preliminary remedial measures.	Consent Decree signed in 1985, currently subject to congressional review.
26. Northern Engraving Sparta, WI Edder Assoc. (EPA Region 5)	Metals	12 acres industrial site	Ground water, soil	By BBL[1] personnel	By Others	By Others	Pending	Pending.	ROD issued.
27. Pepper's Steel and Alloy Dade County, FL Florida Power & Light (EPA Region 4)	PCBs, lead	40 acres	Ground water, soils	By BBL[1] personnel	By Others	By Others	By Others	Soil fixation.	ROD issued, remediation in progress.
28. Petroleum Products Corp. Pembroke Park, FL (EPA Region 4)	Waste oil, metals, organics	2 acres	Soils, ground water	By Others	By Others	By BBL and Others	Pending	Free product recovery.	Consent Decree lodged. BBL retained to perform Remedial Design/Remedial Action. Final Remedial Design under review by EPA.
29. Quanta Resources Syracuse, NY (EPA Region 2)	Asbestos, metals, organics, PCBs	0.75 acre	Soils, probably ground water	Pending	Pending	Pending	Pending	Removal of drums, USTs, ASTs, and their contents.	BBL retained by PRP group to oversee removal action.
30. Racal-Datacom Milgo Site - Emergency Response Miami, FL (EPA Region 4)	Lead, chloride, VOCs	5 acres	Waste units, drain field (soil and ground water later)	Underway (By Others)	Underway (By Others)	Spring 1994	Spring 1995	To be determined.	BBL conducted removal action under emergency response. Positioning for remedial design work.
31. Rose Site Lanesboro, MA General Electric (EPA Region 1)	PCBs, organic solvents	1 acre	Ground-water discharge to wetlands and to ground-water users	By Others	By BBL	By BBL and Others	By BBL and Others	ROD issued 9/88. Identifies ground-water treatment and on-site incineration of unsaturated zone PCBs.	Remedial design underway.
32. Rosen Site Cortland, NY Rosen PRP Group (EPA Region 2)	Volatiles, semi-volatiles, metals	20 acres	Ground water, principal aquifer	By BBL	Pending	Pending	Pending	Pending.	RI in progress.

[1]By BBL personnel signifies through previous employment.

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BLASLAND, BOUCK & LEE, INC.
REPRESENTATIVE EXPERIENCE
STATE SUPERFUND AND MISCELLANEOUS SITES

Client/Project/Location/Agency	Contaminants	Site Size	Environmental Issues of Concern	Remedial Investigation	Feasibility Study	Remedial Design	Construction Engineering	Remediation	Status
1. Akzo Chemicals Site Edison, NJ Akzo Chemicals Inc. (NJDEP)	Organics, metals	90 acres	Ground water, soils, buildings	By BBL	Pending	Pending	Pending	Pending.	Completed.
2. Bear Street Facility Syracuse, NY McKesson Corporation (NYSDEC)	Organic solvents	8.2 acres	Soils and ground water	By BBL	Pending	Pending	Pending	Pending.	Remedial Investigation Report completed pending NYSDEC review and approval.
3. Carthage Machine Co. Carthage, NY Industrial General Corp. (NYSDEC)	VOCs, petroleum hydrocarbons, PCBs	10 acres	Soil, ground water	Others, BBL	BBL	BBL	BBL	Source soils excavated and removed; ground-water pump and treat using air stripping.	Soils excavation complete; awaiting air permit.
4. Coal Gasification Sites Hudson Valley, NY (NYSDEC)	Coal gas residue	6 sites	Surface water, ground water	By BBL	Pending	Pending	Pending	Pending Feasibility Study.	Remedial Investigation underway.
5. Dana Corporation Churubusco Site Churubusco, IN Dana Corp. (IDEM)	PCBs	5 acres	Surface water, POTW	By BBL and Others	By BBL and Others	By BBL and Others	By Others	Decontamination of select areas and removal of residual PCBs from select locations.	Remediation complete.
6. EMR Circuits Hauppauge, NY (NYSDEC)	Volatile organics		Ground water	By BBL	Pending	Pending	Pending	Pending.	RI complete.
7. Fort Edward Landfill Fort Edward, NY General Electric (NYSDEC)	PCBs, municipal trash	20 acres	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	In-situ containment with clay capping and ground-water cutoff wall.	Remediation complete.
8. Fort Miller Site Saratoga, NY General Electric (NYSDEC)	PCBs, municipal trash	5 acres	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	In-situ containment with clay capping and ground-water cutoff wall.	Remediation complete.
9. Former GenCorp Property Toledo, OH GenCorp, Inc. (OEPA)	PCBs	80 acres	Soil, ground water, storm sewer	BBL	BBL	Pending	Pending	Pending.	Remedial Investigation completed.

[1]By BBL personnel signifies through previous employment.

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BLASLAND, BOUCK & LEE, INC.
REPRESENTATIVE EXPERIENCE
STATE SUPERFUND AND MISCELLANEOUS SITES

Client/Project/Location/Agency	Contaminants	Site Size	Environmental Issues of Concern	Remedial Investigation	Feasibility Study	Remedial Design	Construction Engineering	Remediation	Status
10. Griffin Technologies, Inc. Webster, NY (NYSDEC)	Organic solvents	10 acres	Soils, ground water	By BBL	Pending	Pending	Pending	Pending.	RI completed. State is reviewing.
11. Hadco Owego, NY (NYSDEC)	Chlorinated organics	12 acres	Soils, ground water, surface water	By BBL	Pending	By Others	By Others	Ground-water pump and treat.	RI underway. Interim remedial measures underway.
12. Herschberger Landfill Union County, OH (OEPA)	Metals, organics, unknowns	15 acres	Air, soils, ground water, surface water	By BBL	Pending	Pending	Pending	Pending.	RI underway.
13. Housatonic River, MA General Electric (MDEP)	PCBs, possibly other contaminants	20 miles of river	Surface water, fish	By BBL and Others	Pending	Pending	Pending	Study underway related to in-situ PCB biodegradation. Separately, hydraulic modification to river completed to modify PCB flow and transport dynamics.	RI underway, FS pending.
14. Indian Orchard Plant Springfield, MA Monsanto Polymer Products (MDEP)	Organic solvents	130 acres	Ground water, surface water	By BBL	By BBL	By BBL	By BBL	Limited capping and risk assessment.	Massachusetts Contingency Plan Waiver Application submitted.
15. Kenworth Truck Company Chillicothe, OH Paccar (OEPA)	VOCs	100 acres	Soil, ground water	Others	Others	By BBL and Others	By BBL	Ground-water recovery, on-site enhanced bioremediation by reinjection of nutrients.	Construction plans completed.
16. Kingsbury Landfill Site, Kingsbury, NY General Electric (NYSDEC)	PCBs, municipal trash	20 acres	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel	By BBL	By BBL	In-situ containment with clay capping and ground-water cutoff wall.	Remediation complete.
17. Kodak Park Rochester, NY (NYSDEC)	Organics	500 acres	Soils, ground water	By BBL	Pending	Pending	By BBL	Interim remedial measures include ground-water collection trench.	RI underway. Interim remedial measures underway.

[1]By BBL personnel signifies through previous employment.

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BLASLAND, BOUCK & LEE, INC.
REPRESENTATIVE EXPERIENCE
STATE SUPERFUND AND MISCELLANEOUS SITES

Client/Project/Location/Agency	Contaminants	Site Size	Environmental Issues of Concern	Remedial Investigation	Feasibility Study	Remedial Design	Construction Engineering	Remediation	Status
18. LCP Waste Lagoon Syracuse, NY LCP Chemicals (NYSDEC)	Mercury	0.5-acre lagoon	Ground water	By BBL	By BBL	By BBL	By BBL	Select soil removal and containment of residuals.	Remediation complete.
19. Loeffel Site Nassau, NY General Electric (NYSDEC)	PCBs, organic solvents	20 acres including lagoon and drum area	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	In-situ containment with clay capping and ground-water cutoff wall.	Remediation complete.
20. M. Wallace & Sons, Inc. Scrapyard Cobleskill, NY Niagara Mohawk Power Corporation NYS Department of Law/ NYSDEC	PCBs	8 acres	Surface water, ground water, sediments, soils	By BBL	Pending	Pending	Pending	Pending.	State is reviewing RI/FS Work Plan.
21. M.T. Sullivan Site Chicopee, MA M.T. Sullivan PRP Group (MDEP)	Volatile organics	12 acres	Ground water, surface water soils, wetlands	By BBL	By BBL	Pending	Pending	Pending.	RI completed. Risk Assessment submitted to State.
22. McKesson Site Des Moines, IA McKesson Corp. (IDNR)	TCE	1 acre	Ground water	By BBL	By BBL	By BBL	By BBL	In-situ vapor extraction.	Remediation ongoing.
23. Metal Plating Plant Webster, NY Nixon, Hargrave, Devans & Doyle (NYSDEC)	Metals, chromium	1 acre	Soils, ground water	By BBL	By BBL	By Others	By Others	Soil removal and off-site disposal.	RI/FS complete.
24. Modena, NY Savin Metal Corp. (NYSDEC)	Metals	10 acres industrial site	Soils, surface water	By BBL[1] personnel	Pending	Pending	Pending	Pending.	State is reviewing RI data.
25. Monsanto Plant Site Springfield, MA Monsanto (MDEP)	Formaldehyde, organic solvents	25 acres	Ground water, surface water	By BBL	By BBL	Pending	Pending	Remedial work completed to date includes in-situ soil treatment to remediate formaldehyde spill area.	Feasibility study in progress.

[1]By BBL personnel signifies through previous employment.

BLASLAND, BOUCK & LEE, INC.
REPRESENTATIVE EXPERIENCE
STATE SUPERFUND AND MISCELLANEOUS SITES

Client/Project/Location/Agency	Contaminants	Site Size	Environmental Issues of Concern	Remedial Investigation	Feasibility Study	Remedial Design	Construction Engineering	Remediation	Status
26. Oil Plume Remediation Pittsfield, MA General Electric (MDEP)	PCBs, coal tar residue, organic solvents	3 acres	Ground water, surface water	By BBL and Others	By BBL and Others	By BBL	By BBL	Ground-water cutoff wall, oil recovery and ground-water treatment.	Remediation partially completed.
27. Old Fort Edward Site Fort Edward, NY General Electric (NYSDEC)	PCBs, municipal trash	10 acres	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel	By BBL	By BBL	In-situ containment with clay cap. Also ground-water recovery and on-site treatment.	Remediation complete.
28. Oswego Fire Training School Niagara Mohawk Power Corporation NYSDEC	PCBs	4 acres	Surface water, ground water, sediments, soils	By BBL	Pending	Pending	Pending	Pending.	State is reviewing RI/FS Work Plan.
29. Palmer Site Mechanicville, NY General Electric (NYSDEC)	PCBs, organic solvents	4 acres	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	In-situ containment with clay capping.	Remediation complete.
30. Penetrex Site Glenwood Landing, NY Shea & Gould (NYSDEC)	Volatile organics		Ground water	By BBL	Pending	Pending	Pending	Pending.	Phase II Investigation complete and report submitted.
31. Plant Site Rochester, NY Confidential Client (NYSDEC)	Metals, acids, volatiles, alcohols, hydrocarbons	100 acres	Surface water, ground water, sediments	By BBL	By BBL	By BBL	Pending	Pending.	RI underway.
32. Port Washington Landfill Port Washington, NY Town of North Hempstead (NYSDEC)	Volatile organics, metals, leachate	53 acres	Ground water, air	By Others	By Others	Pending	Pending	Pending.	BBL is conducting field work as stipulated in the ROD to determine Remedial Design.
33. Rhone-Poulenc Site Chicago Heights, IL Rhone-Poulenc Basic Chemicals Company (IEPA)	Metals, organics	10 acres	Soils, ground water, landfill, waste lagoons	By BBL	By BBL	Pending	Pending	Pending.	Remedial Investigation underway.

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BLASLAND, BOUCK & LEE, INC.
REPRESENTATIVE EXPERIENCE
STATE SUPERFUND AND MISCELLANEOUS SITES

Client/Project/Location/Agency	Contaminants	Site Size	Environmental Issues of Concern	Remedial Investigation	Feasibility Study	Remedial Design	Construction Engineering	Remediation	Status
34. Service Station Site Central New York Confidential Client (NYSDEC)	Hydrocarbons	50 acres	Ground water	By BBL	By BBL	By BBL	By BBL	Ground-water recovery and treatment.	Remediation underway.
35. Simpson Facility Litchfield, MI Simpson Industries (MDNR)	PCBs	3 acres	Soils	By BBL	By BBL	By BBL	By BBL	Soil excavation and off-site disposal.	Remedial activities complete.
36. Tenneco Polymers Burlington, NJ Tenneco Polymers (NJDEP)	Polymer sludges, municipal trash	5 acres	Surface water, ground water	By BBL	By BBL	By BBL	By Others	In-place closure using synthetic membrane and leachate collection.	Remediation complete.
37. Town Branch Site Russellville, KY Rockwell International (KDEP)	PCBs	4 river miles	Surface water, ground water, sediments, biota	By BBL	By BBL	By BBL	Pending	Pending.	Remedial Design underway.
38. Tulco Inc. Boston, MA FMC Corp. (MDEP)	Pesticides	10 acres industrial site	Soils, ground water	By BBL[1] personnel	Pending	Pending	Pending	Pending Feasibility Study.	State is reviewing.
39. Waste Beds Syracuse, NY Confidential Client (NYSDEC)	Brine	700 acres	Ground water, surface water	By BBL	By BBL	Pending	Pending	In-situ containment based on size of site. Specifics under negotiation.	RI complete, FS draft completed.
40. Waste Stabilization Lagoon, Pittsfield, MA General Electric (MDEP)	PCBs, organics	3-acre lagoon	Ground water, surface water	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	By BBL[1] personnel	Waste removal for secure landfill. Ground-water monitoring.	Remediation complete.

[1]By BBL personnel signifies through previous employment.

IV. Key Personnel

A. Project Organization

This section presents the background of the key personnel BB&L has assembled to cover the variety of disciplines required for the implementation of this project. These personnel, selected on the basis of their specific qualifications and experience in performing projects of similar focus and scope, will be available to commit the level of effort required to meet the scope of work proposed for this project. This team has the necessary expertise and overall experience to achieve the project's objectives and to meet its cost, scheduling, and technical requirements. The team is depicted on the Project Organization Chart, included in this section.

B. Key Project Personnel

William B. Popham, Vice President - Corporate Officer. Mr. Popham will service as BB&L's Corporate Officer offering technical input to the project on an as-needed basis; assisting in regulatory/public meetings, client relations, and providing final review and internal approval of all documents and work products developed; and financial and contractual matters, in accordance with BB&L policy. Mr. Popham has more than 17 years of experience managing industrial/hazardous waste projects. This remedial experience includes both state and federal Superfund sites, involving hydrogeologic assessments, remedial alternative studies, evaluation of interim remedial measures, and removal actions.

Thomas P. Hasek Jr., Associate - Project Manager. Mr. Hasek will serve as Project Manager and will be responsible for the overall implementation of the project. Mr. Hasek has over 14 years of experience in the management of solid and hazardous waste projects, with particular emphasis on inactive hazardous waste site Remedial Investigations/Feasibility Studies, waste characterization, tank closures, and removal actions. This experience involves successful consent order negotiations with the NYSDEC and USEPA in closure and implementation of remedial measures of multiple inactive hazardous waste sites. The key strengths Mr. Hasek brings to this role are his overall understanding of the various requirements of remedial projects, involving waste characterization, treatment, removal, and disposal, and his ability to effectively amalgamate the various project elements into a cost-effective, practical removal design that meets clients' goals. Mr. Hasek has over three years of project experience acting as the Senior Environmental Project Manager for a major manufacturing/chemical facility upgrade, replacement, and closure of hazardous waste, hazardous substance, and petroleum storage tanks. For this project, Mr. Hasek will oversee and manage the proposed BB&L technical staff in the overall development and preparation of the work plan, waste characterization, removal action plan, as well as all the administrative requirements for the project.

Richard W. Gahagan, Senior Project Scientist - On-Site Coordinator. Mr. Gahagan will serve as on-site coordinator and will be responsible for overall implementation of the project. Mr. Gahagan has over 12 years of experience in the management of solid and hazardous waste projects, with particulate emphasis in tank closures, regulatory compliance, and waste characterization and disposal. This experience includes the development of waste stream characterization profiles and analytical requirements for non-hazardous waste landfills, removal and disposal of contaminated materials, and the development of regulatory compliance and waste stream reduction plans for generators. For this project Mr. Gahagan will manage the proposed BB&L staff in the overall implementation of the Phase II Removal Action.

Derek S. Meuse, Project Engineer - Engineering Services. Mr. Meuse brings over four years of environmental consulting experience, including over two years working on a storage tank improvement program at a major industrial facility. His responsibilities, while working at this program, included the development, implementation, and documentation of procedures for the closure of hazardous waste, chemical bulk, and petroleum storage tank systems. This experience involved the preparation of tank system closure plans, work plans for storage tank system construction, work plans for storage tank system site characterizations, storage tank system closure reports, and tank system closure health and safety plans and reports. Other responsibilities during tank system closures included preparing state and federal permit applications, directing the disposition of generated materials based on the program protocols, and serving on a committee charged with identifying and mitigating potential chemical hazards.

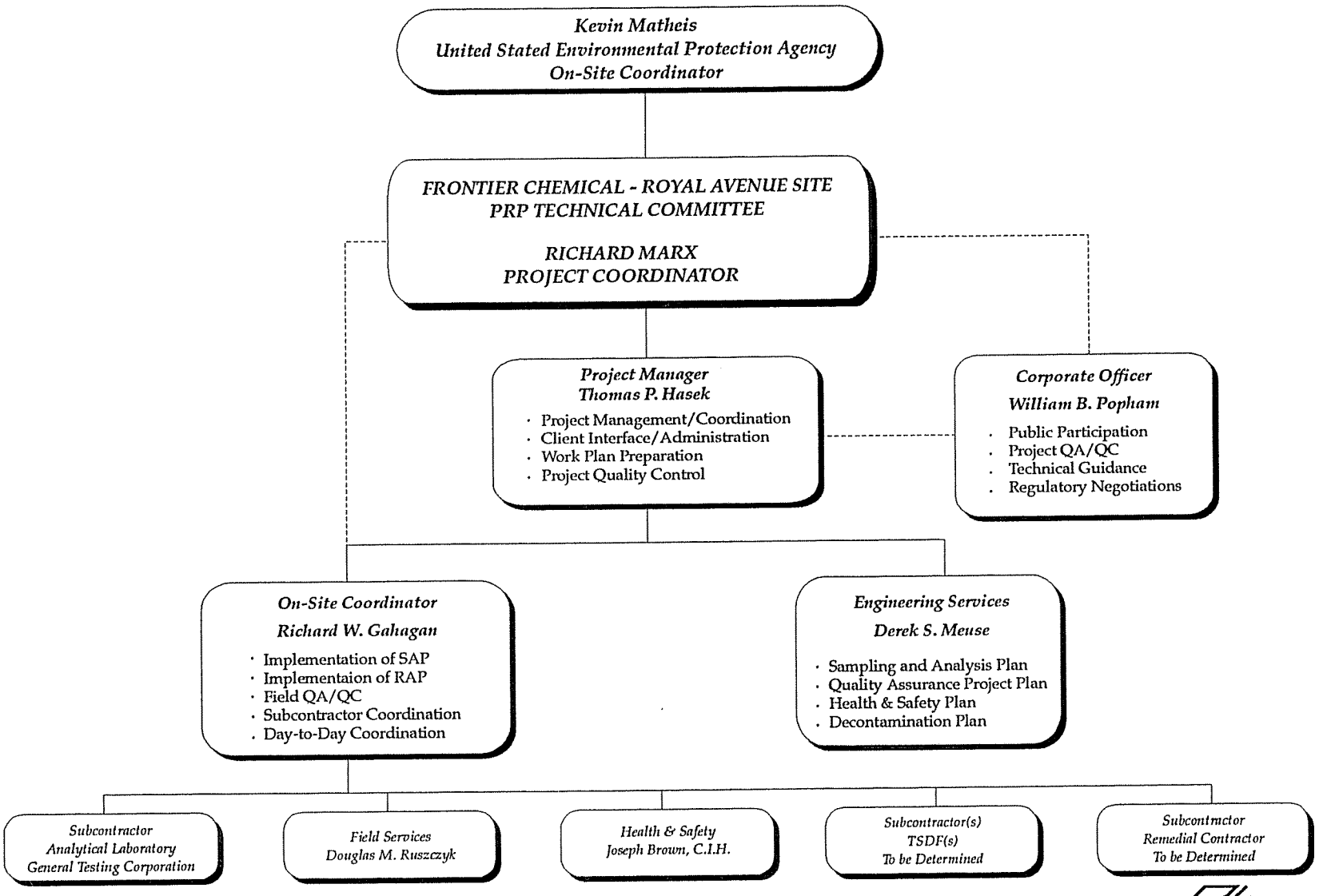
Joseph R. Brown, CIH - Project Health and Safety Task Manager. Mr. Brown will serve as the Project Health and Safety Officer, as required. Mr. Brown will be responsible for the technical review and approval of the Site Health and Safety Plan, as well as on-going review of all project health and safety related issues. Mr. Brown has more than 14 years of experience in the management and performance of comprehensive industrial hygiene, and health and safety programs at a variety of industrial and inactive hazardous waste sites.

C. Resumes

Resumes of the key project personnel identified above, as well as other staff members selected to contribute to the Frontier Royal Avenue Removal Action activities are presented immediately following the Project Organization Chart at the end of this section.

FRONTIER CHEMICAL - ROYAL AVENUE SITE
PHASE II REMOVAL ACTION

PROJECT ORGANIZATION CHART



Key Personnel

William B. Popham
Vice President

RCRA/Hazardous/Remedial: PRP Designated Coordinator responsible for a USEPA 106 Unilateral Removal Action Order for a large lead contaminated residential site located in Buffalo, New York. The project involved the development and implementation of a work plan for the removal of 4,500 tons of contaminated soils in addition to the design and construction of a low permeability asphalt cap, drainage plan, and the permitting/ installation of a direct sewer tie-in for the adjacent source area. The project addressed planning and implementation of site precharacterization, removal activities, mapping, health/safety monitoring, on-site laboratory, QA/QC procedures, transportation/disposal of waste, house crawl space remediation, traffic control, security, property appraisals, site restoration, interior house sampling, as well as coordination with multiple regulatory/municipal agencies and residents. The use of the on-site laboratory employing the x-ray fluorescence analyzer (XRF) was successful negotiated with the USEPA as a pre-characterization field screen and for confirmation/verification oil sampling, which ultimately reduced overall costs and time associated with off-site laboratory analysis.

Managed the removal action at a major federal Superfund site in Tonawanda, New York, involving the characterization and removal of 1,200 drums and 165,000 gallons of contaminated water, sludge, and soils contaminated with chlorinated solvents, oils, and PCBs.

Managed a drum and contaminated soil removal action which involved approximately 850 drums and 300 cubic yards of soil and debris contaminated with chlorinated solvents and oils at a federal Superfund site located in Western New York.

Participated in the management of a PCB and dioxin/furan cleanup at an active manufacturing facility damaged by a fire event. Responsible for coordination of all remedial activities, including oversight of remediation contractor's activities and preparation of work plan and project reports. Main tasks associated with the project included waste management, verification sampling throughout to confirm progress of cleanup effort, and final clearance sampling.

Mr. Popham has more than 17 years of experience in managing industrial/hazardous waste projects, environmental regulatory compliance facility and TSDF audits, and industrial wastewater control programs. Mr. Popham's remedial experience includes both state and federal Superfund sites for projects involving emergency removal actions, hydrogeologic assessments, remedial alternative studies, and evaluation and implementation of interim remedial measures. Mr. Popham maintains a broad base of regulatory knowledge and has been involved with agency negotiations on behalf of clients.

BS/Chemical Engineering 1984,
University of Rochester

AAS/Civil Engineering 1974,
Alfred State Technical College

Managed RCRA Corrective Action program for solvent recycling facility in Ohio. The RCRA Facility Investigation (RFI) work plan was designed to assess impacts in the saturated and unsaturated zones both on and off site at this facility. Investigation efforts included a soil vapor survey; ground-water, stream surface, and sediment sampling and analysis; bioassay assessment; and ambient air monitoring. Responsible for health and safety monitoring in accordance with RCRA criteria.

Managed the removal and disposal of PCB transformers, as well as other PCB-regulated materials, at several industrial facilities.

Designed storm, sanitary, and industrial wastewater collection systems for an 8,500-acre industrial site.

Worked with USEPA consultants to develop proposed wastewater pretreatment standards for the photographic industry.

Implemented and coordinated soil and water remediation projects while member of the New York State Department of Environmental Conservation Regional Hazardous Material Spill Response Team.

Key Personnel

Thomas P. Hasek
Associate

RCRA/Hazardous/Remedial: Project Manager responsible for a USEPA 106 Unilateral Removal Action Order for a large lead contaminated residential site located in Buffalo, New York. The project involved the development and implementation of a work plan for the removal of 4,500 tons of contaminated soils in addition to the design and construction of a low permeability asphalt cap, drainage plan, and the permitting/installation of a direct sewer tie-in for the adjacent source area. The project addressed planning and implementation of site precharacterization, removal activities, mapping, health/safety monitoring, on-site laboratory, QA/QC procedures, transportation/disposal of waste, house crawl space remediation, traffic control, security, property appraisals, site restoration, interior house sampling, as well as coordination with multiple regulatory/municipal agencies and residents. The use of the on-site laboratory employing the x-ray fluorescence analyzer (XRF) was successful negotiated with the USEPA as a pre-characterization field screen and for confirmation/verification oil sampling, which ultimately reduced overall costs and time associated with off-site laboratory analysis.

Project Manager responsible for providing compliance engineering support services for GE Aerospace Facilities located in Valley Forge, Pennsylvania. The project included developing/updating all required contingency plans including RCRA Prevention and Preparedness/Contingency Plans, SPCC Plans, the development and implementation of a site-specific RCRA training programs, the development of facility handling procedures for all plant wastes, and the inventory of all plant chemical and by-products. This project also included an evaluation of facility sanitary sewer discharges, current POTW limitations and provides recommendations related to the applicability of USEPA categorical pretreatment discharge standards.

Managed the closure of a hazardous waste pipeline at a TSDF which consisted of a 3,000-foot underground 18-inch pipeline system. This included NYSDEC closure plan preparation, field observation, closure report and certification. The closure involved the cleaning/decontamination procedures, pipeline testing, and the removal/abandonment of sections based on closure criteria.

Mr. Hasek has over 14 years of experience in the areas of solid and hazardous waste management, environmental regulations/permitting, underground storage tanks, environmental compliance audits/site assessments, and inactive hazardous waste site remedial investigations/feasibility studies and corrective action measures. Previously, Mr. Hasek was employed by Waste Management of North America Inc., as Senior District Engineer, for eight years overseeing a six-state area where he was responsible for development of environmental compliance strategies/programs, solid waste facilities development, permitting, construction, remediation, and environmental management.

MS/Environmental Studies University of Rochester, New York, 1991

BT/Civil Engineering, Rochester Institute of Technology, 1978

Solid Waste Management: Managed both the conceptual and final design, engineering plans as well as the preparation of construction specifications for a 300-ton-per-day recyclables handling and recovery facility in Upstate New York. This project included all regulatory permitting under the NYSDEC Part 360 and SERQA requirements including the representation at public hearings and coordination with the local municipality.

Managed and prepared an environmental compliance and operation manual for a new state-of-the-art double synthetically lined solid waste landfill site. The manual outlined recommended landfill operating procedures; site safety; cover soils management; phased base development/fill sequences; waste handling; landfill administrative procedures; closure and post-closure, environmental monitoring programs for ground water, leachate, gas, and USTs; environmental control and contingency plans; and development of a landfill regulatory compliance/self-audit program.

Thomas P. Hasek [Cont'd.]
Associate

Project Manager responsible for developing a company-wide Waste Exclusion Program for Laidlaw Waste Systems Sanitary Landfill sites across the country. The program was developed in accordance with the Federal Subtitle D Landfill Operation Requirements to provide procedures for detecting and preventing the disposal of prohibited and hazardous waste streams at their solid waste landfills. The program included procedures for random inspections of incoming loads, typical waste screening facilities, records of inspections, training of facility personnel, and notification procedures. To compliment this exclusion program, the corporate acceptance procedures for special waste streams which may be accepted at the landfill sites formalized and organized into a companion program to be implemented.

Manager for sanitary landfill site remediation construction involving a perimeter leachate collection system, HDPE liner cutoff wall, and a direct sewer tie-in for leachate treatment at a POTW. Project involved multiple regulatory approvals, the characterization of the leachate, sewer district formation, and permitting as an industrial discharger.

Manager for 50-foot, below-grade soil bentonite slurry wall and ground-water recovery system for a sanitary landfill site remediation project. Involved in subsurface investigation programs, hydrogeological modeling, design, and permitting. Also prepared bid specification and project contract documents, and construction oversight/certifications.

Responsible for environmental coordination and regulatory compliance, including all environmental monitoring, program development, and advisement of engineering projects for company-owned/operated sanitary landfill sites, transfer stations, and hauling companies. District lead on the interpretation/coordination of proposed environmental regulations with legal, operations, financial, and business associations to determine the impact of regulatory compliance on business interests/development.

Involved with coordinating and monitoring the start-up operations at a Resource Recovery Facility (2,000 tons/day Solid Waste Processing Plant) in Upstate New York.

Supervision of county-owned landfill, transfer stations, and waste hauling activities, including the development of procedures, construction, maintenance, safety, contract and budget estimates, environmental monitoring, cost analysis, permit compliance, and preparation of various engineering reports.

Involved in the coordination of county landfill site search. Worked with various private engineering firms, state and local agencies, and citizens to rank and select various sites for a sanitary landfill facility. Search involved the review of more than 200 parcels of land based upon geology, soils, environmental impacts, access, size, development potential, and various other indicators.

Manager for a New York State Superfund landfill closure study and feasibility report to evaluate the various closure options available based upon site characterization. Site characterization involved the use of various geophysical methods, including seismic refraction, downhole EM, terrain conductivity, and the more traditional method of groundwater monitoring well installations. Subsurface information was analyzed and utilized for the design of a partial perimeter leachate collection system, multilayer clay capping system, subsurface soil bentonite slurry wall, and placement of numerous ground-water monitoring wells at this site.

Manager/Technical Coordinator for numerous sanitary landfill expansion and permit renewal/modification applications to NYSDEC. Projects involved the preparation of various documents, including major hydrogeological site characterization, environmental impact statement, engineering/design reports, and various applications. This involved permitting, SEQRA, legal issues, Public hearings, and regulatory agency interface.

Managed three Superfund remedial investigation/feasibility studies of NYS inactive hazardous waste sites. Involved in the negotiation of consent orders; preparation of work plans; project management of various consultants, drillers, sampling teams, and analytical laboratories; and direct regulatory agency oversight. This included the interpretation of all data, formulation of conclusions based on findings, recommendations

for future corrective action, and delisting petitioning.

Environmental Audits: Conducted site environmental audits at a number of solid waste, transportation, and industrial/manufacturing facilities throughout the country to determine compliance with the various federal/state statutes under RCRA, CWA, CAA, TSCA, CERCLA, OSHA, as well as solid wastes, tanks, and housekeeping. Developed and recommended cost-effective strategies for the various facilities to insure compliance for any outstanding areas as well as recommendations for improved operations.

Manager for preparation of various site/facility acquisition reports to assess the environmental liabilities and research the engineering features of various potential acquisitions of landfill sites, waste hauling companies, virgin land for development, transfer stations, and existing structures.

Conducted facility audits at numerous treatment/ disposal and recycling facilities to determine ability to accept waste streams generated by a major corporation. Ensured compliance with permit and regulatory requirements to minimize the potential for future corporate liability.

Managed and conducted environmental real estate assessment to investigate site conditions and identify existing and potential liability concerns for property transfers. The assessments were conducted across the country on commercial, industrial, manufacturing, apartment, shopping, and warehouse complexes on behalf of banks/lending institutions. These assessments included both Phase I and Phase II studies, as well as follow-up corrective measures and remediation.

Tanks: Task Manager/Senior Environmental Leader for a major manufacturing/chemical facilities upgrade/replacement of hazardous waste, hazardous substance, non-regulated and petroleum bulk storage tankage. This 10-year $250 million project involved over 1,000 above- and below-ground tanks of various capacities. Responsibilities included preparation of closure plans for chemical bulk storage and hazardous waste tanks, work plans for new construction and site characterization activities, and associated health and safety plans. Work also included preparing state and federal permit applications for new and upgraded hazardous waste tank systems, in addition to ensuring compliance with existing storage tank regulations. Other responsibilities included field oversight and health and safety monitoring during tank removals and new construction activities in areas of contaminated soil.

Directly responsible for the development of a UST integrity assessment program to assess present conditions, provide risk/ prioritization guidance, review current testing technology, and provide tank tightness testing. Developed program to formulate an integrated approach to state/federal UST Regulations and to provide useful life projections for upgrade, repairs, and replacements of these tanks.

Managed an underground tank tightness/assessment team which was responsible for performing tank/line tightness tests on over 500 tank systems, which contained hazardous wastes, chemicals, and petroleum products, throughout the Northeast.

Key Personnel

Richard W. Gahagan
Senior Project Scientist

Hazardous Waste: Project Manager responsible for supervision of a major lead-contaminated sand removal/disposal project for the New York State Department of Transportation (NYSDOT). The project required development and implementation of standard operating procedures to minimize the risks to human health and the environment that could potentially result from activities associated with the sandblasting of lead-based paint from several bridges located throughout New York state. The project included supervision of all of health and safety, waste sampling, and characterization procedures, as well as coordination of all activities associated with proper containerization, storage, removal, and disposal of lead-contaminated sand. Reduction of hazards resulting from airborne lead particles was of particular concern to NYSDOT and NYSDEC officials. Encapsulization of each bridge location during sandblasting activities substantially reduced airborne lead particles and facilitated containerization of contaminated sand in preparation for bulk storage and disposal.

Project Manager responsible for the coordination and supervision of a decontamination and building dismantling project in Webster, New York. The project involved development of project-specific health and safety and decontamination procedures to facilitate the dismantling of an arsenic- and selenium- contaminated air purification system. Protocols were developed to reduce contaminant concentrations to acceptable levels; facilitate reoccupation of the quarantined building; and properly characterize contaminated building appurtenances, debris, and rinse waters for disposal.

Managed the preparation of a remedial investigation/feasibility (RI/FS) for a PCB-contaminated metal salvaging facility in Elmira, New York. Responsible for development and implementation of the RI, including evaluation of site conditions, assessment of the nature and extent of contamination, and public health risk and environmental assessment. Prepared the FS to define potential remediate alternatives to provide regulatory officials with sufficient information to select a suitable remedial action

Mr. Gahagan has over 12 years of experience in regulatory compliance, permitting, environmental impact assessment, and solid and hazardous waste management. His career has included positions with the NYSDEC Division of Fish and Wildlife and the Genesee County Health Department. He has been responsible for managing a technical staff of 40 professionals involved in the preparation of several Part 360 permit applications, draft environmental impact statements, and associated technical reports. His career has also included remedial work, supervising the removal of underground storage tanks and the characterization, transport, and disposal of hazardous and non-hazardous waste.

B.S./Biology/Environmental Science, 1982
State University of New York at Geneseo

to mitigate human health risks associated with exposure to PCB-contaminated soils and potential adverse effects of contaminated soils on ground water. Developed the post-cleanup sampling plan to verify that TSCA cleanup standards were achieved.

Supervised the cleanup of a PCB spill site in Buffalo, New York. Provided project management and regulatory compliance services to ensure compliance with the PCB spill cleanup requirements specified within the applicable provisions of TSCA. Prepared cleanup work plan establishing decontamination and health and safety procedures. Developed cleanup objectives and managed the removal, transport, and disposal of PCB contaminated water, sediment, and debris. Managed the development of the post-cleanup sampling plan and the PCB spill report.

Supervised the removal of several underground storage tanks for major chemical and petroleum companies throughout Western New York. These projects included tank cleaning, removal, and testing; chemical transfers, hazardous waste characterization, transport, and disposal; site evaluations and assessments; ground-water monitoring and recovery; soil vapor analysis; and soil vapor extraction. Worked closely with corporate environmental and health and safety departments

to maintain regulatory compliance during all phases of project activities.

Solid Waste Management: Managed the preparation of the conceptual review application, site selection study, and draft environmental impact statement for a proposed 3,000-ton-per-day integrated solid waste management facility in Western New York. This application has been submitted to the NYSDEC, requesting the division of regulatory affairs to conceptually review all issues related to the implementation of a site selection methodology; the selection of technological management and design options; and the subsequent evaluation of impacts to natural and human resources associated with the construction operation and closure of the proposed facility.

Supervised and coordinated the preparation of Part 360 permit applications, Operation and Maintenance manuals, contingency plans, and SEQR reviews for a wide range of solid waste management facilities located in Western New York including:

- Recyclables handling and recovery facilities;
- Construction and demolition debris landfill expansion;
- Composting facilities;
- Processing, recovery, and transfer stations;
- Solid waste incinerators;
- Waste tire processing and storage facilities; and
- Sanitary landfills.

Key Personnel

Joseph R. Brown, C.I.H.

Manager of Environmental Health and Safety

Mr. Brown has more than 14 years of experience in the conceptualization, performance, and management of comprehensive industrial hygiene and health and safety programs for numerous facilities.

MS Environmental Studies, 1978, University of Rochester

BA Biology, 1976, University of Rochester

Mr. Brown serves as Blasland, Bouck & Lee's Manager of Environmental Health and Safety. In this role, he manages the Occupational Health and Safety Program for the Corporation, develops corporate health and safety policies and procedures, and interacts with regional managers, staff, and occupational health physicians. Mr. Brown also manages the Environmental Health and Safety Division. In this capacity, he has responsibility for project management and development of client service areas, such as industrial hygiene surveys, compliance audits, indoor and ambient air quality surveys, and development of health and safety programs.

Mr. Brown also manages environmental remediation projects at current and former industrial facilities. In this capacity, he has developed work plans, negotiated objectives and criteria with regulatory agencies, supervised site monitoring and sampling, identified and evaluated disposal and treatment options, supervised remedial activities, and prepared reports and related documents.

Prior to joining Blasland, Bouck & Lee, his project management experience included traditional industrial hygiene surveys, Phase I and II environmental site assessments, compliance audits, biosafety surveys, indoor air quality evaluations, and asbestos hazard investigations. Before that, he was Program Manager for the New York State Department of Labor's (NYSDOL) Asbestos Control Bureau, where he administered enforcement activities for asbestos projects throughout the state.

Mr. Brown also served as Principal Industrial Hygienist for the NYSDOL's Division of Safety and Health, where he was involved in the review of numerous safety and health issues associated with proposed state regulations. He interacted with the New York State Department of Health and Department of Environmental Conservation to examine occupational health and safety issues, such as blood-borne diseases, asbestos, and air pollution control regulations.

Experience:

Served as project manager during an occupational health investigation of a multi-national manufacturing corporation and acted as the liaison between the employer and OSHA during regulatory compliance activities.

Acted as Site Manager during an ambient air-monitoring program for a national chemical manufacturer. Responsible for site management, staffing, scheduling, and reporting.

Managed health and safety oversight services during an environmental improvement project at a national chemical facility. This project consisted of the large-scale removal of numerous underground chemical tanks. Provided health and safety plan review, on-site evaluation of exposure monitoring, and reporting to the corporation's industrial hygiene staff.

Managed a facility-wide biosafety assessment at a municipal hospital facility as part of an infectious waste incineration upgrade project. Activities included the evaluation of existing infectious waste handling procedures through document reviews and site audits and comparison to a number of regulatory agency requirements. Provided recommendations for improved procedures. A system was developed to measure the amounts of various types of infectious waste generated during various operations. Information was used to determine the capacity and type of incinerator required to treat the waste material.

Performed a number of health hazard evaluations to determine indoor air quality at commercial facilities and schools. Evaluations included characterization of employee exposures to physical and chemical hazards, ergonomic factors, and ventilation system performance assessments.

Conducted several audits for national petrochemical manufacturer. Audits included evaluations of several process safety components,

industrial hygiene issues, and development of recommendations concerning various aspects of the safety programs.

Managed a large-scale environmental remediation project involving the disposal and treatment of solvent contaminated soils and ground water. This project included the development of clean-up criteria, the collection of environmental samples, interaction with regulatory personnel, and the development of treatment options.

Developed and served as the lead instructor for a hazardous materials response training course meeting the specific needs of a national pharmaceutical manufacturer. Training included both lectures and field exercises.

Conducted sampling of underground tanks to assure proper cleaning had been achieved prior to disposal.

Managed a Phase II environmental site assessment which included test trenching operations and the collection of soil samples to determine the source and nature of positive soil gas readings. Interacted with regulatory agency personnel to determine the need for additional site characterization activities.

Assessed employee exposures at canal lock gate areas to airborne lead fume through collection of personal air samples during welding operations. The industrial hygiene survey also included the review of applicable documents such as the respiration protection program and employee training records.

As Principal Industrial Hygienist for the New York State Department of Labor, reviewed numerous safety and health issues associated with proposed state regulations.

Key Personnel

Derek S. Meuse
Project Engineer

Mr. Meuse has over four years of experience in regulatory compliance; environmental permitting; storage tank systems; and site remediation.

BS/Chemical Engineering, 1990, Clarkson University

Permitting, Regulatory, and Compliance: Prepared an extensive environmental RCRA compliance audit summary and corrective action recommendations for a large agriculatural/ manufacturing facility in southern Florida. Responsibilities included auditing hazardous waste training programs, recycling of hazardous wastes, segregation of wastes, hazardous waste 90-day storage areas, emergency response plans, RCRA Preparedness, Prevention and Contingency plans, management of hazardous waste (DOT labeling), manifests, management of batteries and fluorescent bulbs, recordkeeping and reporting, and storage tanks.

Developed and prepared RCRA Preparedness, Prevention, and Contingency Plans pursuant to 40 CFR Part 264 Subparts C and D and a Spill Prevention Control and Countermeasure (SPCC) Plan pursuant to 40 CFR Part 112 for an aerospace facility, located in valley Forge, Pennsylvania. Also, assisted in the development and implementation of a site-specific RCRA training program, the development of facility handling procedures for all plant wastes, and an inventory of all plant chemicals and by-products.

Developed and prepared a Preparedness, Prevention, and Contingency plan pursuant to New Jersey Administrative Code 7:26 for an astro space facility located in Camden, New Jersey.

Developed and prepared a corporate model SPCC Plan for a major agricultural processing facility located in Florida.

Assisted in the preparation of permit applications while working on a major storage tank improvement program. Types of permits prepared include: RCRA Part B Applications of Permit Modifications for hazardous waste storage tank systems; 6 NYCRR Part 373 Permit Applications, Part D-2 Process Information (Tanks) for hazardous waste tank systems; NYSDEC Permits to Construct or Certificates to Operate Air Emissions sources; and USEPA New Source Performance Standard Notifications.

Assisted in the development of a RCRA Part B Permit training course for personnel at a hazardous waste treatment facility.

Generated regulatory interpretations based upon requirements dictated by NYSDEC, program Order-On-Consent and Master Plan, and existing operating permits.

Tanks: Environmental Project Leader for a major storage tank improvement program at a large manufacturing/chemical company under a NYSDEC Order-On-Consent. This multi-year, $250 million program involved over 1,100 above- and below-ground tanks of various capacities. Responsibilities included the development, implementation and documentation of procedures for the closure, upgrade, and installation of hazardous waste, chemical bulk, and petroleum storage tank systems. This included the preparation of tank system closure plans, work plans for new construction and site characterization activities, tank system closure reports, health and safety plans and health and safety reports for client and/or NYSDEC approval. Other responsibilities during tank system closures and installations included preparing state and federal permit applications for new and upgraded hazardous waste tank systems; directing the disposition of excavated materials based in the program's soil management protocol; serving on a committee charged with identifying and mitigating potential chemical hazards; and interpreting tank database information to fulfill program Master Plan and Order-On-Consent reporting requirements.

Assisted in the development of environmental site assessment plans for tank system closure projects. Acted as field team leader on environmental site assessments, collecting soil and water samples, in Level B and C for laboratory analysis. Analytical data was then used in the preparation of tank system closure plans.

Derek S. Meuse [Cont'd.]
Project Engineer

Acted as a Site Health and Safety Officer on various construction and environmental projects, advising construction managers and workers on compliance with OSHA 1910.120, and program Master Health and Safety Plan. Extensive Level B and C field experience involved in the health and safety oversight of projects.

Proficient in the use and field maintenance of a wide variety of portable analytical instruments including: organic vapor detection devices using both photo-ionization and flame ionization detection, combustible gas indicators, personal organic dosimeters, nitrogen dioxide meters, formaldehyde meters, hydrogen sulfide meters, immune assay analysis for hydrocarbons, and X-ray fluorescence analysis for metals.

Site Remediation: Assisted in the development and implementation of a removal action work plan to satisfy the requirements of a CERCLA 106 unilateral order issued by the USEPA to a PRP Group comprised of six corporations. Field activities included acting as the on-site Health & Safety Supervisor, conducting precharacterization and confirmatory sampling, and utilizing an X-MET 920 X-Ray fluorescence analyzer requiring site-specific calibration and regression modeling to test soils for lead contamination. X-ray fluorescence experience included the development of three separate calibration models and the analysis of over 1,100 samples for lead contamination.

Assisted in the development and implementation of a Work Plan to abate lead dust contamination from several residences adjacent to a lead-contaminated superfund site. Responsibilities included the evaluation of various dust abatement options and sampling techniques, and acting as the on-scene coordinator.

Responsible for the industrial hygiene sampling, health and safety monitoring, and general oversight associated with the remediation of a former U.S. military manufacturing facility.

Remedial Investigations: Performed ground-water sampling in conjunction with the remedial investigation of a Superfund site in Moira, New York.

Performed surface and subsurface soil sampling for PCB analysis and prepared the Focused Remedial Investigation Report for several electrical substation sites.

Key Personnel

Frank M. Kozak
Manager

Acted as Project Manager for Remedial Investigation/Feasibility Study (RI/FS) of Superfund site with four landfills. Responsible for all organizational, technical, and financial aspects of project involving ground-water sampling; EM, GPR, and magnetometer surveys; contaminant source evaluation; investigation of ground-water flow conditions and contaminant distribution; and Remedial Action selection. Led negotiations with state agency and USEPA.

Acted as Technical Lead for a Remedial Action evaluation of inactive hazardous waste site. Responsible for technical effort to assess the effectiveness of a ground-water extraction (300 gpm), treatment and recharge system. The project involved sampling of 103 monitoring points, synthesis of a large historic ground-water quality data base, evaluation of plume evolution and ground-water flow modeling. Developed recommendations to enhance the effectiveness of the Remedial Action process, including alternate pumping and recharge scenarios and rehabilitation of the recharge/recovery system. Negotiated with state agency and USEPA.

Managed a site characterization study of an approximately 6.5 million gallon bulk petroleum storage facility in the State of Virginia. The study involved a site assessment, risk assessment, and remediation assessment. The site assessment, which involved evaluating site hydrogeologic and ground-water quality conditions, defined a decreasing contaminant concentration temporal trend and confirmed that ground-water flow direction was essentially opposite the expected regional flow direction. The qualitative risk assessment did not reveal any potential at-risk ground-water receptors. Based on the site and risk assessment findings, the recommended remedial alternative involved long-term monitoring of ground-water quality conditions.

Managed a hydrogeologic investigation and interim remedial measure program at a photochemical manufacturing facility. Responsible for implementation of multi-phase program, including monitoring well installation, soil and ground-water quality data interpretation, assessment of ground-water flow conditions, and identification of solid waste management units.

Mr. Kozak has over six years of experience performing remedial and hydrogeologic investigations of hazardous waste sites, Superfund sites, industrial facilities, and landfills. Responsibilities include all technical and financial aspects of projects for industrial firms, municipalities, and state and federal agencies. He is also experienced as a petroleum geologist, performing stratigraphic and geophysical evaluations.

MS/Geology/Hydrogeology, 1980, Ohio State University

BS/Geology, 1978, Syracuse University

Managed investigation and remedial action development for soil contamination due to releases from gasoline and fuel oil underground storage tanks. The project involved assessing the nature and degree of contamination relative to state clean-up criteria, developing a remedial approach, and negotiating the remedy with the state regulatory agency. The selected remedies involved on-site bioremediation of excavated soils contaminated with benzene and "no-action" for excavated soils with low levels of semivolatile organic compounds.

Managed the RI/FS of a landfill in Westchester County, New York. Responsible for organizing and coordinating initial multidisciplinary efforts to investigate the environmental impact of the landfill. The project involved characterization of ground-water flow and quality condition, delineation of wetlands, and assessment of impacts on downgradient ecosystems.

Acted as Project Manager for storage tank improvement program at a major industrial facility in New York. Responsible for development of new projects and quality control of deliverables, as well as contractual and administrative issues.

Acted as Technical Lead for a hydrogeologic investigation to determine the source of contamination at a southeastern New Hampshire textile plant. Investigated potential on-site and off-site contamination sources; developed and supervised installation of ground-water monitoring wells; and analyzed hydrogeologic and chemical data.

Frank M. Kozak [Cont'd.]
Manager

Acted as Technical Lead for a source characterization investigation of a municipal landfill, to assess the areal extent of solid wastes and subsurface contamination. Tasks included water sampling, water quality data analysis, magnetometer survey, and delineation of a former sludge lagoon.

Key Personnel

Richard P. DiFiore

Manager of Field Services

Industrial: On-site coordination of field work involved in the sampling of 17 waste lagoons for a lagoon remediation program. Lagoons contained sludges from an organic chemical manufacturing plant. Responsibility for safety, quality control, shipment, chain of custody, subcontractor coordination, sampling techniques and sampling personnel.

On-site coordination of field investigations at four river systems contaminated with PCBs and other constituents. Acted as field manager in charge of all investigations under EPA and state oversight.

Managed environmental oversite investigation during dredging and armoring of PCB-contaminated river sediments. Responsibilities included identifying areas to be excavated; supervision of excavation and health & safety issues; and conducting comprehensive monitoring program.

Managed field investigations for a remedial investigation of an 800-acre Superfund site. Coordinated all aspects of field program including health & safety concerns, manpower scheduling, data management, QA/QC and subcontractor coordination.

Provided on-site supervision of underground storage tanks removals, containing hazardous substances and petroleum products at numerous sites throughout the Northeast and South.

Coordinated the design, installation, and operation of a vapor extraction system to remove TCE from soil for a RCRA closure in the Midwest. System included 15 extraction wells, 40hp blower, and two 1,000-pound carbon units.

Managed wastewater sampling programs for five organic chemical companies located throughout the Country. Developed sampling plans, implemented program, and completed reports to satisfy OCPSF pretreatment regulations.

Provided on-site coordination of remediation program consisting of excavation on lead and PCB-contaminated soil. Developed and negotiated remediation plan and completed closure report.

Mr. DiFiore has 14 years of experience in the management and on-site coordination of field investigations for contaminated aquatic systems, lagoon remediation, soil remediation, feasibility studies, sewer evaluations, flow monitoring and sampling, and geophysical surveys.

AAS/Civil Technology, 1977, Mohawk Valley Community College

Participation in pilot fuel-blending facility program; assistance in the design of the facility; and construction supervision and operation of the facility. Overall program involved recovering wastes from two tar lagoons and blending them into a fuel comparable to No. 6 fuel oil. Also conducted sampling of the blended fuel and performance of on-site tests for quality control.

Field work and performance of feasibility study for a wastewater characterization program. Performance of flow monitoring and sampling of process (industrial) sewers for characterization of process waste. Assistance in the development of a feasibility study of the various alternatives for the separation of process waste.

Coordination of a program along 3,800 feet of a tributary stream to develop a profile of the PCBs and hazardous wastes deposited in the stream bed.

Performed Magnetometer Surveys at several hazardous waste landfills.

Performance of RCRA sampling on drums of laboratory wastes.

Municipal: Participated in and coordinated field investigations of 282 miles of sanitary sewer in Westchester County, New York. Field work involved flow monitoring, smoke testing and physical inspections for the isolation of infiltration/inflow within the system. Coordinated all field work necessary in developing detailed 100 scale aerial photos of 282 miles of sanitary sewer and over 100 miles of storm sewers. Assisted in the preparation of the final report.

Coordinated and performed the sampling of seven POTWs for conventional and priority pollutants. Assisted in the development of a sampling protocol. Work involved coordination with sampling

crews and laboratories. Installed automatic samplers, flow proportioning; performed quality control measures, scheduling of sampling and preparation of samples for shipment.

Developed and coordinated the monitoring program for the implementation of Westchester County's Industrial Pretreatment Program. The five-year program involved the sampling of over 100 industries throughout Westchester County, New York. Conducted training program on sampling and flow monitoring for Westchester County personnel.

Assisted in the completion of a Phase I Facility Plan for the sewer rehabilitation of the Mamaroneck Sewer District.

Provided on-site coordination for sampling and flow monitoring of combined sewer overflows in Metropolitan New York and Upstate New York City.

Construction Supervisor of sewer rehabilitation program including television inspection, joint sealing, manhole rehabilitation, and pipe replacement.

Key Personnel

Carolyn M. Ruffing

Project Scientist/Health & Safety Site Coordinator

Ms. Ruffing has over seven years of experience in the environmental field in the areas of health and safety training and environmental risk assessments. Ms. Ruffing also has experience in regulatory compliance and in conducting Phase I environmental assessments, including Phase II recommendations and program management.

BS/Environmental Health, 1985, West Chester University

Hazardous Waste: Health and Safety officer for Superfund site projects, with responsibilities including Health and Safety Plan preparation and field operations audits to ensure compliance with the plan and with pertinent EPA and OSHA regulations.

Field team leader for hazardous waste site sampling projects, including surface and subsurface soil investigations, monitoring well installation, and ground-water sampling.

Performed personnel and ambient air sampling at National Priorities List (NPL) sites for characterization of wastes and documentation of human and environmental impact.

Performed all phases of risk assessments, following EPA Guidelines, for both NPL and non-NPL Superfund sites. Aspects of the risk assessments included indicator contaminant selection, evaluation of human and environmental pathways, and calculation of risk by development of customized Lotus spreadsheets.

Conducted siting studies for municipal and hazardous waste incinerators, based upon air modeling and topographical area.

Industrial Hygiene: Performed air sampling in industrial environments for determination of personnel exposure. In addition, recommended follow-up actions to decrease airborne levels of contaminants and educate employees on the health and safety aspects of the workplace contaminant levels.

Performed environmental audits for OSHA compliance, which included reviews of facility hazard communication program, respiratory protection programs, and related issues.

Authored Material Safety Data Sheets (MSDS) for a major precious metals chemical company. Developed a training manual for in-house use on MSDS formulation.

Developed several customized hazard communication programs for industrial clients, including the written program, organization of MSDS, and employee training.

Health and Safety Program Management: Developed and supervised a regional office health and safety program for a major environmental consulting firm which included five offices and two laboratories. Program components included review of field health and safety plans, monitoring of the medical surveillance program, training, and supervision of designated health and safety alternates.

Developed and implemented a comprehensive laboratory health and safety program for three analytical laboratories for compliance with the OSHA Laboratory Health and Safety standard. Program included: monitoring for compliance with the NRC License, personnel protective equipment selection, methylene chloride monitoring, development of safe handling practices for samples, employee training, and development of a comprehensive health and safety manual.

Training: Developed comprehensive training programs for compliance with OSHA and EPA regulatory training requirements, including HAZWOPER 24-Hour and 40-Hour courses, Hazard Communication, and RCRA. Experience also includes developing and performing the training sessions, developing comprehensive course manuals, and Train-the-Trainer programs.

Environmental Audits: Conducted Phase I environmental audits for real estate transactions. Recommended follow-up actions for the remediation of noted concerns and designed work plans to perform Phase II projects.

Key Personnel

David J. Ulm
Associate

Hazardous Waste: Responsible for directing several Remedial Investigation/Feasibility Study (RI/FS) programs including:

- A 5-acre active fire training school where oils containing PCBs were placed on or over training props and set on fire to simulate electrical fire fighting conditions for a utility client in New York State. Chemical of concern in soils, sediments, surface water, and ground water included PCBs, volatile, and semi-volatile organics and metals. Sediment and surface water investigations are required for an adjacent stream which discharges to a surface water body used as a public water supply source.

- An 8-acre inactive petroleum/chemical waste solvent storage and transfer facility in New York State. Chemicals of concern in soils and ground water include methylene chloride, methanol, N,N dimethyaniline, aniline and benzene. Negotiated technology-based clean-up levels for soils. Developed and implemented the first full-scale soil bioremediation pilot study (in-situ and ex-situ technologies) to be undertaken in New York State as part of NYSDEC's Inactive Hazardous Waste Sites Program.

- An active manufacturing facility with a chromeplating operation where plating rinse waters containing trivalent and hexavalent chromium were released to the environment. Chromium contamination is present in soils, stream sediments, and ground water. Negotiated risk-based cleanup levels for soils.

- A 7-acre inactive scrap yard in New York State where transformer oils containing regulated levels of PCBs were released to the environment. PCBs have been detected in the soils, ground water, and surface water and in the sediments of an on-site quarry pond. Off-site surface water and sediment investigations are focused on determining the presence and the extent of PCBs in the downstream river system. Responsible for the design and installation of a 400-gallon-per-minute PCB water treatment system used to drain a 2-acre on-site quarry pond to facilitate debris removal as part of an interim remedial measure.

Mr. Ulm has over twelve years of experience in the areas of hazardous and solid waste site investigation and remediation. He currently heads a hazardous waste engineering division at Blasland, Bouck & Lee, Inc.

BS/Wood Products Engineering, 1981, SUNY College of Environmental Science and Forestry

AAS/Forestry, 1979, Paul Smith's College of Arts and Sciences

Responsible for developing and administering numerous closure plans including:

- An inactive petroleum/waste solvent storage and transfer facility, conducted to satisfy the requirements of the Resource Conservation and Recovery Act (RCRA), which involved verifying decontamination of 11 aboveground storage tanks with capacities of up to 4 million gallons, and initiating removal and disposal of the aboveground tanks, underground tanks, and contaminated above and underground distribution piping. Verification procedures involved implementing a tank interior air sampling program using low volume sampling pumps with specific chemical absorbent collection tubes.

- A 65-acre inactive hazardous waste disposal site involving Consent Order negotiations with regulatory agencies. Selected alternative consisted of a synthetic membrane cap, leachate collection and storage facilities, a methane gas collection system, and an extensive on-site and off-site ground-water monitoring system.

- Hazardous waste surface impoundments at a chemical manufacturing plant in New York State, involving removal of mercury contaminated sludges and associated on site contaminated soils. Sludge was filter-pressed on site for disposal, and contaminated liquids were processed at on-site wastewater treatment plant.

Responsible for developing and administrating numerous PCB investigation/remediation programs including:

- An inactive motor manufacturing facility in Indiana where past releases of oils containing regulated levels of PCBs, from several transformer locations, impacted building materials throughout two 200,000-square-foot buildings at the facility. Sampling programs were implemented to define the extent of PCBs in porous and non-porous building materials. Remedial actions included wood block floor removal, concrete removal, and building structure cleaning.

- A transformer room cleanup in the center of an active office building, occupied by over 1,000 employees, where PCB-contaminated transformer oil was found at regulated levels throughout the concrete transformer vault. The cleanup activities were conducted at night in order to minimize their effect on daily office activities.

- Directed to completion numerous programs for certifying closure of PCB waste storage facilities for clients in New York and Indiana. Programs included developing and implementing soil sampling plans in accordance with the PCB Spill Cleanup Policy.

Resident Engineer in charge of construction for interim remedial program at inactive PCB landfill in Indiana. Construction involved removal of PCB capacitors, installation of cover soil material and 36 mil. hypalon liner, and passive carbon gas venting system.

Prepared, in response to RCRA Consent Order, an evaluation of the design and performance of three secure chemical management facilities to determine if a hydraulic connection existed between these facilities and the surrounding ground water for an industrial client in New York.

Supervised closure of a 60-acre inactive hazardous waste landfill. Project involved use of a synthetic membrane cap, surface water drainage system, and passive gas venting system.

Responsible for directing the preparation of a RCRA Corrective Measures Study for a 385-acre hazardous waste treatment, storage, and disposal facility (TSDF). The Corrective Measures Study involved evaluating and recommending corrective measures for 45 solid waste management units (SWMUs) including five hazardous waste landfills and seven solid waste landfills.

Responsible for directing the preparation of a feasibility study to evaluate remedial alternatives for seven former waste lagoons at a federal Superfund site. The lagoons contain sludges from municipal and industrial wastewater treatment plants. Chemicals of concern in the sludges, soils, and ground water include volatile and semi-volatile organics and metals. Treatability studies to evaluate the effectiveness of solidification and low-temperature thermal desorption as potential remedial alternatives were conducted on the sludges and soils.

Solid Waste: Responsible for design and closure of a 35-acre municipal solid waste landfill involving use of clay cover system, surface water drainage system, passive gas venting scheme, and ground-water monitoring system.

Designed and developed plans for a double-lined incinerator ash landfill facility incorporating a leachate detection system and storage facility, and a ground-water monitoring program.

Assistant Resident Engineer for construction of a 250-ton-per-day garbage burning resource recovery facility in Upstate New York.

Conducted thermal plume analysis for a 250-ton-per-day energy recovery facility located in Upstate New York. Analysis involved determining the temperature and velocity effects of heated condenser water discharge on the Oswego River.

Environmental Impact Statements: Prepared environmental impact statements for a number of projects including: sanitary sewer improvement facilities planning studies; major sewer rehabilitation projects; proposed water supply withdrawal from a reservoir utilized for flood control; 200-ton-per-day and 250-ton-per-day garbage burning resource recovery facilities in Upstate New York; several municipal solid waste landfills; and study of potential effects on the Hudson River from an increase in permitted

wastewater discharge from an existing wastewater treatment facility.

Directed the preparation of a Generic Draft Environmental Impact Statement (GDEIS) for the long-term, land-based management of wastewater treatment sludges from a large municipality in New York State. The sludge management program is being conducted in response to the Ocean Dumping Ban Act of 1988 and a Consent Decree and Enforcement Agreement for phasing out ocean disposal of sludge.

Environmental Audits/Property Transfers: Responsible for directing numerous environmental audit activities for property transfers and acquisitions, including active and closed industrial/manufacturing plants to determine: potential liability due to the presence of hazardous materials; compliance with applicable environmental regulations; and costs for characterization and remediation of identified sources of environmental liability. Conducted commercial property transactions involving: site visits to determine the presence of hazardous materials; regulatory enforcement checks; and aerial photograph review.

Environmental Assessments/Permitting: Coordinated public participation requirements for several projects eligible for state and federal funding through the Construction Grants Program.

Prepared Full Environmental Assessment for installation of a new water line under the Salmon River in Upstate New York. Responsible for coordination of the permitting processes to satisfy the regulatory requirements of United States Corps of Engineers and the New York State Department of Environmental Conservation.

Prepared a Full Environmental Assessment Form with supporting documentation for a sludge dewatering facility. The environmental assessment process followed all applicable State Environmental Quality Review (SEQR) guidelines.

David J. Ulm [Cont'd.]
Associate

PUBLICATIONS

Environmental Issues Associated with the Demolition of an Old Manufacturing Facility. Lynch, E.R., P.E.; Ulm, D.J.; Kirschenheiter, F.J. Presented at New York Water Pollution Control Association Winter Meeting, New York, NY, January, 1989.

Applied Bioremediation of Hazardous, Petroleum, and Industrial Wastes. Ulm, D.J.; McGuire, P.N.; Lynch, E.R. Presented at Superfund XIV, Washington, D.C., November 1993.

AWARDS

Awarded first prize in the 1994 New York State Association of Consulting Engineers (NYSACE) annual Engineering Excellence Awards Competition for development and implementation of the first full-scale soil bioremediation pilot study (in-situ and ex-situ technologies) to be undertaken in New York State as part of NYSDEC's Inactive Hazardous Waste Sites Program. Selected to represent the state organization in the national competition, the American Consulting Engineers Council (ACEC) 1994 Engineering Excellence Awards Competition.

Key Personnel

Susan Coia-Ahlman
Senior Project Engineer

Ms. Coia-Ahlman has over 7 years of experience in the areas of feasibility studies, treatment technology evaluation, and NPDES permit preparation.

MS/Environmental Engineering, 1991, Northeastern University

BS/Chemical Engineering, 1986, Clarkson University

Hazardous Waste: Project manager responsible for preparing first feasibility study under Massachusetts Contingency Plan. Included evaluation of site characterization data, evaluation of remedial technologies, and preparation of remediation cost estimate for site contaminated by oxide box waste and coal tars.

Project Manager responsible for preparing Site Characterization Work Plan for site contaminated with coal-tar-related wastes in New York. Responsibilities included development of soil and ground-water investigation program to determine the nature and extent of contamination at the site and development of data base to prepare Risk Assessment and procure Final Closure Approval.

Assisted in preparing feasibility studies in accordance with CERCLA and SARA. Responsibilities included detailed evaluation of remedial technologies and preparation of detailed cost estimates for various sites contaminated by aromatic hydrocarbons, asbestos, and metals.

Developed Spill Prevention Control and Countermeasure Plan (SPCC) for proposed cogeneration plant in Massachusetts and for bulk oil storage terminal in New York.

Prepared focused Remedial Investigation Work Plan for electrical substation to evaluate the presence and extent of PCBs in soils and ground water at the site. Responsibilities included developing an investigation program to determine the nature and extent of contamination and evaluating sampling techniques.

Assisted in preparation of Hazardous Waste Reduction Plan for metal plating facility in New York. Responsibilities included preparing a summary of waste streams, evaluating waste reduction techniques, and evaluating costs associated with managing hazardous waste.

Prepared remediation work plan to seal crawl spaces beneath homes located adjacent to lead-contaminated Superfund site. Responsibilities included evaluating various cement sealants and application methods.

Prepared summary reports detailing removal of hazardous and non-hazardous wastes from Superfund sites in New York. Reports consisted of chronological summary of work plan preparation and implementation, waste and soil removal, and building demolition.

Prepared remediation work plan to abate lead dust contamination from residences adjacent to lead-contaminated Superfund site. Responsibilities included evaluation of various dust abatement options, sampling techniques, and waste disposal options.

Prepared two operation and maintenance manuals for migration control systems installed at Kodak to assess subsurface conditions at Kodak Park. The manuals included trench construction details, discussion of specific operating criteria, monitoring and inspection requirements, and personnel duties.

Wastewater: Evaluated treatment technologies, prepared conceptual design, and prepared discharge permit application for semivolatile-contaminated ground water at state Superfund site.

Responsible for quarterly evaluation of home well water treatment systems. Performed overview of maintenance activities, evaluated analytical date, and determined efficiency of granular activated carbon treatment system.

Project Manager for evaluation of environmental issues associated with facilities hydrotest and final treatment and disposal of wastewater.

Prepared various contingency plans to implement domestic well treatment system programs for residential areas impacted by ground water contaminated by volatile organic compounds.

Compiled and analyzed wastewater effluent data from SPDES permits in support of a legal case.

Demonstrated client's compliance with state and federal discharge permits. Assisted in producing detailed statistics on existing constituents and interpreted resulting terms of client's responsibility.

Assisted in determining the impact of wire coating facility's effluent on receiving stream and evaluating compliance alternatives. Also prepared monthly discharge monitoring reports.

Assisted in on-site survey of wastewater discharges from U.S. Naval Base in order to characterize discharges and establish sampling requirements and discharge permit applications for industrial users.

Prepared NPDES, SDP, and sewer connection permit applications for various industrial facilities including a chemical manufacturer, cogeneration facility, pharmaceutical manufacturer, and oil storage terminal in New York and Massachusetts.

Prepared storm water discharge permit applications for various industrial users in New York and Massachusetts. Activities performed included: evaluation of need for permit application, preparation and implementation of field sampling plan, and preparation of permit application.

Prepared Stormwater Pollution Prevent Plan for plating facility in New York State. Activities performed included assessment of facility; identification of Best Management Practices; and preparation of the plan.

Assisted in preparing design specifications and cost estimates for product recovery system to be implemented at service stations.

Assisted in developing a basis for SPDES permit negotiation and reviewing and updating Monroe County's Industrial Waste Pretreatment Program. This included the development of a sound technical basis for terms and conditions of the SPDES permit at all three of Monroe County's treatment plants. The pretreatment program update included: revision to the current Sewer Use Law, development of new permit format, evaluation of current local discharge limits, and enhancement of current enforcement programs to meet recent changes in regulations.

Assisted in performing facility wastewater treatment plant evaluation for Welch Allyn. Gathered and evaluated information on both the industrial and sanitary treatment plant operation to determine compliance with NYSDEC proposed discharge limits.

Environmental Auditing: Conducted environmental audits for oil storage terminal and marina to determine environmental compliance status and identify areas of potential environmental liability in Massachusetts.

Conducted comprehensive environmental compliance audit at a Mobil bulk oil storage terminal in New York. Audit included evaluation of management practices and policies, and evaluation of environmental compliance status.

Conducted Phase I survey of bulk oil storage terminals to determine environmental compliance status and identify areas of potential environmental liability in Ohio.

Key Personnel

Douglas M. Ruszczyk
Geologist

Mr. Ruszczyk has five years of experience in the areas of USEPA-authorized removal action and injection well closures, RI/FS implementation, subsurface investigations, ground-water well monitoring, environmental site assessments, sewer system inflow/infiltration studies, and chemical and hazardous waste storage tank closures.

BA/Geology, 1984, State University of New York at Buffalo

On-Site Observer (OSO) during the implementation of a USEPA-approved removal action work plan for a Potentially Responsible Parties (PRP) Group. Involved in preparing the work plan for lead-contaminated soil in a residential site in Buffalo, New York, a site-specific health and safety plan (HASP), and a contractor bid-specification package. Responsible for the coordination and implementation of removal action field activities and oversight of all field activities in accordance with the work plan. Maintained detailed daily field log reports to review against contractor invoices and change orders. Responsible for coordination with the USEPA's on-scene coordinator, weekly progress reports, and preparing final report.

Geologist during the implementation of a USEPA Consent Order to investigate and remediate injection well systems at 17 sites for a major petroleum company. Collected confirmatory soil samples, as necessary, in accordance with Consent Order. Witnessed and logged subcontractor operations to prepare closure certification reports for each site.

Geologist responsible for monitoring well installation; soil boring investigation; soil, sediment, ground-water, and wipe sampling during an NYSDEC-approved RI/FS at a former lead recycling facility. Interpreted hydrogeologic data and soil, sediment, and ground-water quality data for preparation of RI Report.

Involved in a hazardous waste pipeline closure operation as a third party observer for a client in Niagara Falls, New York. Witnessed and logged subcontractor operations during the implementation of a NYSDEC-approved closure plan. Prepared the Closure Certification Report on the hazardous waste transfer pipeline for submittal to the NYSDEC.

Completed SEQR Long Form EAF and 6 NYCRR Part 360 application for a planned municipal recycling facility (MRF) operated by Laidlaw Waste Systems, Inc. The applications were presented to the Town of Clay Planning Board, its engineering consultant, and the NYSDEC for approval.

Project team leader for Frontier Chemical ground-water monitoring program. Outlined monitoring well development, sampling procedures, and on-site decontamination procedures. Responsible for QA/QC in the collection of ground-water samples and their preservation and transport for analytical testing.

Field geologist during Level C preliminary site assessment work for Eastman Kodak Company. Work included borehole logging, soil scanning, and soil sampling during the removal and upgrade of chemical and hazardous waste storage tank within Kodak Park.

Performed Level B field work at a U.S. Government Arsenal in New Jersey. Work included the removal of a mixture of concentrated nitric and sulfuric acids from two aboveground storage tanks (ASTs) and the disassembling of a building for hazardous waste disposal according to established work plans.

As an assistant project scientist, performed various geologic and environmental engineering tasks including Phase I site assessments, tank and pipeline closures, tank testing, field investigations, and facility compliance audits.

Geologist for the investigation of bedrock geology and gypsum mining in Amherst, New York for a SEQR Environmental Impact Statement. Assessed the strength and integrity of the bedrock, considering the effects of room and pillar mining operations.

Conducted sewer system evaluation, including interpretation of field data to determine existing sewer capacity, peak daily flow, and inflow/infiltration quantities. Maintained and calibrated field monitoring equipment.

Key Personnel

James A. Wallace, III

Senior Project Manager II

Mr. Wallace has over 13 years experience in materials engineering and applied earth sciences, including hazardous waste management, environmental planning, and ecological studies. Mr. Wallace has gained valuable knowledge of regional geology through geotechnical and subsurface environmental investigations performed in Virginia, North Carolina, South Carolina, and Georgia. His diverse experience provides a unique combination of skills directly related to the soil and water quality assessment and hazardous waste remediation.

RCRA Investigation/Remediation: Mr. Wallace served as principal investigator and project manager for contamination assessment and remediation of RCRA-regulated compounds at industrial facilities (textile plants and brass manufacturers) located in North Carolina and South Carolina. Mr. Wallace was responsible for the coordination and direction of the hydrogeologic assessment and source identification of soil and ground-water impairment by chlorinated hydrocarbon contamination originating from releases of 1,1,1 trichloroethane and tetrachloroethene. Hydrogeologic assessments at each facility were performed in phases to evaluate multiple release sources, including underground storage tanks, random disposal sites, a CERCLA landfill (drums), and potential off-site contaminant sources. Contamination assessment activities included detailed evaluation of ground water flow and contaminant fate, including an evaluation of the natural degradation of "daughter" compounds relative to the approximate age and source of the contamination. Remedial design plans were based on ground-water pump and volatilization treatment and in-situ soil washing technologies. Treated water disposal was permitted under a state Non-Discharge Permit (recharge to the subsurface) and NPDES Permit, or disposed of off site at a permitted disposal facility (water-surfactant emulsion).

Petroleum Hydrocarbon Investigation/ Remediation: Mr. Wallace has served as principal investigator and project manager responsible for all aspects of environmental investigations including contaminant plume delineation; contaminant transport and fate evaluation; Comprehensive Site Assessments (CSA); Corrective Action Plans (CAP); and design, installation, and operation of remedial systems, including regulatory permitting.

Mr. Wallace has over 13 years of experience with all phases of environmental investigation and remediation projects. He has been responsible for projects which included investigation for various volatile and semi-volatile organic compounds, design and construction of remediation systems, and obtaining regulatory permits.

BS/Freshwater Fisheries Biology & Marine Science, 1977, North Carolina State University

BS/Civil Engineering, 1982, North Carolina State University

Mr. Wallace has worked extensively with state regulatory personnel in North Carolina, South Carolina and Virginia. Applicable work experience includes soil and ground-water contamination assessments in all physiographic provinces. Remediation experience includes ex-situ land farming treatment, enhanced in-situ bioremediation, incineration, volatilization by aeration, in-situ soil washing, soil vapor extraction, and pump and treat technologies in both unconfined and confined aquifers and bedrock fractures.

Mr. Wallace served as the regional program and project manager for underground storage tank contamination assessments (gasoline, diesel fuel, and waste oil) located in the coastal plain and piedmont physiographic provinces of North Carolina and South Carolina. He served as principal investigator responsible for preparation of CAPs according to regulatory guidelines for 11 sites in North Carolina and project manager for preliminary CSAs performed at 13 South Carolina sites. CAP/remediation system alternative analysis and designs included closed-loop ground-water pump and treatment systems, enhanced in-situ bioremediation, and volatilization at sites located in Fayetteville and High Point, North Carolina.

Project manager and principal investigator for leaking UST at the Enmark Stations, Inc. service station site (gasoline and diesel fuel) located in Knightdale, North Carolina. Scope of Work included CSA, tank removals, contaminant source evaluation and identification, initial "source" soil abatement, bedrock fracture analysis, health risk assessment, community relations, and remediation system alternatives analysis and design. An

innovative CAP was prepared for the Knightdale site, which includes the use of hydrogen peroxide as an oxygen source for enhanced in-situ biodegradation of petroleum hydrocarbons. This was the first project on which use of hydrogen peroxide was approved by the state of North Carolina.

Project manager and principal investigator for leaking underground storage tanks (diesel fuel) for Air Products & Chemicals, Inc. facility located in Reidsville, North Carolina. Project activities included UST removal, CSA, and remedial "source" soil excavation. Off-site disposal of petroleum hydrocarbon-impaired soil was arranged at a brick manufacturing facility.

Regional Project Manager for aboveground and underground storage tank contamination assessments performed for Bridgestone/Firestone, Inc. Served as principal investigator for leaking UST projects at retail centers in Goldsboro and Charlotte, North Carolina, and aboveground storage tank spill in Wilson, North Carolina. Scope of work included CSAs, hydrogeological assessments, and remedial soil excavation and disposal/treatment.

Expert Testimony: Mr. Wallace has provided expert witness testimony in Federal and state courts on projects related to foundation failures (residential), pavement failures, and wetlands assessment and delineation; and during litigation of responsible parties for a RCRA/CERCLA facility.

Environmental Compliance and Audits: Responsible for non-intrusive Phase I environmental site audits to identify potential environmental liabilities for a wide variety of projects including industrial, commercial, institutional and RCRA-regulated facilities and undeveloped properties. Environmental audit experience includes multi-media compliance audits of industrial facilities and manufacturers of rubber, textiles, brass and steel products. Mr. Wallace has performed underground storage tank assessments for regulatory compliance, tank closure assessments and development of liquid storage upgrade and conversion plans for existing storage systems. Responsible for client contact, coordination of site inspections, industrial plant and corporate management interviews, review of environmental documentation, contact with regulatory agencies to determine compliance status of industrial facilities and final report preparation.

SPCC Plans and NPDES Stormwater Permits: Prepared Spill Prevention and Countermeasure Control (SPCC) Plans for commercial and industrial facilities including fuel terminals, distribution facilities, and industrial manufacturing facilities. Recent project management experience in sampling and preparation of permit applications for NPDES stormwater permits at a large federal naval facility.

Wetlands Assessment and Mitigation Plans: Performed wetland functional assessments and boundary delineations. Developed mitigation plans for planned and on-going projects located near and/or including regulated wetlands.

As a Fisheries Biologist for the U.S. Fish & Wildlife Service in Raleigh, North Carolina, Mr. Wallace was responsible for field reconnaissance, review, and research of potential environmental impacts, and report preparation for major U.S. Army Corps of Engineers projects, wetland assessment projects advertised under the Federal Permit Program (Section 10/404 Permits), and 201 permit review. Position included maintaining direct contact with local, state and federal regulatory agencies including the North Carolina Wildlife Commission, North Carolina Inland and Marine Fisheries, National Marine Fishery Service, the EPA and U.S. Army Corps of Engineers. Performed aquatic sampling and evaluation of laboratory data during review of dredge sludge disposal alternatives for COE dredging projects. Also assisted in the study and preparation of Environmental Assessment/Impact Statements in North Carolina.

Geotechnical and Construction Materials Engineering: As a Project Engineer and Department Manager, Soil & Material Engineers, Inc. in Columbia, South Carolina and Raleigh, North Carolina, Mr. Wallace was responsible for managerial and technical direction of branch construction services and materials testing department including marketing, profitability, cost accounting, and overview and supervision of engineering technicians. This department provided quality control/quality assurance engineering inspection and testing services associated with soil, concrete, steel, asphalt and

built-up roof construction in accordance with ASTM, ACI, AASHTO and local state building and material codes and guidelines.

Work experience included a wide variety of projects ranging from light and heavy architectural structures to industrial buildings, airports, and utility facilities. Responsible for design materials testing and inspection of asphalt and concrete, fill compaction and placement, foundation inspection, physical parameters of in-place asphalt and concrete foundations, timber piles, pipe piles, and caissons.

Engineering design responsibilities included thickness design of both flexible (asphalt) and rigid (concrete) pavements using the AASHTO, Asphalt Institute, Corps of Engineers, and national crushed stone pavement design methods; asphalt and concrete mix design per the ACI, AASHTO, and PCA design methods; soil-cement mix design; foundation design, and foundation and pavement drainage recommendations. Pavement design and construction experience includes projects for the FAA. Also, performed pavement design using geotextile pavement components.

Performed vibration studies for commercial, residential, and historic structures during blasting for rock excavation on numerous roadway, utility, and construction projects. Also performed vibration studies associated with design of equipment support pads and floor systems at a robotics facility.

Key Personnel

James M. Nuss, P.E.
Senior Project Engineer

Mr. Nuss has experience providing environmental engineering services for large industrial clients including process, hydraulic, and ground-water/wastewater treatment system design. In support of these design activities, Mr. Nuss has performed contract preparation, construction assistance, and contract management activities. Mr. Nuss also has experience in the generation and preparation of work plan reports and engineering analysis covering a wide range of hazardous waste site remediation projects.

BS/Civil Engineering, 1986, Syracuse University

Assisted in the design of a 500,000 gpd wastewater treatment facility for a large transformer manufacturer. Designed sludge dewatering system, reviewed contractor submittals for facility equipment and prepared contract change orders and an Operations and Maintenance Manual.

Performed treatability study of ground water from a site contaminated by a manufactured gas operation and subsurface PCB-containing oil plume. The treatability study was conducted for removal of PCBs, volatile organics, and metals. Processes reviewed included air stripping, carbon adsorption, sedimentation, filtration, and chemical oxidation. Results of study were utilized to select a cost-effective treatment alternative as well as provide preliminary basis of design parameters.

Process engineer for design of a 115,000 gpd ground-water treatment facility at a Superfund site in Massachusetts. Facility consisted of ground-water interception trenches, air stripper, and carbon adsorption unit. Responsibilities included conceptual design, selection of equipment, preparation of contract drawings and specifications for bid, and preparation of a basis of design document for EPA review.

Designed 50 gpm mobile water treatment system for removal of suspended solids and PCBs generated from a dredging operation. Treatment, consisting of chemical addition, filtration, and carbon adsorption, was contained in an insulated mobile trailer. System designed and constructed in six weeks.

Involved with the study of a river system containing PCBs. Investigations involved preparation of a remedial investigation work plan to include PCB water column monitoring; sediment sampling and analysis; review of naturally-occurring rechannelization; and study of increased, enhanced river sedimentation.

Generated protocols and implemented field activities for a water column monitoring program. Monitoring was in conjunction with construction activities for the replacement of a dam. Monitoring stemmed from concerns regarding the proposed construction sequence and an increase in suspended solids and PCB levels in the water column. Six-month program initially established "baseline" water conditions, to be compared with water quality data during dam replacement.

Served as project engineer for a research and development project involving the biodegradation of PCBs contained with pond sediments. Project involved the construction and fabrication of a structure within the pond to isolate existing pond sediment. Duties included development of a construction sequence to allow permitting and regulatory approvals to proceed; coordination of several aspects of the project including scientific needs, site limitations, wetlands impacts, time constraints, and economics; developed and performed sampling and analysis activities; supervised structural, mechanical, and electrical design of facility, and calculated weight and buoyancy impacts in consideration of installation requirements.

Designed remedial actions for a 9.3-acre landfill on the federal Superfund list. Developed a construction sequence for the placement of a temporary synthetic cover to be used following the removal of capacitors and other PCB-containing debris.

Assisted in the development of remediation plans for several PCB sites for a rubber products manufacturer in Indiana. Responsibilities included review and critique of previous work efforts, coordination of field investigations, performance of a sampling and analysis program, and development of subsequent work plan and drawings.

Analyzed the stability of several lagoon embankments to be used for containing dewatered waste sludge for a chemical company in New Jersey. Efforts included a soil boring program and laboratory analysis to determine soil characteristics. Responsibilities included selection and coordination of laboratory testing, application of test results to a computer model, and preparation of report.

Project Manager for a 1.5-acre Superfund site containing PCBs and VOCs. Coordinated the development of several Work Plans for submittal to the EPA. Work Plans were prepared to satisfy specific site remediation details contained in the Record of Decision (ROD) and Consent Decree for the site. The selected site remediation consists of on-site incineration of PCB-containing soils and treatment of volatile and semi-volatile organics in the ground water via an on-site air stripper and carbon adsorption system. Prepared and/or supervised the preparation of several design-related plans, including: Health and Safety Plan; Sampling and Analysis Plan; Quality Control/Quality Assurance Plan; Notification Plan; Site Security Plan; Ground-Water Monitoring Program; Ground-Water Extraction/Treatment Plan; Ground-Water Monitoring Plan; Excavation Plan; Soil Treatment Operations Plan; Treatment By-Product Disposal Plan; Site Dewatering Plan; Closure and Site Monitoring Plan.

Directed design of a ground-water treatment facility with a capacity of 1 mgd. Treatment processes included oil separation, pH adjustment, chemical addition, clarification, filtration, and carbon adsorption. Design activities involved the incorporation of existing ground-water extraction systems and the availability of a sludge dewatering system in an adjacent treatment facility. Responsible for the design of the carbon adsorption component of the project, as well as overall project design coordination, design review, client contact, and permit development.

Developed a stormwater management plan for a large industrial site formerly utilized for the manufacture and repair of PCB-containing electrical transformers. Stormwater plan involved the identification of flow dynamics through the existing system, physical modifications to maximize the amount of stormwater receiving treatment at the existing treatment facilities (oil/water separators and wastewater treatment facility) and documentation of operating and inspection plans.

Prepared revisions to a closure and post-closure plan for a PCB liquid incinerator. Revisions were consistent with current TSCA and RCRA regulations and included the development of a closure sequence, estimate of waste inventories, post-closure actions, and project costs.

Developed technical information to support in-place containment of PCBs at a federal Superfund site. Efforts included review of data, evaluation of containment against previously-selected remedies (using CERCLA criteria), and development of project costs.

Performed engineering calculations involving the removal of floating oil products. Analyzed the effectiveness of several oil/water separators in treating stormwater flows. Also evaluated existing/proposed mechanical systems to remove oils from a subsurface oil plume positioned on top of the ground-water table.

James M. Nuss, P.E. [Cont'd.]
Senior Project Engineer

PUBLICATIONS

Remedial Measures to Contain and Recover a Subsurface Oil Plume: Case Study. Nuss, J.M.; Silfer, A.T; and Kaiding, D.C. HMC/Superfund, Washington, D.C., December 1992.

General Testing Corporation

Statement of Qualifications

GENERAL TESTING CORPORATION

STATEMENT OF QUALIFICATIONS

REVISED 8/93

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Statement of Qualifications

1. Introduction

General Testing was established in 1971 as an independent analytical and field services company to serve the environmental testing needs of the public and private sectors. We have since grown to be one of the premier commercial laboratories in the Northeast, with offices in the Buffalo, Rochester, Syracuse, and Hackensack, N.J. areas.

General Testing specializes in the analysis of solid/hazardous wastes, contaminated soils, groundwaters, surface waters, industrial effluents and drinking waters. We also offer analytical services associated with large surface water studies. All services are performed in accordance with protocols set forth by the Environmental Protection Agency.

Our corporate policy is to provide prompt and reliable services at affordable prices. In delivering our services we emphasize excellent communications with our clients and continuous improvement in the delivery of our services.

Providing reliable data is of the utmost importance to us. We have developed a rigorous quality assurance program, whereby approximately 30% of the analyses are performed for quality control purposes alone.

Completion of work on time is given equal importance. We have organized our production and project acceptance around our ability to meet or exceed our customer's TAT expectations at least 90% of the time. Our standard TAT's are two to four weeks, depending on protocol, with accelerated turnarounds available upon request. Computerized data tracking provides continuous monitoring of work in progress. Our dedicated staff of client representatives assist customers in determining their specific analytical and sampling needs and then continuously update them on their project's progress.

General Testing is headquartered in Rochester, NY, with satellite offices in Hackensack, NJ, Buffalo, NY and Syracuse, NY.

2. Organization

General Testing is organized into three groups; Laboratory Services, Sales and Marketing, and Administration. Our satellite offices draw upon the resources of each of these groups. The head of each group reports directly to the president, Walter Scheible, and meets regularly to discuss production, quality, finances and policy.

Mike Perry, as general manager of operations and laboratory director, directs all laboratory services which includes analytical (both inorganic and organic), support (information systems, client services, and reporting), field and branch operations. Mark Wilson supervises the analytical, Mary Kittrell the support services, and Brian Mackin all field services.

Sales and Marketing is directed by Katherine Wager. This group is responsible for all sales/service activities, market evaluation and advertising.

Administrative Services is responsible for finance, purchasing, maintenance, and human resources activities. This division is headed by Heather Cohen.

Quality Assurance is headed by Mark Monachino. This group assures that all work performed meets regulatory and company quality control standards.

The Hackensack office is managed by Virginia Murray, the Buffalo office by Katherine Wager, and the Syracuse office by Phil Cohen. They work closely with company staff in Rochester. Qualified personnel in these offices are designated to fill essential functions - such as quality control, health and safety, customer assistance - in addition to their regular staff responsibilities. They work closely with their counterparts in the Rochester office.

3. Facilities

General Testing Corporation maintains facilities in Rochester, New York; Hackensack, New Jersey; Buffalo, New York; and Syracuse, New York. Management and major analytical systems are based in Rochester. The Hackensack facility serves as a satellite laboratory and a base to service regional clients. The Buffalo and Syracuse offices serve as bases of operations for the sales and service of regional clients. A detailed list of space allocation can be found in Appendix A.

Rochester

Our Rochester facility serves as corporate headquarters. All major analytical systems and most of our technical staff are based there. This allows for efficient processing of samples. Regular interoffice courier deliveries ensure prompt transfer of samples between facilities.

Almost half the 20,000 square feet of available space is dedicated to sample processing and analysis. The other half is divided among office, maintenance, and storage. The facility is equipped with more than 2000 cubic feet of walk-in cooler storage and a 1500 GPD closed loop, pressurized, high-purity water system.

Analytical space is segregated into areas for organics prep, metals prep, organics analysis, metals analysis, and classical chemistry. Specific areas are also set aside for sample receipt and processing, microbiology, and waste storage.

Hackensack

The Hackensack facility serves area clients and is a base from which major surface water studies are performed. A 2000 square foot staging area is available for preparation of equipment and supplies. Analytical areas are well equipped with extensive bench, hood, and storage space. A complete microbiological laboratory is included, with a 12 cubic foot autoclave and 10 incubators. Specialized analytical systems include UV/VIS, infrared spectrophotometers, and auto analyzers. A 600 cubic foot, walk-in BOD incubator capable of holding over 5000 BOD bottles is provided.

Buffalo

The Buffalo facility includes 500 square feet of laboratory space, 500 cubic feet of refrigerated storage, 1000 square feet of sample handling and field equipment storage, and 500 square feet of office space.

Syracuse

The Syracuse facility includes approximately 300 square feet of office space. Refrigerated storage is available for holding samples awaiting shipment.

4. Analytical Systems

General Testing possesses a full array of analytical instrumentation dedicated to the analysis of environmental samples. Most of the instrumentation is equipped with autosamplers and is linked to microprocessors for greater analytical efficiency. Most analytical systems are integrated into our LAS network. All instrumentation is serviced and calibrated routinely and the documentation is readily available for inspection. A list of analytical equipment can be found in Appendix B.

Areas of expertise include classical (wet) chemistry, metals, organics, and microbiology. On those occasions when we do not have the capability for certain analytical specialties (e.g.- the analysis of dioxins and dibenzofurans, asbestos, radiological parameters, fuel analyses such as BTU, and physical testing), the work is subcontracted to certified laboratories with which we have a proven working relationship. Client representatives arrange the subcontracting and monitor the progress of each sample. Results are reviewed and incorporated into our final report.

Our company also offers analytical services associated with large water-quality studies of surface waters. We have performed testing related to CSO studies, water quality, assimilative capacity studies of streams and rivers, bay and estuary studies, as well as lake and reservoir studies. Our analytical facilities are particularly well equipped for this type of work. Two of our laboratories include walk-in BOD incubators that can hold up to 5000 bottles, and the Hackensack microbiological laboratory has 10 air and water jacket incubators.

General Testing employs EPA-approved methods for all sampling and analytical procedures. Analytical methodology conforms to the Clean Water Act and Resource Conservation and Recovery Act requirements. A list of sources can be found in Appendix C.

5. Field Services

Since its inception in 1971, General Testing has offered its clients complete field support in addition to quality analytical services. As a result, we have gained experience in almost all types of sampling and related field measurements. Our resources are varied, and include sufficient equipment to outfit several crews.

The extensive field services available at General Testing can be grouped into four areas: groundwater monitoring, effluent monitoring, hazardous site testing/solid waste collection and surface water sampling and flow measurements.

Groundwater Monitoring

On a quarterly basis, General Testing samples approximately 700 wells for clients in the Northeast. The work includes the use of both dedicated and non-dedicated systems; shallow and deep wells (up to 200 ft); relatively clean waters and contaminated waters requiring supplied air; and in all kinds of situations from routine protocol to those involving exacting protocols.

Our personnel are trained in the latest techniques through our internal training program, as well as seminars offered by certified instructors. All personnel have completed the required 40 hour OSHA health and safety training. Our field staff usually operates in teams of two or three, and they can meet very exacting time requirements, including emergency situations. Mobile laboratories, purging trailers, steam decontamination systems, a variety of vehicles, and all safety apparatus are available.

All groundwater sampling is conducted in accordance with generally accepted USEPA, and State specific groundwater collection procedures. Our personnel have been trained to follow rigorous sampling plans and are familiar with a variety of documentation. Their experience also gives them the ability to make good judgements on what is acceptable for each level of protocol.

Process and Sanitary Effluents

Our field personnel routinely address the NPDES, SPDES and other effluent monitoring needs of over 100 clients. We have more than 50 pieces of flow measuring and auto sampling apparatus for this type of work, and have customized or factory-built primary devices in all types and sizes of conduit.

Collection of samples from effluent channels, sewers, pipes, and tanks is commonly performed with autosamplers. We employ a variety of arrangements with clients to obtain samples, depending on the composite times, process times and the availability of client manpower. Care is taken to obtain representative samples by matching tubing type and diameter, intake screens, pump types and speeds, bottle type and sizes, and other equipment to the location and intended analyses.

Measurements of flow rate, either independently or in conjunction with sampling equipment, can be provided for almost any situation. Usually, we install factory-made flumes or weirs. We can also construct customized, primary devices for irregular x-sections. Open channel flow measurements using current meters, dilution/concentration/tracing techniques, and specialty equipment are also available.

Our experienced and well-trained personnel can efficiently and safely work in enclosed areas.

Hazardous/Solid Waste

General Testing is an independent laboratory and is not involved in engineering or hydrogeological consulting. We serve many engineering and hydrogeological clients, however, and generally look to the client to provide the field and analytical specifications for a project.

We have the equipment and trained personnel required to implement a project plan involving both sampling and analysis of a variety of matrices including solvents, oils, sludges, soils and raw materials. For example, we have set up mobile laboratories for extended periods at abandoned sites to screen and identify hazardous wastes, and we routinely perform coring and sampling of soils and materials resulting from tank leaks, tank removals, building demolitions, gasoline spills, etc.

General Testing possesses a variety of varied augers and coring equipment necessary to outfit several crews. Since one device seldom serves as the only suitable sampler for a given site or situation, a variety of equipment is usually brought to a site and the optimal device is selected. Hand-held augers are used for shallow samples, and power-driven augers for depths of four feet or greater. Coring devices are utilized alone for soft soils up to four feet deep, but are preceded by a power auger for greater depths. A split spoon head on the coring rod assembly is used for the majority of our soil collection work.

Decontamination of augers, split spoons and other soil collection equipment is accomplished in most cases with a portable steamer. Where possible, sufficient precleaned, aluminum-foil-wrapped split spoons are brought directly to the site from the laboratory.

Surface Water Sampling and Flow Measurements

General Testing can offer its clients the field services and analytical capabilities associated with this extremely specialized area. We have performed the testing related to over twenty large CSO studies, water quality and assimilative capacity studies of streams and rivers, bay and estuary studies, and lake/reservoir studies.

We are particularly well-equipped for this type of work with three boats, over 50 pieces of field instrumentation, and over 60 cumulative years experience in this area.

6. Customer Services

General Testing emphasizes customer service by providing a staff of dedicated specialists to assist with every request. Our team of account managers and client representatives emphasize good communications with our clients. They are knowledgeable in the regulations, related methodologies, and services available. All have an extensive background in the environmental field. Most are four year degreed with analytical experience.

Client Representatives specialize in the daily, job specific needs of our clients. They process work requests, provide updates on data availability and completion dates, and obtain answers regarding quality control or methodology.

Account Managers are assigned to all major customers and provide assessment of customer requirements, quotations, new business development, external visitations, and general account servicing.

Client Representatives and Account Managers work as a team, offering backup for someone familiar with the site or project. Your work is monitored more closely, and completed more reliably and promptly with this level of supervision. We strive to be the most responsive environmental analytical and field services company available.

7. Data Management

Data is stored, manipulated, and reported on an HP1000 series mainframe computer, using Hewlett Packard Labsam (LIMS) software. This system is linked to, and can share data with, a second HP1000, which is used to process and report GC/MS data. Computers in our Hackensack and Buffalo facilities are linked to the Rochester system.

A 20 node PC network is tied into the data management system, providing automated data transfer from instruments not directly linked to the HP1000 computers. It also gives laboratory management and client representatives ready access to data.

Our information systems department works closely with your client representative, or directly with your personnel, to provide data in a form most useful to you. Customized formats, diskette deliverables, and electronic transfer are some of the options available.

8. Quality Assurance Program

At General Testing Corporation, we believe that quality control is an essential part of assuring valid and defensible data, and that our quality assurance program must apply to every area of our company.

Within Laboratory Services there are five main components of the quality program: Field Quality Control (governing sample collection), Analytical Quality Control (governing laboratory analytical procedures), Performance and System Audits, Quality Assurance Training, and Quality Assurance Reporting.

Field Quality Control

All field personnel are trained in EPA-approved sampling protocols for the analysis being performed. All field equipment is thoroughly cleaned between sample collections. Instrument calibrations are performed and documented as specified. Documentation is required for all field activities and any field measurements. At the direction of our clients, field collection of quality control samples, including trip blanks, equipment blanks, and sample duplicates is performed.

Analytical Quality Control

Analytical precision and accuracy are monitored through the use of limits generated from quality control data from the previous six to twelve months. Analysis of outside check samples is done on a 10% basis. Analysis of blanks and spiked blanks is done with every analytical run. Analysis of laboratory duplicates and matrix spikes is done on a batch basis (1-20 samples analyzed). Instruments are calibrated before analysis begins. Continuing calibration checks are made during all analyses. For organics analyses, surrogate standards are added to all blanks, standards, samples, and sample spikes prior to extraction and/or analysis. If the results do not fall within acceptable limits the data is flagged and, if possible, repeat analysis performed.

We use computerized monitoring of quality control performance, and all data is reviewed by experienced, analytical managers prior to submitting data to the client.

Performance and System Audits

Internal system audits of field and laboratory operations are done every six months by the Quality Assurance Director and the Laboratory Director. These include audits of: instrumentation and

equipment maintenance, proper formulation of standards, use and storage of reagents, adherence to analytical protocol, compliance with holding time, preservation and storage of samples, preparation of sample containers and laboratory glassware, analytical performance for precision and accuracy, and documentation.

Deficiencies found during the audit are reported to the respective department managers, who must initiate immediate corrective actions and submit written responses to the Quality Assurance Officer, documenting corrective actions.

General Testing Corporation participates in State certification programs (see the certification listings in Appendix D), and submits to on-site, external systems audits as requested by state agencies and major clients.

Internal performance audits for each measurement parameter and system are done periodically through review of quality control data. QC problems are summarized and corrective actions recommended and documented by the QA Officer.

The New York State Department of Health, the New Jersey Department of Environmental Protection, and other State agencies conduct external performance audits on a semi-annual basis, through the use of proficiency samples. General Testing's results are evaluated against statistical limits, and certification for specific parameters is granted upon acceptable performance. We have also been evaluated by EPA, through on-site audits and proficiency samples, in conjunction with numerous projects.

Quality Assurance Training Program

The Quality Assurance Department trains each new employee in routine QA procedures and QC sample analyses. Periodic proficiency testing is given to all analysts, and on-the-job evaluations are done periodically, with emphasis given to techniques and proper procedure. The QA Department maintains a record of each analyst's training and proficiency.

Quality Assurance Reporting

The Quality Assurance Director and the Laboratory Director hold regular QA/QC meetings with the respective department managers to review QC performance. Data quality indicators are assessed for each analyte and method, and a written summary of QC problems/trends is submitted by the Quality Assurance Director. Possible solutions are recommended as corrective action.

Findings of internal audits performed every six months are summarized by the Quality Assurance Director and submitted to the Laboratory Director and the respective department managers. Results of inter-laboratory performance audits are submitted to the respective department managers by the Laboratory Director and the Quality Assurance Director.

A copy of General Testing's Quality Assurance Program is available upon request.

9. Reporting

General Testing offers comprehensive reporting services to meet your documentation needs. HP's LABSAM LIMS system forms the basis of our data management system, but it allows great flexability in customizing the content and format of individual client reports. Each report is reviewed against your initial requirements, and receives a final technical review by the Laboratory Director.

Our standard report presents analytical data and, if requested, quality control data in columnar form. For larger reports, involving extensive analyte lists, data is segregated into organics, metals, and general chemistry. Each report includes the laboratory ID number, customer sample ID, project reference, date sampled or received, and reporting units. Footnotes are added by a series of standard flags. More extensive information may be presented in the form of a case narrative, written by senior laboratory staff. All reports include chain of custody documentation.

Upon request, General Testing will modify our standard report to meet customer requirements. Reporting formats are almost unlimited. Additional data on detection limits, methodology, dates of analysis, QC limits, etc. can be included. Raw data copies are available, and we offer various data summaries to facilitate data use.

General Testing can also address specific regulatory formats such as EPA CLP, New York DEC ASP, or New Jersey DEP ECRA. With prior notice, reports can be supplemented with diskette deliverables.

10. Health and Safety Programs

General Testing's safety program is designed to educate all employees in the proper use of safety equipment, safe laboratory practices and evacuation procedures. General safety training is given to each new employee before beginning work. In compliance with the New York State "Right to Know" law, and the Federal Hazard Communication Program, each new employee is also given chemical safety training before beginning work. This training includes the safe handling of hazardous/toxic materials and the effects of overexposure. A review and enhancement program is conducted annually.

Safety concerns are given particular attention . Our personnel are trained in the proper use of protective personal equipment, explosimeters, gas analyzers, supplied air systems, respirators, manhole egress systems, and other safety equipment commonly used in confined spaces.

Employees receive a rigorous pre-employment medical exam to establish a baseline for future comparison. The exam includes a detailed medical history, chest X-ray, EKG, pulmonary function test, urinalysis and a battery of blood chemistry tests tailored to the laboratory environment.

As a part of the company's overall health and safety program, laboratory employees receive routine medical exams every two years. All field personnel undergo routine medical monitoring, and have an annual physical exam if they work at any hazardous waste sites. Training for hazardous wastes workers under OSHA 1910.120 is required for all field personnel.

Full medical profiles are kept on all employees by either the Occupational Health and Safety clinics associated with the University of Rochester or the Niagara Falls Medical Center. The staff safety officer, with consulting help from these two organizations, monitors the test results of all personnel. Testing is done annually or bi-annually, depending on the sensitivity of the work done by the employee.

A fire marshal and safety committee meet monthly to review procedures and to suggest corrective action when appropriate. Laboratory work areas, ventilation hoods and safety equipment are inspected regularly. Inadequacies are noted and promptly corrected.

A copy of General Testing's Laboratory Safety Program is available upon request.

11. Experience

With over 20 years in the environmental testing business, General Testing has participated in a wide variety of projects and programs. We currently sample and analyze over thirty thousand samples annually. We work primarily with industry, engineers and other consultants and municipalities. Over the years we have become an integral component of over 100 remediation programs, and over 75 large industrial municipal groundwater monitoring programs. In many cases we are asked to interface with regulatory agencies, and help create critical documents and plans. General Testing existed before the majority of environmental regulations were passed and the experience gained in implementing the regulations as they evolved has given us a unique perspective which can rarely be matched by other labs.

A brief description of some of our major projects can be found in Appendix E.

12. Personnel

General Testing employs approximately 85 people. More than three quarters are involved in analytical, laboratory support and field services. We generally employ people with degrees in applied sciences such as chemistry, biology and geology. This is true of laboratory personnel as well as field sampling and sales/service staff. We also actively encourage continuing education in appropriate fields.

Resumes of the key personnel who will be involved with your work are available upon request. Brief biographies can be found in Appendix F.

13. Pricing Policy

At General Testing, we know you want prompt and reliable testing service but at a price you can afford. We make every effort to extend to you the maximum costs savings available, based on the type of analyses required, the number of samples per batch, the number of sites involved, and current laboratory capacity.

Discounts are available on continuing contracts, and on multiple sample orders. Please consult our sales staff (account managers) or client representatives for further information. A copy of General Testing's fee schedule is available upon request.

Appendix A

Laboratory Space Allocation

	ROCHESTER	BUFFALO	HACKENSACK	SYRACUSE
Field Services Area	1192	580	2700	
Hazardous Waste Storage	166	100	160	
Sample Storage	605	80	1198	80
Maintenance Area	1050	-	-	
Garage for Field	1437	-	200	
Record Archives	1000	-	200	
Equipment Storage	600	100	400	
Sample Processing	926	100	480	
Wet Chemistry	1860	400	1300	
Microbiology	162	100	240	
Metals Preparation	323	-	-	
Metals Analysis	748	-	-	
Organics Preparation	741	-	-	
Organics Analysis	1200	-	-	
Analytical Offices	2080	100	752	
TCLP Preparation	220	-	-	
Reporting, ISD, & Client Representative Services	2550	-	-	
Business Offices	3825	480	380	220
TOTAL AREA	20685	2040	8010	300

* All data is in square feet

Appendix B

ANALYTICAL EQUIPMENT SUMMARY

I. Organics

A. GC/MS Semi-Volatiles

1. 2 - HP5890 GC with 5970 MSD linked to dedicated HP 1000 series computer for data processing and auto sampler. Used for 625, 8270 and CLP analyses.

B. GC/MS Volatiles

1. 2 - HP5890 GC with 5970 MSD linked to dedicated HP 1000 series computer for data processing and 16 place Tekmar Purge/Trap. Used for 624, 8240 and CLP analyses.

2. 1 - HP5890 II GC with 5971 MSD HP Chemstation for data processing and 16 place Tekmar Purge/Trap. Used for 624, 8240, 524 and CLP analyses.

C. Pesticides

1. 2 - HP5890 GC's with dual Electron Capture Detectors (ECD) (1 injection split into 2 capillary columns), auto samplers and HP Chemstation for data processing.

2. 1 - HP5730 GC with ECD/FID detectors, HP3396 integrator for data processing and auto sampler.

3. 1 - Varian 3700 GC with ECD/TSD detectors, auto sampler and HP3392 integrator.

D. GC VOA's

1. 4 - GC's (1 Varian 3300 and 3 Tracor 540's) with Hall Cell and PID combination detectors, 10 place Tekmar Purge/Traps and 2 HP3362 integrator and 1 HP Chemstation for data processing. Used for 601, 602, 8010, 8020, and 8021 analyses.

2. 1 - HP5710A GC with dual FID detectors, HP 3362 integrator and 10 place Tekmar Purge/Trap. Used for 8015 analyses.

3. 1 - Tracor 540 GC with FID/PID combination detector, 10 place Tekmar Purge/Trap and Vista 402 for data processing. Used for Petroleum Contaminated Soil Guidance List - 8021, 8015, 602, and 8020 analyses.

E. Miscellaneous Organics

1. 1 - Gow-Mac series 559-GC with dual TSD detectors for analysis of trace gases.

2. 1 - HP5890 with dual FID detectors, autosampler and HP3392 integrator; used for Petroleum Hydrocarbons Method 310-13 or screening for GC/MS.

3. 2 - MCI Model TOX-10 TOX analyzers.

4. 1 - OI Model 700 TOC analyzer.

5. 1 - ABC automated Gel Permeation Chromatography (GPC) Cleanup Unit.

6. 2 - HNU PI 101 Organic Vapor Analyzers.

II. Metals

A. ICP - Leeman Labs, PS 3000 simultaneous ICP with auto sampler and CLP software.

B. Atomic Absorptions

1. PE4100ZL Graphite Furnace with Zeeman background correction, autosampler, CLP software, and PC work station.

2. PE3100 Graphite Furnace with D2 background correction, autosampler, CLP software, and PC work station.

3. Varian Spec 30 Graphite Furnace/Flame with D2 background correction, autosampler, and PC work station.

4. Varian 975 Graphite Furnace with D2 background correction, autosampler, and PC data station.

5. Varian 1475 Flame AA with autosampler and PC data station. Used for Cold Vapor Hg analysis.

III. Wet Chemistry

A. Latchat Quickchem Automated Ion Analyzer with flow injection, dual channel, autosampler and PC data station. Used for 8 different chemistries.

B. Technicon Auto Analyzers

1. AA II - dedicated to TCN analysis.

2. AA II with built-in Micro Distillation dedicated to Phenol analysis.

C. Various Spectrophotometers for colorimetric analysis.

D. Two IR analyzers, one Perkin Elmer dual beam and one BSI Total Hydrocarbon Analyzer; used for Petroleum Hydrocarbon analysis.

IV. Reporting

A. HP series 9000 computer for HP LABSAM LIMs tracking and reporting software.

B. HP 1000 computer dedicated to CLP form generation.

C. Novell PC Network system for CLP form generation using Telecation forms and disk deliverables software.

Appendix C

Analytical Methodology Sources

1. Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, September 1986, U.S. Government Printing Office, Washington, DC 20402.

2. Methods for the Chemical Analysis of Water and Wastes, EPA 600/4-79-020, revised March 1983, Environmental and Support Laboratory, USEPA, Cincinnati, OH 45268.

3. Standard Methods for the Examination of Water and Wastewater, 17th edition, 1985, American Public Health Association, 1015 Fifteenth Street, Washington, DC 20005.

4. Federal Register, 40CFR Part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants, revised July 1, 1987, U.S. Government Printing Office, Washington, DC 20402.

5. New York State Department of Environmental Conservation Analytical Services Protocol, September 1989 and December 1991, NYSDEC Bureau of Technical Services and Research, 50 Wolf Road, Albany, NY 12233.

6. Analytical Handbook, Laboratory of Organic Analytical Chemistry, Wadsworth Center of Laboratories and Research, New York State Department of Health, Albany, NY 12201.

7. Remedial Investigation Guide, New Jersey Department of Environmental Protection, Division of Hazardous Waste Management, March 1990, Trenton, NJ 08625.

8. RCRA Groundwater Monitoring Technical Enforcement Guidance Document, USEPA.

9. Field Sampling Procedures Manual, New Jersey Department of Environmental Protection, November 1985, Trenton, NJ 08625.

10. Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells, Aller et al., June 1989, Environmental Monitoring and Support Laboratory, USEPA, Las Vegas, Nevada 89193.

Appendix D

Certifications

General Testing maintains certifications with the State agencies listed below. In addition, we are certified by many private concerns such as Chemical Waste Management, E.I. du Pont de Nemours, Inc., and Woodward-Clyde Consultants.

Agency:	New York State Department of Health
Categories:	Potable/Non-potable Waters, Solid and Hazardous Waste. Air Emissions.
Laboratory ID #:	10145 for Rochester
Contact person:	Matthew Caruso (518) 474-8519

Agency:	New York State Department of Health
Categories:	Contract Laboratory Protocol (CLP)
Laboratory ID #:	10145 for Rochester
Contact person:	Matthew Caruso (518) 474-8519

Agency:	New York State Department of Health
Categories:	General Chemistry (Potable/Non-potable)
Laboratory ID #:	10801 for Hackensack
Contact person:	Matthew Caruso (518) 474-8519

Agency:	New Jersey Department of Environmental Protection
Categories:	Limited Chemistry, ICP, Atomic Absorption, Gas Chromatography, GS/MS, ICP, (Drinking Water & Water Pollution).
Laboratory ID #:	73331 for Rochester
Contact person:	Don Bowyer (609) 292-3950

Agency:	New Jersey Department of Environmental Protection
Categories:	Limited Chemistry (Potable/Non-potable).
Laboratory ID #:	02317 for Hackensack
Contact person:	Don Bowyer (609) 292-3950

Agency:	Connecticut Department of Health Services
Categories:	Potable Water, Effluents, Sewage, Soil.
Laboratory ID #:	PH-0556
Contact person:	Phillip Schlossberg (203) 566-4045

Agency:	Massachusetts Department of Environmental Quality Engineering
Categories:	Drinking Water/Water Pollution.
Laboratory ID #:	NY032
Contact person:	John E. Delaney (508) 682-5237

Appendix E

Corporate Experience

AFI

Date:	Present
Site:	Various Landfill Sites
Work Description:	Analysis of groundwaters on a quarterly basis as per NYS Part 360 regulations.

Atochem North America

Date:	September - November 1989
Site:	Geneseo, New York
Work Description:	Analysis of process wastewaters and treatment plant effluent over an 8 week period for Volatiles, Extractables, and a variety of metals and general chemistry parameters.

Bausch & Lomb

Date:	1982 - Present
Site:	Frame and Optics Centers, Rochester, New York
Work Description:	Analysis of effluent wastewaters in compliance with county and state programs. Analysis of solid waste prior to disposal.

Cecos International

Date:	1987 - 1991
Site:	Niagara Falls, New York
Work Description:	Analysis of groundwaters on a quarterly basis as part of routine monitoring program.

Clinton Bogert Associates

Date:	March 1988 - 1989
Site:	Hackensack River, New Jersey
Work Description:	Project involved the assessment of river water quality during dry and wet periods at various times of the year. Over 8000 river, benthic and CSO samples were analyzed for BOD, solids, chlorophyll, and nutrients.

Conestoga-Rovers & Associates, Inc.

Date:	May 1990 - March 1991
Site:	Confidential Site
Work Description:	Analysis of over 60 soils and sediments, and 40 waters, for all or part of TCL/TAL by NYSDEC 1989 ASP.

Conestoga-Rovers & Associates, Inc.

Date:	April 1990
Site:	Confidential (North New Jersey)
Work Description:	Analysis of over 120 transformer oils for PCB content.

Day Engineering

Date:	1986 - Present
Site:	Rochester, New York
Work Description:	Provide sampling and analytical services as required.

Erdman & Anthony Associates

Date:	Summer, 1988
Site:	NYS I-490/I-590 Interchange
Work Description:	Project involved the analysis of over 250 soil samples from a site potentially contaminated with solvents and herbicides.

ERM

Date:	November 1990 - February 1991
Site:	Vanderhorst
Work Description:	Treatment and analysis of soils and groundwater as part of the bench scale study concerning remediation options for site.

E.I. du Pont de Nemours, Inc.

Date:	Summer, 1988
Site:	Confidential
Work Description:	Analysis of 10 sediments for the Hazardous Substance list, and 70 sediments for mercury, PCB's, pesticides and volatiles. Additional waters and sediments were involved in an ellutrite test.

E.I. du Pont de Nemours, Inc.

Date:	June 1984 - April 1993
Site:	Necco Park
Work Description:	Sampling and analysis of up to 125 groundwater monitoring wells per quarter. Analyses include a site specific list of inorganics, volatiles, and acid and base neutral extractables.

E.I. du Pont de Nemours, Inc.

Date:	September 1986 - April 1993
Site:	Niagara Falls Plant
Work Description:	Sampling and analysis of up to 75 groundwater monitoring wells per quarter. Analyses include a site specific list of inorganics, pesticides, and base neutral extractables.

GE

Date:	1992 - 1993
Site:	Upstate New York
Work Description:	Analysis of groundwaters for halogenated volatile organics.

Geotrans, Inc.

Date:	1992 - 1993
Site:	Confidential Buffalo Site
Work Description:	Analysis of over 100 soils, sediments and groundwaters for TCL/TAL analytes in accordance with 1989 NYS DEC ASP B.

Hazen & Sawyer

Date:	May 1989 - Present
Site:	Hudson River, Jamaica Bay, N.Y.C. Harbor
Work Description:	Performing major surface water study involving the sampling and analysis of approximately 7000 water samples for nutrients, solids, O&G, coliforms, BOD, DO and other parameters.

Hydroqual Inc.

Date:	Present
Site:	Mahwah, New Jersey
Work Description:	Provide project specific sampling and analytical services. Samples from bench and pilot scale treatability studies form the bulk of this clients needs, with rapid TAT the norm.

Hydroqual Inc.

Date:	August 1991 - November 1991
Site:	PAB Oil, Louisiana
Work Description:	Analysis of contaminated soil, and samples from various stages of treatment, as part of EPA's Superfund Innovative Technology Evaluation program. Over 140 samples were analyzed for volatiles, semi-volatiles, metals and petroleum hydrocarbons.

Malcolm Pirnie

Date:	1987 - Present
Site:	Buffalo, New York
Work Description:	Analytical services as required to support a variety of projects. These include effluent monitoring, treatability studies and Superfund sites.

Mobil Chemical

Date:	April 1990 - Present
Site:	Macedon, New York
Work Description:	Assessment of various wastes, and process effluents, as part of routine monitoring program.

Olin

Date:	March 1991 - Present
Site:	Rochester, New York
Work Description:	Analysis of several waters each week for volatiles on a rush basis. Work is part of treatment system monitoring.

PRC

Date:	1993
Site:	Edwards Air Force Base
Description:	Analysis of 300 soil samples for volatile organics as part of EPA's Superfund Innovative Technology Program.

Sanifill Corp.

Date:	1992 - Present
Site:	Landfills throughout Southeast USA
Description:	Monitoring of groundwater and treatment systems.

Seneca Meadow, Inc.

Date:	1993
Site:	New York
Work Description:	Sampling and analysis of groundwaters for NYS DEC ASP parameters under a RI/FS program.

Sevenson Environmental Services, Inc.

Date:	1992 to Present
Site:	Various
Work Description:	Provide a wide range of analytical services including analysis of PCBs, volatiles, semi-volatiles and metals typically utilizing NYS ASP procedures. Fast turnaround is generally required due to remediation schedules.

Unisys Corporation

Date:	1992
Site:	Rochester
Work Description:	Analysis of groundwaters for volatile organics and TAL metals under NYS DEC ASP criteria.

Unisys Corporation

Date:	1991 - 1993
Site:	Massachusetts
Work Description:	Analysis of soils and groundwaters for volatiles.

U.S. Gypsum

Date:	1985 - Present
Site:	Oakfield, New York
Work Description:	Sampling and analysis of groundwaters on a quarterly basis.

Wehran Envirotech

Date:	March 1990 - 1992
Site:	Confidential Upstate NY Site
Work Description:	Analysis of over 300 soils, sediments and groundwaters for the full TCL/TAL by NYS DEC 1989 ASP.

Wehran Envirotech

Date:	1984 - Present
Site:	Various landfill sites
Work Description:	Provide sampling and analytical services for groundwater monitoring at sanitary landfills on a quarterly basis.

WMI

Date:	1980 - Present
Site:	Various offices in New York
Work Description:	Analysis of waste streams prior to acceptance for disposal.

Woodward-Clyde Consultants

Date:	Present
Site:	Wayne, New Jersey; Plymouth Meeting, Pennsylvania; and Niagara Falls, New York offices.
Work Description:	General laboratory services as projects require.

Woodward-Clyde Consultants

Date:	Spring 1989
Site:	Confidential
Work Description:	Analysis of approximately 100 soil and water samples from contaminated site by GC/MS, Volatile Organics and Base/Neutrals.

Woodward-Clyde Consultants

Date:	July - September 1989
Site:	Confidential (RCRA)
Work Description:	Analysis of 60 groundwaters for low level volatiles, pesticide/PCB's, and several metals. Extended reportables required including all raw data.

Woodward-Clyde Consultants

Date:	October 1989 - March 1990
Site:	Paterson, New Jersey
Work Description:	Analysis of approximately 100 soils and 35 groundwater samples for Base/Neutrals, Volatiles, PP metals, and Petroleum Hydrocarbons. Reporting as per NJ Tier II format.

Xerox Corporation

Date:	September 1985 - Present
Site:	Primarily within the Rochester, New York area, but also with other sites nationwide.
Work Description:	Quarterly sampling and analysis of more than 250 monitoring wells.

Xerox Corporation

Date:	1973 to Present
Site:	Primarily within the Rochester, NY area but also with sites worldwide.
Work Description:	Analysis of waste streams, remediation systems, and miscellaneous monitoring of air, water and soil.

Appendix F

Summary of Key-Personnel

Rochester

Walter Scheible, the founder and CEO, earned an M.S. degree in environmental engineering from Cornell University. He holds a P.E. license in New York and New Jersey. He worked for the U.S. EPA as a project engineer on a study of the Great Lakes, served as an Associate Professor of Civil Engineering/Environmental Studies at Monroe Community College for thirteen years, and taught environmental science courses at Rochester Institute of Technology. He has served as president of the NYS Association of Approved Environmental Laboratories and is currently on the Board of Directors.

Michael K. Perry is a graduate of Georgia State University with a B.S. in chemistry. He has over 18 years experience with organics and metals instrumentation. Prior to joining General Testing in 1979, he was employed by Coca-Cola Corporation in quality assurance where he was involved in methods development for several large projects. Mike is currently general manager of operations, laboratory director, and a member of the Board of Directors.

Mark Wilson is a graduate of the State University of New York at Buffalo, with a B.S. in medical technology. Prior to joining General Testing in 1985, Mark worked in the toxicology lab at the medical center of the University of Kentucky, where he performed GC and atomic absorption analyses on biological fluids. He is a certified bacteriologist. Mark directed General Testing's entry into the GS/MS business. He is currently the assistant laboratory director and laboratory manager.

Mark Monachino holds B.S. and M.S. degrees in chemistry, the latter from Rochester Institute of Technology. He joined General Testing in 1985, he has lab experience as a metals (AA) analyst, and as manager of extractable organics (PCB's and pesticides). Mark is a qualified NYS inorganics and organics data validator. He presently serves as quality assurance director.

Lorie Croston holds a B.S. in biochemistry from the State University of New York at Fredonia. She has extensive experience in metals and classical wet chemistry methods. Prior to joining General Testing in 1990, she worked as an inorganic analyst at Environmental Testing Facilities, and as a research assistant at Environmental Resources Center. Lorie is a qualified NYS inorganics data validator and is currently QA officer/safety officer.

Scott Gabel is a graduate of the State University of New York at Brockport, with a B.S. in environmental science (chemistry minor). He managed the general chemistry department prior to moving into the organics area, where he is experienced in infra-red spectrophotometry and gas chromatography. He has extensive experience with EPA-approved GC and GC/MS methodologies. Prior to joining General Testing in 1984, he worked in the R&D department for Cadbury Schwepps. Scott is currently manager of GC and GC/MS volatiles.

Larry Nark is a graduate of Evangel College with a B.S. in biology. Prior to joining General Testing in 1992, Larry worked at Galson and Core laboratories analyzing semi-volatile compounds by GC/MS. While at Core, he also supervised the semi-volatile extractions group. Larry is currently manager of GC and GC/MS extractable organics.

Thomas Traver has a B.A. in chemistry from the State University of New York at Buffalo. He has extensive experience with EPA approved GC and GC/MS methodologies. Prior to joining General Testing in 1984, he worked for IBM as a chemical environmental technician doing field and laboratory work in the air monitoring group. Tom is currently in the GC/MS area as a senior chemist.

Dave Lipani holds a B.S. degree in chemistry from St. Bonaventure University. He joined General Testing in 1988, and is experienced in GC and GC/MS volatile organic analyses. Prior to joining GTC, he worked as a chemist at Versar, Inc., performing organic analyses. Dave currently works in the GC/MS area.

Todd Brown has a B.S. degree in chemistry from Rochester Institute of Technology. He joined General Testing in 1988, and is experienced in all phases of extractable organic analysis, as both an analyst and manager.

Dave Masucci holds a B.S. in biology from Le Moyne College. He joined General Testing in 1988, and is experienced in both metals and organic analyses. Dave currently serves as an analyst in the Extractable Organics Department.

Lauren Riley has a B.S. degree in chemistry from the University of Rochester. Her previous experience includes metals analyses at Galson and Pace laboratories. She is also a qualified NYS inorganics data validator. Lauren joined General Testing in 1993 as the manager of metals.

Paul Cvetich is a B.S. candidate in chemistry at Rochester Institute of Technology. He joined General Testing in 1986, and is experienced in all phases of metals analyses, including ICP, flame, and furnace methodologies. Prior to joining GTC, he worked as a lab technician at Bausch & Lomb. Paul is currently a lead technician in our metals group.

Rebecca Wheeler holds a B.S. in biochemistry from Nazareth College of Rochester. She joined General Testing in 1990, and is experienced in wet chemistry and metals analyses. Prior to joining GTC, she worked as a lab technician at Fisons Pharmaceuticals. Rebecca is currently an analyst in the Metals Department.

Greg Teall has B.S. and M.S. degrees in biology from the State University of New York at Brockport. Before joining General Testing in 1988, he had four years of analytical experience in the water quality laboratory at SUNY Brockport. Greg is the inorganics manager and has co-headed teams responsible for large surface water projects.

Nadia Mead has a B.S. in medical technology from the State University College of Fredonia. She joined General Testing Corporation in 1990 as a lab technician. Prior to General Testing she worked as a medical technologist at Medina Memorial Hospital. Nadia is currently a senior analyst in our Wet Chemistry Department where she coordinates sample analysis and reviews data.

Mary Kittrell has a B.A. in computer science/economics, and is working towards an M.B.A. degree from St. John Fisher College. She has experience in all phases of computerized data management and report generation. Before joining General Testing in 1987, she worked as a sales representative/assistant controller for Accel Systems, Inc. Mary currently manages the laboratory support area including the Information Systems Department where she developed all the information processing systems currently utilized by the company.

Janice Jaeger holds a B.A. in pre-veterinary medicine/ pre-professional zoology, with a minor in chemistry, from Ohio Wesleyan University. She joined General Testing in 1989 as a sample technician in the receipt and processing group. Her previous experience includes a position as surgical assistant in a veterinary practice from 1984-1989. Janice currently works as a client representative.

Susan C. Lochner has a B.A. in earth/space science from Mansfield State College (PA). She joined General Testing in 1984, and worked as the field sampling manager before assuming her present duties. Sue currently serves as a client representative.

Karen Bunker has a B.S. in biology from the University of Notre Dame. She joined General Testing in 1984 as a laboratory technician, and served as manager of our wet chemistry department in 1985. She currently works as a client representative.

Brian Mackin holds a B.S. degree in earth science and biology from the State University of New York at Brockport, and has completed the 40-hour OSHA safety course (1910.12). He joined General Testing in 1986, and has experience in all areas of field sampling, both as a technician and manager (current position) in the Field Services unit.

Valentina Gardner holds a B.S. in biology from the State University of New York at Brockport. She joined General Testing in 1986, and has experience in all areas of sample processing, as both a technician and manager (current position).

Doug Sogard holds a B.S. degree in geology from State University of New York at Brockport. He joined General Testing in 1988 as a field sampling technician. He later transferred to the sample receipt and processing group, where he currently works.

Tim Perry directs a five person team responsible for all facility remodeling and maintenance. Before joining General Testing in 1986, Tim worked for several contracting firms and for Foster Wheeler as a machinist.

Barry Fry holds an M.S. degree in environmental science from the State University of New York at Brockport, where he served on a team that conducted a two year study of Lake Ontario water quality. Prior to joining General Testing in 1987, he worked in the chemical/coatings industry, as an employee of PPG Industries and Voplex Corporation. Barry currently serves as an account manager.

Heather Cohen currently serves as director of administrative services including finance, maintenance, purchasing, and human resources. Heather also serves on the Board of Directors as Secretary/Treasurer. Prior to joining General Testing in 1975, Heather worked for an international engineering consultant with administrative responsibilities. She has developed the human services department, computerized all aspects of finance and is actively involved in community affairs, representing General Testing on various boards.

Peggy Johnson serves as assistant to the administrative director and is currently responsible for financial accounting activities. Before joining General Testing in 1989, she was with Friendly Ice Cream Corporation as a bookkeeper while completing her education in accounting.

Cindy Toomey joined General Testing in 1986 as a field technician. She currently serves as a client representative and as assistant to the ISD manager where she serves as a CLP specialist and reports coordinator.

New Jersey Facility

Virginia Murray holds B.S. and M.A. degrees in geology from Brooklyn College of the City University of New York. She joined General Testing in 1984, and is experienced in all phases of laboratory management. Previously, she performed extensive metals analyses for the Research Foundation of the City University of New York on a study of contamination in Jamaica Bay, N.Y. Virginia currently is the laboratory manager for our Hackensack, N.J. office and branch office.

Carl R. Wallin has a B.S. degree in environmental science from Cook College/Rutgers University. He has experience in all areas of field sampling, both as a technician and manager. Prior to joining General Testing in 1988, he worked for the N.Y.S. Department of Parks, Recreation and Historic Preservation; Burns and Roe, Inc.; and the U.S. Environmental Protection Agency. Carl currently directs all field and safety activities for the N.J. office.

Ellen Schneidenbach has a B.S. in environmental science from Kutztown University. She joined General Testing in 1987, and has coordinated bottle set assembly, sample receipt, and breakdown for at least three major surface water projects . Ellen is currently in charge of analytical report generation and assembly in the Hackensack office.

Buffalo Facility

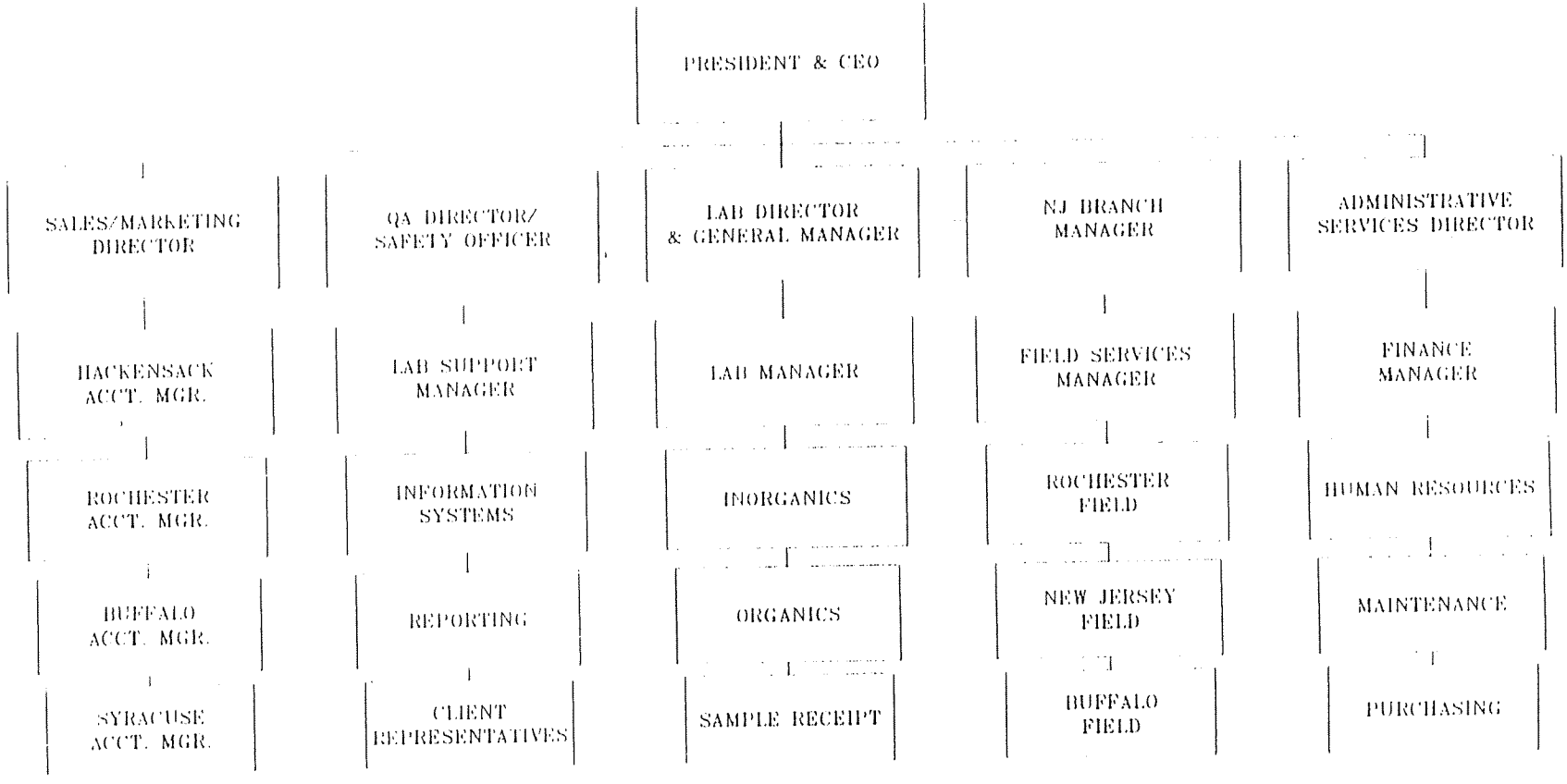
Katherine Wager has a B.S. in chemistry from Canisius College. Prior to joining General Testing in 1991, she worked as a chemist and supervisor at Ecology and Environment, Inc., and as a laboratory director at Huntingdon Analytical Services. Kathy is currently General Testing's sales director and office manager in Buffalo.

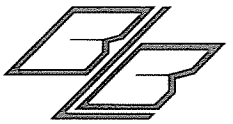
Syracuse Facility

Phil Cohen has a M.A. in psychology from Hahnemann University. Prior to joining GTC in 1986, Phil worked for DePaul Mental Health Services as a child care worker. His experience at General Testing includes several years of wet chemistry and organic preparation. Phil is currently account manager in our Syracuse office.

APPENDIX G

GENERAL TESTING CORPORATION
ORGANIZATION CHART
JULY 1993





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