Parametrix, Inc.

Consultants in Engineering and Environmental Scienc

13020 Northup Way Bellevue, WA 98005
206-455-2550 • Fax: 206-869-9556

A. Elizabeth Gordon, Ph.D.
WIPP Permit Coordinator
State of New Mexico
Environment Department
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, NM 87502

December 20, 1991
80-2932-01 (W5)

Re: Review of Resource Conservation and Recovery Act Permit Application and Other Technical Documents

Dear Dr. Gordon:

Thank you for the opportunity to submit our technical proposal and qualifications to conduct review of the WIPP RCRA permit application and technical documents. After careful consideration, Parametrix has selected Applied Research Associates, Inc., of Albuquerque, and TRC Environmental Consultants, Inc., as a subconsultants on this project. We believe you will find that our combined resources and the resulting proposal offer you the strongest team for your project.

Proposal Organization

Our attached proposal addresses the various issues associated with technical review of documents under RCRA regulations. Our submittal is organized by the following sections as outlined in your Request for Proposal (RFP).

Section 1: General Liability Insurance
Section 2: Professional Liability Insurance
Section 3: Key Personnel
Section 4: Project Understanding and Approach
Section 5: Relevant Project Experience
Section 6: Estimated Costs
Section 7: Local Office Documentation
Section 8: References
Section 9: Subcontractor Qualifications
Section 10: Conflict of Interest Forms
Section 11: Standard Operating Procedures
Section 12: Equal Employment Opportunities

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As we understand, the State of New Mexico is in need of a consultant to perform the technical review of documents associated with the WIPP permit application. These tasks include: completeness determination; technical evaluation of documents; evaluation of engineering components and responses from applicants; decision analysis, and administrative support of general permitting activities.

Experienced and Committed Project Team

The project team we have selected has experience in all the above referenced tasks, as well as extensive overall RCRA-related services. Mr. Clyde Moore, P.E., Program Manager, and Mr. Bill Kane, Project Manager, have over 30 years combined experience with hazardous waste. They are currently assisting the Washington State Department of Ecology with technical review services for the Hanford facility in Richland. Two key members of ARA working with us include Mr. John Gibbons and Mr. Terry Steinborn. Both have extensive experience with hazardous waste, and are knowledgeable about the WIPP facility. Mr. Kirk Winges of TRC has over 20 years experience with air quality investigations and monitoring, and has managed over 100 air quality studies. We have included resumes which reflect these individuals' experience, as well as other key team members resumes.

Specifically, our RCRA experience includes the preparation or review of:

- RCRA Part A and B permits,
- Waste stream characterization reports,
- RCRA facility investigation/corrective measure study work plans,
- CERCLA remedial investigation/feasibility study work plans,
- Design plans and specifications for land disposal of hazardous, radioactive, and mixed wastes,
- RCRA site-wide background soil sampling plan, and
- RCRA characterization and use of soil and groundwater background.

In addition to our RCRA project specific experience, Parametrix provides services in a wide range of areas, including:

- hazardous waste engineering
- civil engineering
- environmental impact statements
- sanitary engineering
- risk assessments
- environmental planning

- hydrogeology
- gas management
- regulatory analyses
- chemical/industrial engineering
- statistics
- data management

From these disciplines, we have identified over 40 professionals specifically for your project with the resources of over 300 additional staff from which to draw should it become necessary. Our firm is large enough to handle large, complex projects such as RI/FSs, but we also assist our clients with smaller projects such as property transaction transfers.

Local Presence Means Immediate Response to NMED

In addition to the extensive technical skills which the Parametrix Team offers to NMED, we understand the importance of effective communications with our clients. With ARA located in Albuquerque, we can ensure NMED that we will provide immediate response to any issues which may arise during the course of this project. In addition, Parametrix has worked with clients located throughout the U.S., including Oregon, Montana, Maine, Alaska, California, and many others.

Parametrix understands the importance of this project to New Mexico's Environment Department, and it matches our capabilities very closely. We appreciate your consideration of our submittal and look forward to the opportunity to further discuss this project during the next step of the selection process.

Sincerely,

PARAMETRIX, INC.

Ramon A. Beluche

Ramon A. Beluche, Ph.D.
Principal in Charge

Original

Technical Proposal and Qualifications

Review of Resource Conservation and Recovery Act Permit Application - Waste Isolation Pilot Plant (WIPP)

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous and Radioactive Materials Bureau

Parametrix, Inc.
13020 Northup Way
Bellevue, WA 98005

PARAMETRIX, INC. BACKGROUND

Parametrix is a professional services firm assisting clients with their engineering and environmental needs. A medium-sized firm, we are large enough to complete major projects, but small enough to ensure that each project receives the attention of senior management. The firm is a qualified Minority-owned Business Enterprise, certified by local and state agencies.

We undertake projects utilizing a team approach, drawing upon the skills of personnel in various offices to ensure responsiveness to project requirements. The principals of Parametrix have learned that close client coordination and communication are the key factors in meeting the objectives of our clients. We have six offices in Washington, Oregon, California, and Hawaii. Each office is managed and directed by a senior management professional skilled in directing projects in accordance with local requirements. We have close coordination between our offices in order to draw upon the diverse disciplinary talents of our professional staff.

Since 1969, Parametrix has worked with a variety of clients including local, state, and federal agencies, port districts, public utility districts, and private corporations. We assist these clients with municipal, civil, and environmental engineering. We also conduct environmental and natural resource studies such as fisheries, environmental impact assessments, water quality investigations, toxicology assessments and comprehensive planning projects.

Our staff is comprised of health physicists and toxicologists, civil and environmental engineers, scientists, and planners capable of analyzing the potential impact of a project or programmatic proposal on the physical and human environment of any locality. Parametrix has a staff of approximately 250 employees organized into the following technical groups:

- Hazardous Waste Management
- Solid Waste Management
- Toxicology
- Civil Engineering
- Fisheries and Aquatic Resources
- Wetlands Management
- Terrestrial Ecology
- Environmental Planning
- Land Development
- Traffic and Transportation.

HAZARDOUS, RADIOACTIVE, AND MIXED WASTE MANAGEMENT

A range of services are provided by our Hazardous Waste Management Group. The specialized experience of our staff includes a thorough knowledge of regulatory requirements, site procedures assessment, liaison with regulatory agencies, and the design and implementation of investigative programs, monitoring programs and remedial activities. These technical staff have the proper training and the appropriate protective and surveillance equipment required to enter and investigate waste sites. Parametrix has worked on Federal Superfund landfills and other municipal landfills where radioactive contamination issues have emerged. In addition, we are providing technical support to the Washington State Department of Ecology for the cleanup activities at the Hanford Nuclear Reservation.

Hazardous, Radioactive, and Mixed Waste Management services we provide include:

- Preparation and review of RCRA facility Part A and Part B Permit applications
- Technical support involving RCRA and CERCLA/SARA actions and activities
- Preparation of RCRA closure plans, applications for facility closures and facility closure negotiations
- Review of Federal and State regulations and Department of Energy orders
- Radiological Sciences/Health Physics
- Hazardous, radioactive, and mixed waste and material containment and disposal plans
- Leachate and gas management engineering
- Design of industrial effluent treatment systems
- Assessment and mitigation of soil, groundwater and air contamination
- Chemical engineering
- Environmental audits of industrial facilities, waste sites and real estate.

This group also includes specialists in geology and groundwater resources who have technical expertise in the geohydrological aspects of hazardous waste management, environmental pollution risk assessment, characterization of physical and chemical aspects of groundwater aquifers, and design of measures to mitigate soil and groundwater contamination.

SOLID WASTE MANAGEMENT

Our staff is experienced in virtually every aspect of the solid waste management field. Members have presented expert testimony related to solid waste management in federal court, and have made presentations on solid waste management issues on behalf of the United Nations, U.S. Environmental Protection Agency, the Washington State Department of Ecology, the Government Refuse Collection and Disposal Association, and the University of Washington.

Solid Waste Management services include:

- Preparation of comprehensive solid waste management plans
- Siting, design, operation, and closure of solid waste landfills
- Study of groundwater quality impacts due to leachate migration
- Research on the quantity and quality of gases produced during refuse decomposition, and energy recovery feasibility
- Design, construction and operation of landfill gas control systems
- Siting and design of transfer stations
- Resource recovery projects
- Environmental impact statements for solid waste disposal facilities
- Implementation of recycling programs and facilities
- Yard waste composting facilities.

TOXICOLOGY

Parametrix has professional staff who provide a wide variety of expertise used to evaluate toxicity concerns. We have a group of aquatic toxicologists who conduct and interpret both acute and chronic bioassays at our in-house laboratory. They are experienced in conducting exposure assessments, toxicological risk evaluations, fate and transport modeling, as well as design and assessment of mitigation options. This staff specializes in ecological and human health risk assessments, NPDES permitting issues and toxicity reduction/identification evaluations.

Toxicological services that we provide include:

- Acute and chronic bioassays
- Biomonitoring
- Toxicity identification/reduction evaluations
- Toxicity data analysis and interpretation
- Interpretation of federal and state regulations
- Permit assistance

- Dredging sediment analysis
- Groundwater modeling
- Expert testimony.

CIVIL ENGINEERING

Our Engineering Group has extensive experience in all aspects of civil engineering, including planning, design, cost estimating, and construction management of municipal and general public works projects.

Civil Engineering services we provide include:

- Hydrology and urban runoff management
- Water distribution and storage
- Wastewater collection, treatment and disposal systems
- Outfall design
- Dredge and fill
- Park, recreation and trail facility development
- Marine and waterfront facilities
- Economic feasibility analyses
- Structural design and analysis.

FISHERIES AND AQUATIC RESOURCES

The Natural Resources Group of Parametrix, Inc. includes technical specialists who perform both biological impact assessments and specialized biological resources studies. These professionals are fisheries and aquatic resources biologists, water quality specialists, wetland ecologists, wildlife biologists, botanists and toxicologists.

Projects conducted by the fisheries and aquatic resources biologists range from fisheries and water quality impacts associated with hydroelectric development to investigations in the marine environment related to shoreline development, wastewater outfalls, marinas, and toxic wastes. Our experience in performing these types of projects includes reviewing existing literature, designing and implementing programs for data collection, conducting a wide variety of field sampling efforts, and using methods of statistical analysis and mathematical modeling to process this information. Parametrix maintains its own equipment for field sampling, and laboratory facilities for basic water quality analyses and toxicity bioassays.

Fisheries and Aquatic Resources services include the following:

- Baseline biological sampling
- Fish habitat evaluation and impact analysts
- Hydroelectric project impacts
- Instream flow requirements (IFIM)
- Benthic invertebrate assessments
- Chemical characterization of sediments
- Water quality characterizations
- Measurement of hydrological and oceanographic processes
- Population estimates of aquatic biological resources
- Nutrient and pollutant loading analysis
- Effluent transport and dilution modeling.

WETLANDS MANAGEMENT

Our wetlands ecologists are trained to conduct specialized wetland investigations. Wetlands ecologists provide expert assistance to ensure that private and public development projects can be built in compliance with existing wetland regulations. In addition to development projects, we assist local governments by conducting wetland inventories which allow for more predictable development in their jurisdictions.

Wetlands services include the following:

- Wetland inventories and delineations
- Assessments of wetland functions
- Classification and rating of wetland systems
- Evaluation of project impacts on wetland functions
- Analysis of regulatory policies
- Permit assistance
- Wetland restoration and creation as mitigation
- Recommend wetland buffer requirements
- Freshwater and marine macrophyte surveys.

TERRESTRIAL ECOLOGY

We have a wildlife biologist certified in the U.S. Fish & Wildlife Service Habitat Evaluation Procedures (HEP). Both our wildlife biologists and our botanists are qualified to identify and make recommendations with regard to threatened and endangered species, and are experienced in working with resource agencies.

Wildlife biologists who are members of our Natural Resources Group provide specialized wildlife investigations. These include:

- Mapping and inventory of existing vegetation and/or wildlife habitats within a study area
- Impact analysis of proposed development activities
- Development of mitigation plans.

ENVIRONMENTAL PLANNING

Our Environmental Planning Group prepares environmental assessments and impact statements, as well as related technical documents. The staff maintains an up-to-date working knowledge of local, state, and federal regulations which pertain to the environmental review process, including guidelines for implementing the State Environmental Policy Acts and the National Environmental Policy Act (NEPA), as well as regulations pertaining to Federal Energy Regulatory Commission applications and shoreline development.

Many of the projects conducted by this division have involved complex, controversial, proposed actions, requiring strict adherence to all applicable regulations and guidelines and effective coordination with local citizens through a public involvement program.

Environmental Planning projects include:

- Shoreline development, including pleasure craft marinas and naval fleet port facilities
- Major residential and mixed-use business park developments
- Transportation improvements
- Wastewater facilities plans
- Solid waste landfill siting and closure studies.

Our planning staff provide expertise in land use planning and forecasting, facility planning, demographic analysis and forecasting, and facility siting.

They provide economic base studies, industrial location analysis, and economic development strategy formulation. Our technical staff maintain a working knowledge of federal, state and local data sources as well as local land use plans, policies and controls, and the State and National Environmental Policy Act (SEPA and NEPA) guidelines and regulations. Planning and economics services include analyses of:

- Projection of population, employment and housing
- Facility siting analysis
- Land use impact analysis

- Impact assessment on:
  - health and social services
  - public infrastructure
  - recreation
  - employment and income
- Economic base studies
- Economic development analysis.

LAND DEVELOPMENT

We provide commercial, residential, and industrial site planning and development for commercial, residential, and industrial projects through a combination of technical groups that include planning, surveying, engineering, and environmental sciences. Depending on the size and complexity of a project, Parametrix staff have conducted special investigations to ensure that wetlands, aquatic and marine aspects of the natural environment are properly protected and that appropriate environmental documentation, in the form of an environmental impact statement, assessment, or checklist, is prepared.

Typically, our land development services include site planning, surveying, mapping, and legal descriptions; utility and site engineering; hydrology and runoff management; traffic circulation and control; permit assistance; and construction staking, management and inspection.

Land Development services provided by Parametrix include the following:

- Grading and drainage design
- Utilities design
- Sewage collection
- Parking and circulation
- Signalization
- Permit application
- Wetlands delineation and mitigation
- Environmental impact assessments
- Construction management.

TRAFFIC AND TRANSPORTATION

Our Traffic and Transportation Group has considerable experience with a broad range of roadway and traffic engineering projects. These include the design of arterial and collector roadways, analysis and design of mitigating measures for properties affected by road-way improvements, the design of traffic control facilities and systems, and the design and construction of non-motorized traffic facilities.

Traffic and Transportation services we provide include:

- Roadway facilities design and upgrade
- Storm drainage, sewer, and utility design
- Design rockeries, retaining walls and parking
- Intersection and roadway segment capacity analysis
- Intersection signalization and signage
- Lighting analysis and design
- Channelization and intersection geometrics
- Design of bicycle, pedestrian, and equestrian trail systems
- Coordination with public and private utilities
- Property owner coordination, public meetings, and LID formations.

GENERAL SERVICES

PUBLIC INVOLVEMENT

Parametrix uses public involvement programs as an effective way to build consensus and prevent needless controversy by providing credible information and subsequent opportunities for public participation throughout the planning stage of a project. We assist many clients with the identification of social, political, and economic issues which might enhance or impede project approval. Likewise, we recommend strategies for capitalizing on assets and overcoming potentially negative issues. Parametrix is skilled at planning meetings and presentations that foster cooperation and useful feedback from the public. Our staff are also experienced at selecting advisory committees, guiding the interaction of agencies and private clients with committees and citizen groups, and responding to public comments.

COMPUTER CAPABILITIES

The Parametrix computer system is an integrated system of IBM-compatible personal computers located in all Parametrix offices. The system is used for scientific modeling and analysis, database development and manipulation, telecommunications, project management, and word processing and report production. A large pool of computers is available to all staff to provide direct access to the system and maximum flexibility. We also provide computer-aided drafting (CAD) and high-quality plotters. Our computer systems include Geographic Information Systems (GIS).

Geographic Information System (GIS):

- Fully supported SUN Workstation using ARC/INFO software.
- Integrate satellite and other remotely sensed resource imagery with GIS data.
- Capable of transferring Intergraph and Autocad CAD files into ARC/INFO GIS files for processing and mapping.

Modeling and Analysis:

- Comprehensive spreadsheet, statistical, and equation solving software.
- Topographic and 3-dimensional surface plotting systems.
- A library of engineering, scientific, and biological models in FORTRAN and other high-level languages.

Telecommunications:

- FAX system for rapid transmission of any printed material.
- High-speed modem capacity for intercomputer file transfer.
- Subscriber to the CompuServe communication service for access to over 700 on-line databases and electronic mail service.

Word Processing:

- Laser printers for fast, high-quality production of printed documents.
- Complete translation capability with over a dozen word processing systems.

Computer Aided Drafting (CAD):

- Wildsoft coordinate geometry and data terrain modeling software, integrated with AUTOCAD Version 9 to supplement automated field data collection and computing capabilities.
- Ability to interface with digitally produced aerial mapping data for manipulation of field data collection and computing capabilities.
- High-speed accuracy for site planning, site engineering, earthwork calculations, site and facilities mapping.

SURVEYING

Parametrix also maintains a Surveying Group with extensive background in cadastral, topographic, route, and construction staking surveys, and preparation of legal documents for right-of-way and easement acquisition. This technical group works closely with the engineering design and planning staff to ensure effective coordination from initial project concepts through construction.

SUPPORT SERVICES

Parametrix has organized its staff and resources to meet our clients' expectations. Professionals in graphics, word processing, and editing support the technical staff to help produce clear, concise technical documents and reports. A technical library and a computer search service access the latest technical information to help develop the most appropriate solution for a client's specific circumstance.

PROJECT MANAGEMENT

Parametrix operates with a Project Manager/Project team framework so that each project is assigned to the staff members most suited to produce a complete and professional product. The Project Manager assigned to direct a particular effort is the individual whose professional capabilities and experience are most relevant to the requirements of the project. Parametrix utilizes state-of-the-art management tools and computerized databases to provide immediate information, personnel allocation, task budgets and expenditures, and schedule compliance. Project Managers are responsible for:

- Developing program content, objectives, and priorities
- Establishing schedules and budgets
- Assembling and coordinating Project team member task assignments
- Monitoring work progress
- Coordination with the client.

FACILITIES

WASHINGTON

- P.O. Box 460
  1231 Fryar Avenue
  Sumner, WA 98390
  (206) 863-5128
  FAX # (206) 863-0946

- 13020 Northup Way
  Bellevue, WA 98005
  (206) 455-2550
  FAX # (206) 869-9556

- 5700 Kitsap Way, Suite 202
  Bremerton, WA 98312
  (206) 377-0014
  FAX # (206) 479-5961

OREGON

- 6130 N.E. 78th Court
  Suite No. C-7
  Portland, Oregon 97218
  (503) 256-5444
  FAX # (503) 256-4221

CALIFORNIA

- 100 S. Ellsworth, 9th Floor
  San Mateo, California 94401
  (415) 696-3155
  FAX # (415) 348-3017

HAWAII

- 1164 Bishop Street, Suite 1400
  Honolulu, HI 96813
  (808) 524-0594
  FAX # (808) 523-2995

1. GENERAL LIABILITY INSURANCE

Parametrix, Inc., as the prime consultant for this project, maintains comprehensive general liability insurance ($3,000,000), and automobile liability insurance ($1,000,000). At the end of Section 2, we have included a certificate of insurance which documents insurance coverage and limits of liability. Parametrix will obtain worker's compensation insurance, as required by law, for its employees performing services in the State of New Mexico. Applied Research Associates, Inc. (ARA), Parametrix' proposed subconsultant, maintains $5,000,000 comprehensive general liability insurance. ARA complies with the worker's compensation laws of New Mexico. TRC Environmental Consultants, Inc. maintains $1,000,000 comprehensive general liability insurance. TRC will obtain worker's compensation insurance, as required by New Mexico law.

2. PROFESSIONAL LIABILITY INSURANCE

Parametrix, Inc., as the prime consultant for this project, maintains $1,000,000 professional liability insurance in place of bonds. Our insurance coverage is described in the certificate of insurance at the end of this section. TRC Environmental Consultants, Inc. maintains $2,000,000 professional liability insurance.

4[redacted] L

CERTIFICATE OF INSURANCE

TED 02361

ISSUE DATE (MM/DD/YY) 12/10/91

PRODUCER

JURLEY ATKINS & STEWART
1800 NINTH AVE #1500
SEATTLE WA 98101

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY LETTER A	AMERICAN STATES INSUR.
COMPANY LETTER B	PLANET INSURANCE CO
COMPANY LETTER C	
COMPANY LETTER D	
COMPANY LETTER E	

INSURED

PARAMETRIX INC
P O BOX 460
SUMNER, WA 98390

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	GENERAL LIABILITY	02CC2947473	10/20/91	10/20/92	GENERAL AGGREGATE	$ 2,000,00
	X COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG.	$ 2,000,00
	CLAIMS MADE X OCCUR.				PERSONAL & ADV. INJURY	$ 1,000,00
	OWNER'S & CONTRACTOR'S PROT.				EACH OCCURRENCE	$ 1,000,00
	X WA STOP GAP				FIRE DAMAGE (Any one fire)	$ 50,00
	X EMPLOYEE BENEFI				MED.EXP. (Any one person)	$ 5,00
A	AUTOMOBILE LIABILITY	02CC2947473	10/20/91	10/20/92	COMBINED SINGLE LIMIT	$ 1,000,00
	X ANY AUTO				BODILY INJURY (Per person)	$
	ALL OWNED AUTOS				BODILY INJURY (Per accident)	$
	SCHEDULED AUTOS				PROPERTY DAMAGE	$
	HIRED AUTOS					
	NON-OWNED AUTOS					
	GARAGE LIABILITY					
A	EXCESS LIABILITY	01SU08710930	10/20/91	10/20/92	EACH OCCURRENCE	$ 1,000,00
	UMBRELLA FORM				AGGREGATE	$
	OTHER THAN UMBRELLA FORM					
	WORKER'S COMPENSATION AND EMPLOYERS' LIABILITY				STATUTORY LIMITS	
					EACH ACCIDENT	$
					DISEASE-POLICY LIMIT	$
					DISEASE-EACH EMPLOYEE	$
B	OTHER PROFESSIONAL LIABILITY	NTF2015876	11/12/91	11/12/92	$1,000,000 EACH CLAIM AND $2,000,000 IN THE AGGREGATE	

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

PROJECT: RCRA PERMIT APPLICATION/TECHNICAL DOCUMENT. REVIEW FOR DEPARTMENT OF ENERGY WASTE ISOLATION PILOT PLANT.

CERTIFICATE HOLDER

NEW MEXICO ENVIRONMENTAL DEPARTMENT
P O BOX 26110
SANTA FE, NM 87502-6110

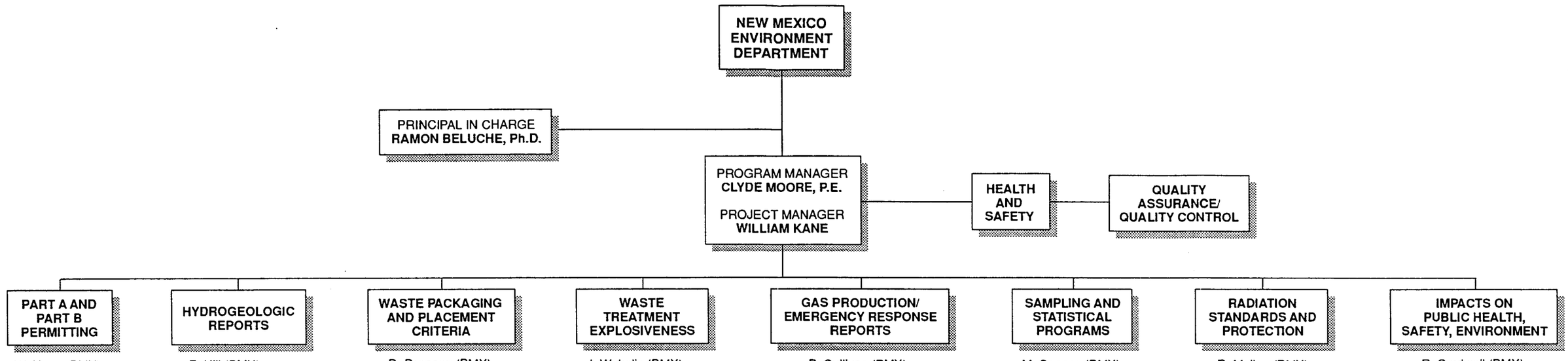
CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

Brooke

Project Team Organization



• Denotes Lead Staff

PMX - Parametrix, Inc.
ARA - Applied Research Associates, Inc.
TRC - TRC Environmental Consultants, Inc.

Representative RCRA Experience

- Washington State Department of Ecology, Consulting Services for Environmental Cleanup at Hanford Facility
- Washington State Department of Natural Resources, On-Call Hazardous Waste Services
- Enviromental Security Corporation, Grant County Waste Facility Part B Application Preparation and Review
- Preston-Thorgrimson, Continuing RCRA, CERCLA/SARA Services

Team Strengths

RCRA Experience - Parametrix is the prime contractor providing technical and regulatory review of RCRA and CERCLA documents at the Hanford Reservation.

Technical Expertise - The Parametrix team consists of highly qualified and experienced professionals in all aspects of RCRA/HSWA, CERCLA/SARA, mixed waste issues and all relevant regulations.

Resources - In addition to the key staff identified in the organization chart the Parametrix team has over 300 technical staff members available to support this project.

Project Management Team - Messrs. Moore and Kane have 23 years and 8 years experience, respectively. Their experience includes a wide range of hazardous waste related projects, including technical review of permit applications under RCRA regulations.

3. EXPERIENCE OF KEY PERSONNEL

Parametrix, Inc. (PMX) and our subconsultants, Applied Research Associates, Inc., and TRC Environmental Consultants, Inc., possess the wide range of experience and capabilities necessary to provide the New Mexico Environment Department (NMED) with all the technical support required for review of documents submitted by the U.S. Department of Energy (DOE) in permitting the Waste Isolation Pilot Plant (WIPP). Parametrix personnel have extensive experience and an understanding of federal hazardous waste regulations, as well as other applicable laws and regulations governing permitting of facilities. ARA, located in Albuquerque, has extensive experience with state and local regulations governing hazardous waste in New Mexico, as well as experience with the WIPP study site. TRC and Parametrix have teamed on many projects, including the Navy's Everett Homeport, the ASARCO RI/FS, and the Newcastle Demolition Landfill.

As shown in our team organizational chart, Parametrix has assembled a committed, technically experienced, and available project team including over 40 qualified professionals. In addition, the team has the combined resources of over 300 staff members to draw upon. Parametrix has carefully selected experienced and qualified key staff to work on the WIPP project. These individuals have a broad range of experience in hazardous, radioactive and mixed waste, remediation design, RCRA and CERCLA, hydrogeology and modeling, chemical engineering, toxicology, and other technical areas.

The following information highlights several of the key team members assigned to the WIPP project. We have included detailed resumes presenting relevant project experience for key members of the team at the end of this section.

The Parametrix management team includes Clyde Moore, P.E., as the overall Program Manager and Bill Kane as the Project Manager. Together, they bring over 30 years of experience to this project.

RCRA Expertise

The Parametrix team has expertise in RCRA activities including the performance, review, and oversight of RCRA Facility Assessments (RFAs), RCRA Facility Investigations (RFIs), Part B permit completion and technical support, corrective action, groundwater monitoring, regulatory compliance with the land ban, and underground storage tank regulations.

Clyde Moore, P.E. (PMX), Program Manager, will provide technical and management oversight for your project. Mr. Moore has over 23 years of experience in solid and hazardous waste management issues. He has provided engineering design recommendations for several RCRA and CERCLA waste-related projects. He has many years of experience dealing with landfill gas-related issues including preparation of gas control plans and final design of gas control systems. He has had extensive interactions with federal, state, and local regulatory agency officials on most of his projects. Currently, Mr. Moore is the Program Manager for the Hanford Environmental Services contract with the Washington State Department of Ecology (Ecology). Services to Ecology include the review of RCRA Part A and Part B Permit applications, CERCLA documents, environmental impact statements, and waste stream characterization reports.

Prior to joining Parametrix, Inc., Mr. Moore spent 11 years with the King County Solid Waste Division where he served as both Supervising Engineer and Solid Waste Supervisor for numerous Washington State solid waste and RCRA-related projects.

Bill Kane (PMX), Project Manager, has over 8 years of extensive professional training and experience with federal and state environmental laws and regulations governing the operation, liability, and cleanup of hazardous and radioactive waste sites, and the treatment, storage, and disposal (TSD) of hazardous, radioactive, and mixed wastes. Prior to joining Parametrix, Mr. Kane was the Advanced Quality Control/ Waste Certification Engineer for Rockwell International at Rocky Flats, Colorado. Mr. Kane's project experience with Rockwell included review of the TSD procedures for wastes; environmental auditing and training; evaluation process techniques and operations; and waste tracking. Currently, Mr. Kane is the Project Manager for the Hanford Environmental Services contract with Ecology. He has been actively involved in the review of the RCRA Part A and Part B Permit applications, as well as the review of design plans and specifications as part of the permit application and for other operable units at the Hanford site.

Kristin Darnell (PMX) is a civil engineer with over 10 years of experience in environmental engineering. Her background includes developing and/or reviewing RCRA Part B permit applications for a radioactive mixed waste treatment and disposal facility, and a non-radioactive hazardous waste landfill at the Hanford, Washington site, and hazardous waste TSD facilities in New York, Ohio, and Washington. She has worked closely with federal and state agencies and has an excellent understanding of regulations governing RCRA projects.

Julie Wukelic (PMX) is an environmental engineer with more than nine years of experience managing and coordinating multidisciplinary waste management programs. Ms. Wukelic has experience and knowledge in RCRA/HSWA, CERCLA, SARA and TSCA as well as federal and state regulations for hazardous, solid and radioactive wastes. She has also been involved in reviewing, writing and commenting on technical reports, DOE/NRC policies and RCRA permit applications. Prior to joining the private consulting business, Ms. Wukelic was Program Manager at Westinghouse Company, Richland, Washington, for several nuclear waste technology programs at Hanford. Her responsibilities included providing technical review and comment to Part A and Part B applications/permits.

Richard Mullen (PMX) is an Environmental Scientist with a Master's degree in Radiological Sciences (Health Physics). He is the Quality Assurance Officer for the Midway Landfill RI/FS. He has reviewed analytical data from all types of matrices and analytical methods and has applied Contract Laboratory Program procedures to the data validation. He has extensive experience with Washington State's interpretation of RCRA as it is promulgated under the State Dangerous Waste Regulations. Mr. Mullen is the Assistant Project Manager for the Hanford Environmental Services contract with the Washington State Department of Ecology. In this role he has technical review responsibilities as well as project management duties for the RCRA/ CERCLA projects. Prior to joining Parametrix, Mr. Mullen worked as a Radiation Monitor for the State of Washington Office of Radiation Protection. One of his tasks involved indoor radon monitoring and risk assessment in Washington state.

Terry Steinborn, Ph.D. (ARA), is a Professional Hydrogeologist with over 20 years experience. Mr. Steinborn's experience includes many RCRA/SARA/CERCLA projects in which he served as Project Manager/Senior Review. For the Westinghouse Hanford Company, he was Project Director for the Radioactive Mixed Waste Alternatives Study. His responsibilities included advising Westinghouse and the U.S. Department of Energy on RCRA/SARA requirements for their operations, and he examined conflicts between hazardous material regulations and those for radioactive waste. He also served as Site Manager for the ARCS project to perform an RI/FS at the Allied Plating site in Oregon. For this project Mr. Steinborn was responsible for the preparation of plans, operations procedures and reports to meet EPA requirements, including RCRA and CERCLA.

Hydrogeology Expertise

The Parametrix team can provide NMED with both expertise and experience in conducting hydrogeological and geological investigations at hazardous and radioactive waste sites. Groundwater characterization and contaminant transport modeling have been conducted for various scenarios, including contamination by heavy metals, organics and radionuclides. Team members' experience includes hydrogeologic investigations, groundwater monitoring system design and implementation, groundwater remediation, contaminant fate and transport studies, field sampling and analysis plans, and subsequent review and interpretation of analytical data. In addition, Parametrix staff have conducted geologic studies in sedimentary, metamorphic, igneous and unconsolidated geologic environments. Parametrix staff have also reviewed geologic sections of mineral recovery permits for the U.S. Forest Service.

Elizabeth Hill, P.G. (PMX), a senior hydrogeologist and geologic engineer with Parametrix, has over 8 years experience at hazardous waste sites. She has extensive RCRA/CERCLA experience and has assisted clients with achieving regulatory compliance. She has directed sampling activities, data analyses, and technical review of RCRA-related work for a chemical manufacturing plant, a lumber mill and wood treatment facility, and served as Lead Hydrogeologist for the Nu Way RI/FS for Oregon's Department of Environmental Quality. In addition, Ms. Hill is the Lead Hydrogeologist responsible for directing hydrogeologic work for a large groundwater modeling project in Oregon.

John Gibbons, Ph.D. (ARA), is a senior geoscientist with specialization in geomechanics and regional tectonics. His current ARA projects include providing technical leadership and quality assurance responsibility for hazardous, radioactive, and mixed waste contaminants. Mr. Gibbons is an experienced senior hydrogeologist and has conducted and provided technical oversight for many hydrogeologic projects, including conducting a preliminary hydrogeologic characterization of the southeastern part of Sandia-Kirtland Military Reservation. Mr. Gibbons has also conducted scenario analysis and modeling of mechanical and hydrologic effects of repository excavation and waste heat and gas generation on formations overlying the WIPP study site.

Air Quality Expertise

TRC Environmental Consultants, Inc. has a comprehensive background related to air quality monitoring and meteorology. Their experience

includes developing comprehensive emission estimates, determining cost-effective and energy-efficient emission controls including BACT and LAER, performing state-of-the-art modeling analyses using agency-approved techniques, and installing and operating ambient air quality and meteorological instruments.

Kirk Winges (TRC) has over 20 years of experience conducting air quality investigations. He has conducted over 50 air quality modeling studies for a wide range of industries, including geothermal developments, pulp mills, coal gasification plants, coal mines, smelters, and coal-fired electric generation plants. Mr. Winges has also prepared PSD permit applications for 15 major industrial developments. In addition, he has been retained as a technical expert on air quality issues by such organizations as the National Coal Association, the American Mining Congress and the American Petroleum Institute. He has provided expert witness testimony before the Under Secretary of the Interior and the Director of the Office of Surface Mining.

Toxicology Expertise

The Toxicology Services group at Parametrix, Inc. is intimately familiar with the dynamic nature of the technical and policy issues important in applying risk assessments in a scientifically sound and credible manner. The risk assessment staff is experienced in toxicology, hazard assessment, exposure assessment, and risk estimation. In addition to understanding the technical basis for risk assessment, the Toxicology group recognizes the importance of risk management and communication in the overall process. For past projects, team members have performed risk assessments for agencies responsible for protecting human health. In addition, sampling plans for endangerment assessments have been designed to provide cost-effective data collection. The team has extensive training and experience in conducting multimedia risk assessments for federal, state, and local agencies; as well as for private corporations (including assessments at RCRA facilities and CERCLA sites).

Rick Cardwell, Ph.D. (PMX), manager of Toxicology Services at Parametrix, has 23 years of experience conducting scientific investigations and managing projects in environmental toxicology, environmental chemistry, and aquatic biology. Dr. Cardwell's latest project involves a multi-year national monitoring program for tributyltin in water, sediments, and tissues of aquatic life.

Jonathan Shields (PMX) is a Public Health Specialist with Parametrix. He provides expertise in human health risk assessment, toxicology,

health and safety planning. He has reviewed emergency response contingency plans required as part of RCRA Part B permit applications. The proposed facility included a hazardous waste incinerator, inorganic liquids treatment facility, on-site waste stabilization, and an on-site hazardous waste landfill. He reviewed potential public health and environmental impacts of proposed design alternatives as part of the Environmental Impact Statement associated with the RCRA Part B permit application.

T. Patrick Allen, P.E.

Bachelor of Science, Civil Engineering
Professional Engineer - Washington

Pat Allen is a Civil Engineer in the Solid Waste Engineering Group of Parametrix, Inc. He has over 8 years of interdisciplinary experience in the planning and design of municipal engineering projects; the planning, operation, and design of solid and hazardous waste programs and facilities; and the operation and management of nuclear power plants. Additionally, Mr. Allen has a background in economic analysis, computers, and radioactive material control.

City of Sumner Comprehensive Sewer Plan

Design Engineer - Performed hydraulic modeling and evaluation existing and future sanitary sewer systems for the City of Sumner.

West Point Sewage Treatment Plant Improvements

Design Engineer - Performed hydraulic modeling of existing and proposed sewer system using SWMM computer model.

U.S. Navy Nuclear Power Program

Served as Division Head for the fluid and mechanical section of a nuclear powered submarine. Responsible for planning, scheduling, and proper performance of major maintenance and repair activities to nuclear systems. Completed intensive training program in power plant engineering and management, radiation monitoring and shielding, water chemistry, thermodynamics, materials, and electrical engineering to qualify as power plant supervisor. Also responsible for radiation monitoring and training for crew of 150.

Washington State Department of Transportation

Served as a Transportation Technician and construction survey crew member for transportation projects in Clallam, Thurston, and Benton Counties.

Mason County Sanitary Landfill Closure Plan

Project Engineer - Responsible for developing plan for closure of the Mason County Landfill including final grading, stormwater management, roadway alignment and landfill gas collection system.

Midway Landfill Closure

Design Engineer - Wrote project specifications and assisted in design development for final closure of this National Priority List site. Performed stormwater modeling and analysis. Evaluated all aspects of alternative final cover systems including hydrologic evaluations through computer modeling (HELP II), erosion control, slope stability, and compatibility with existing conditions and future uses.

Mason County Comprehensive Solid Waste Management Plan Update

Project Engineer - Wrote sections of the Plan on recycling, incineration, long-haul collection, and special wastes.

Aberdeen Sanitary Landfill

Project Engineer - Responsible for all engineering support for the Aberdeen landfill including coordination and review of environmental monitoring, final closure construction inspection, and semi-annual capacity analysis. Evaluated alternative final cover systems through use of landfill performance computer model and evaluated alternative waste stream scenarios for impact on rate structure. Wrote Post-Closure Plan and amendment to Final Closure Plan to conform to new State regulations. Also developed statistical analysis method for evaluating groundwater sampling data.

Snohomish County Regional Landfill

Performed tip fee analysis for new MFS landfill including cost estimates, site development plans, and site life projections.

Olalla Sanitary Landfill

Design Engineer - Assisted in developing plans and specifications for final closure including site roads, stormwater facilities, and grading.

Spokane County Comprehensive Solid Waste Management Plan

Wrote sections of the plan on waste-to-energy and incinerator ash. Helped prepare section of the plan on recycling.

Klickitat County Regional Landfill

Developed comprehensive financial model for proposed regional landfill to assist Rabanco in competitive bidding for disposal contracts. Wrote financial assurance provisions of closure and post-closure plan per MFS requirements.

Olympic View Sanitary Landfill

Project Manager - Responsible for all ongoing consultation for the Olympic View Sanitary Landfill including coordination and review of environmental monitoring, operations support, engineering and construction. Projects include new cell design, special waste disposal evaluation, expansion planning and environmental evaluations. Coordinated development of plans and specifications for leachate treatment facility improvements. Evaluated alternative final cover systems through use of landfill performance computer modeling to determine the preferred final cover system. Developed comprehensive leachate generation model through all phases of landfill development for use in planning leachate management systems.

Fort Lewis Special Incinerator Ash Cell

Project Manager - Responsible for all site design work for this incinerator ash landfill including roads, sanitary sewers and storm drainage. Coordinated development of design

Rick D. Cardwell, Ph.D.

Ph.D., Fisheries (Aquatic Toxicology)
Master of Science, Fisheries (Fish Physiology)
Bachelor of Science, Fisheries Science

Rick Cardwell is the Manager of Toxicology Services at Parametrix, Inc. Dr. Cardwell manages consulting and laboratory testing divisions, conducts human health and ecological risk assessments of chemicals, and manages environmental affairs and permitting issues for industrial and municipal clients. He has 23 years of experience conducting scientific investigations and managing projects in environmental toxicology, environmental chemistry, and aquatic biology.

Site-Specific Water Quality Criteria Development for Lead and Thallium, Missouri

Developing site-specific water quality criteria for lead and thallium for protection of aquatic life (lead) and human health (thallium) downstream of a lead smelter and two lead mines.

Human Health and Ecological Risk Assessments of Acid Mine Drainage, Confidential Mining Clients, Arizona

Assessing risks of metals in groundwater and surface water mine drainage from copper mines in Arizona. Investigating the possible impacts to a 700+ member community, to aquatic life, and to threatened and endangered wildlife species (1991 - Present).

Peer Reviewer to EPA: Development of National Guidance for Ecological Risk Assessment, Washington, D.C.

Served, at the request of EPA, as one of about 30 peer reviewers chosen nationally to review proposed guidelines for conducting ecological risk assessments (June 1991).

Human Health Risk Assessment of Worker Exposure to Recycled Tertiary-Treated Sewage in a Smelter, Sydney Water Board, Australia

Prepared a human health risk assessment that examined risks of potential exposure to ingested pathogenic microbial organisms, metals, and volatile organics in a smelter where the candidate makeup water was recycled sewage.

Human Health and Ecological Risk Assessment of Treatment Alternatives: Tertiary-Treated Sewage, Sydney Water Board, Australia

Providing guidance concerning how to conduct the human health and ecological risk assessments for an Environmental Impact Assessment, which is designed to select the most suitable treatment alternative (1991-Present).

Human Health and Ecological Risk Assessments of Lead Tailings (Waste) in Coeur d'Alene River and Valley, Confidential Mining Clients, Idaho

Conducting human health and ecological risk assessments to determine the risk posed from tailings (from lead mines) in riverine and lake sediments and surface water.

Water Quality and Biological Monitoring Programs at ASARCO's Troy, Montana Copper — Silver Mine (1980 — Present)

Designing, conducting, and managing all water quality and biological monitoring (bioassay, benthic invertebrate) of streams and groundwater below mine, including representing the company at meetings with state agencies and the public.

Ecological and Human Health Risk Assessments of Storm Waters and Combined Sewer Overflows, Municipality of Metropolitan Seattle (1986-1987, 1991)

Modeled the fate and transport of chemicals discharged from these two sources, and determined their probability of adverse effect using a risk assessment approach.

Ecological Risk Assessment: Dielectric Fluid Spill from Submarine Cable, New York Power Authority

Prepared ecological risk assessment for spill of hydrocarbon into Long Island Sound, New York.

Elliott Bay Sediment Remediation Project, Municipality of Metropolitan Seattle (1990 — Present)

Conducting an aquatic ecological and human health risk assessment that is being used to select sites, select indicator chemicals, and quantify risks associated with contaminated marine sediments. The assessment will provide the information needed for policy makers to decide the tradeoffs between risks and costs of remediating contaminated marine sediments.

Computer Simulation of the Effects of Ambient Water Quality on the Fate of Copper, Iron, Mercury, and Zinc in the Cooling Pond of Florida Power and Light's Martin Plant (1989 - 1990)

Copper, iron, mercury, and zinc discharged to a cooling pond were modeled using EPA's environmental fate computer program, MINTEQ. Sorption of the metals onto sediments of the cooling pond were predicted and dissolved metal concentrations compared with chronic water quality criteria to determine if an adverse environmental impact could be expected.

Environmental Studies of the Proposed U.S. Borax Quartz Hill Molybdenum Mine, Ketchikan, Alaska

Headed team of biologists who evaluated potential effects, as part of an environmental impact statement, of the proposed molybenum mine proposed south of Ketchikan. Evaluated impacts of sedimentation and water quality (especially heavy metals) on salmon in local streams and of fish and shellfish in the neighboring fjords.

Environmental Report for the Proposed Grant Lake, Alaska Hydroelectric Project
Headed the environmental assessment for this proposed FERC project. Evaluated potential effects of the proposed project on fish, wildlife, vegetation, water quality, archeology, and land use of the site, situated on the Kenai Peninsula.

Studies of the Effects of Oil, Pulp Mill Effluent, Tannic Acid, Toxic Chemicals and Water Quality on Larval Fish, Invertebrates, and Bivalve Mollusks, Washington.
Principal investigator for more than a dozen studies of the effects of chemicals reaching the marine environment on oyster larvae, clam larvae, herring larvae, and crab larvae. The materials evaluated for toxicity included tannic acid, derived partially from wood, the toxicity of different types of pulp mill effluents, and sediments.

Additional Qualifications

In other previous work experience, Dr. Cardwell directed all aspects of aquatic toxicology laboratory operations, including profit-and-loss, client relations, quality assurance, analytical chemistry, culture and aquatic toxicity testing of freshwater and saltwater algae, fish and invertebrates, and field studies of pesticide effects.

Dr. Cardwell served as Principal Investigator for a variety of research projects that evaluated how marine crustacea, bivalve mollusks, and fish are effected by toxic chemicals associated with petroleum hydrocarbons, detergents, metals, municipal and industrial effluents, and dredged materials. His evaluations relied upon both laboratory and field toxicity tests and analyses of contaminants in water, sediments, and effluents. He also conducted studies of the effects of dredging in Grays Harbor on oyster larvae.

Professional Affiliations

American Society for Testing and Materials (since 1975)
- Chairman of Committee E-47: Biologic Effects and Environmental Fate (1986-1989)
- Chairman of Task Group that developed the national test method: "Standard Practice for Conducting Basic Acute Toxicity Tests with Four Species of Bivalve Mollusks," (1978-1980).
- Symposium Co-chairman and editor: ASTM Sixth Aquatic Toxicology and Hazard Evaluation Symposium, St. Louis, Missouri (1981)
- Symposium Chairman and editor: ASTM Seventh Aquatic Toxicology and Hazard Evaluation Symposium, Milwaukee, Wisconsin (1983)

Society for Environmental Toxicology and Chemistry (since 1985)

American Fisheries Society (since 1967)
- President, North-Pacific International Chapter: 1979-1980
- Symposium Program Chairman: Symposium on Salmon Enhancement, Bellingham, Washington (1979)

- Coordinator for American Fisheries Society review of the Environmental Protection Agency's "Red Book" on national water quality criteria, specifically the section on a water quality criterion for selenium.

American Institute of Fishery Research Biologists (since 1973)
- Secretary-Treasurer, Northwest Washington District:1975-1978
- Fellow: 1987

American Society of Limnology and Oceanography (since 1979)

Pacific Fisheries Biologists (since 1970)

<u>Advisory Positions</u> (1988-1990)

Assignment: Member, Washington State Biomonitoring Science Advisory Board: Concerning Toxicity Testing of Pulp Mill Effluents.
Sponsor: Washington Dept. of Ecology and Northwest Pulp and Paper Mill Association

Assignment: Featured speaker on Risk Assessment, Bioaccumulation Workshop -- Chemicals in Sewage Wastewaters.
Sponsor: U.S. Environmental Protection Agency. 1990

Assignment: EPA Workshop on Approaches to Revising the National Water Quality Guidelines, Guest Speaker on Acute-Chronic Ratios.
Sponsor: U.S. Environmental Protection Agency. 1990

Assignment: Ecological Advisory Subcommittee of Science Advisory Board: Development of Environmental Quality Standards and Standards Setting Procedures.
Sponsor: Washington Department of Ecology. 1990-1991

Assignment: National Peer Reviewer, Marine Complex Effluent Toxicity Testing Program of EPA.
Sponsor: U.S. Environmental Protection Agency, Environmental Research Laboratory, Narragansett, RI. 1989

Assignment: National Peer Reviewer, Toxicology Program of Laboratory's Aquatic Toxicology Program.
Sponsor: Environmental Protection Agency, Environmental Research Laboratory, Gulf Breeze, Florida. 1988

Assignment: Peer Review of Risk Assessment Procedures Used for Setting Water Quality Standards for Metals and Rice Herbicides, Sacramento River.
Sponsor: California Water Resource Control Board, Sacramento. 1989.

Douglas A. Drennen, P.E.

Bachelor of Science, Civil Engineering
Registered Professional Engineer — Oregon and Ohio

Doug Drennen is Section Head and Senior Project Manager for the Parametrix, Inc. Solid Waste Division. He has 17 years of professional engineering experience working with both public agencies and private consulting firms. At Parametrix he has been Project Manager for several landfill development and closure projects, design of transfer and recycling facilities, and preparation of Solid Waste Management Plans. For seven years he was Manager of Engineering and Analysis for the Portland, Oregon Metropolitan Services District (Metro), Department of Solid Waste. Mr. Drennen was responsible for financial planning and capital improvements programming and rate analysis for this operating utility. He managed design and construction of several capital projects.

Mr. Drennen is experienced in all facets of solid waste management, including planning and permitting, policy analysis and project implementation (i.e., engineering through construction). Additionally, he has experience in developing RFPs for full service vendors, revenue bond financing, conducting rate studies, developing public involvement strategies, and negotiating contracts with both energy users and facility operators. At Metro he was responsible for franchise administration and has reviewed proposals from private operators as well as negotiated and prepared the operating agreements.

Jackson County, Oregon

Mr. Drennen is the project manager and consultant to Jackson County in technical and policy issues relating to the development of their solid waste system, including rate analysis and financial planning.

Pierce County Comprehensive Solid Waste Management Plan Update, Pierce County, Washington

Project Manager for the preparation of the Pierce County SWMP Update to conform to the new requirements of RCW 70.95. Required development of the key recycling component and an analysis of the energy recovery alternatives for the county. Also a programmatic Environmental Impact Statement (EIS) was prepared to support the decisions in the SWMP.

Spokane Solid Waste Management Plan and EIS (1990), Spokane, Washington

Project Manager for developing an integrated solid waste management plan and Environmental Impact Statement for Spokane County. The plan included developing a comprehensive recycling component, which required preparing budget level cost information for a curbside collection program, as well as other recycling programs. The Spokane plan addresses all aspects of Solid Waste Management, including WTE and establishing further disposal options for ash residue and bypass waste.

King County Solid Waste Management Alternatives Environmental Impact Statement, King County, Washington

Senior Project Engineer and Task Leader for developing the waste reduction/recycling alternatives for this programmatic EIS, and for evaluating the impacts on the waste stream. Also responsible for completing the Ash Residue Impact Assessment.

Portland Metropolitan Service District (Metro) Solid Waste Plan Update, Portland, Oregon

Senior Manager for the 1985 update of Metro's Solid Waste Management Plan. Evaluated energy/resource recovery alternatives, including composting. The update included integrating a major Waste Reduction and Recycling Plan for the district.

Summit County Comprehensive Solid Waste Management Plan, Summit County, Ohio

Project Manager and Senior Engineer for developing a major update of the Solid Waste Plan for the County and the City of Akron, Ohio. This plan was required by OEPA to meet the mandates of RCRA.

Hansville Sanitary Landfill Conversion Plan, Kitsap County, Washington

As Project Manager, Mr. Drennen managed the preparation of engineering design plans for conversion of an open burning dump to an approved sanitary landfill. Mr. Drennen was responsible for bringing the facility into compliance with the Washington State Minimum Functional Standards for Solid Waste Disposal. A closure plan for the active landfill area was prepared. He also managed the preparation of plans and specifications for closure facilities.

St. Johns Landfill, Portland, Oregon

Engineering Manager for the Metropolitan Service District, Operator of the 2000 TPD facility, Portland, Oregon. (1980-1987)

Midway Landfill Superfund Site Closure Plan, EIS and RI/FS, Seattle, Washington

Mr. Drennen was responsible for the design of the Midway Landfill gas permanent motor/blower and flare system. He was involved in the preparation of engineering design reports, plans and specifications, and construction cost estimates for work necessary to expedite mitigation of the immediate threat related to landfill gas that had migrated offsite. Also he was Project Manager for preparing final plans and specifications for the final closure improvements including a final cover system, using a flexible membrane liner.

Olympic View Sanitary Landfill Development/Closure Plan, Kitsap County, Washington

As Project Manager, Mr. Drennen has been responsible for managing key programs including an impervious cover cap and gas management system for completed landfill segments, and a 10-year expansion area featuring bottom liner, leachate collection, and an 8-million gallon leachate treatment system.

St. Johns Landfill Closure, Metropolitan Service District, Portland, Oregon
Project Manager for the development of plans and specifications for closing the 220-acre landfill. Plans included an FML liner with a gas collection and a permanent motor blower and flare system. This project incorporated a 5-year construction strategy to enhance the final closure by preloading areas that experience extreme settlement for this $30 million project.

Hansville Landfill, KCSL Inc., Kitsap County, Washington
Project Manager for development of the expansion plan, cover, and closure facilities for the landfill to meet WAC 173-304 Minimum Function Standards requirements in Kitsap County, Washington.

Olalla Landfill, Department of Public Works, Kitsap County, Washington
Project Manager for the development of plans and specifications for the landfill closure to meet MFS requirements, Kitsap County, Washington. The landfill was covered using a bentonite amended soil to minimize infiltration.

Kootenai County Recycling and Transfer Center, Kootenai County, Idaho
Mr. Drennen worked with County officials and operation staff to develop an overall design concept. This plan included expansion capabilities into a materials recovery facility and yard waste composting. Upon completing this process he managed the preparation of plans and specifications for the facility which began operations in 1991.

Silverdale Transfer Station Expansion, KCSL, Inc., Washington
Mr. Drennen developed a concept plan for expanding an existing direct dump transfer facility into a tip floor concept that would allow the facility to act as a intermediate processing center for yard waste and other source separated materials.

West Transfer and Recycling Station, Metro, Portland, Oregon
Senior Manager for siting and design of a 600 TPD transfer station in Washington County, Oregon. Included developing a concept for a process to handle yard wastes and other source separated materials. Metropolitan Service District (1984-1986)

Clackamas Transfer and Recycling Station, Oregon
Engineering Manager for the Metropolitan Service District for the design and construction of the 800 TPD facility, Portland, Oregon. (1982)

Metropolitan Service District Transfer Station Plan.
Project Manager, Portland, Oregon. (1982) He prepared the overall transfer plan for the 3 county Metro area.

Kristin J. Darnell

Bachelor of Science, Civil Engineering

Kristin Darnell is an Environmental Engineer at Parametrix with approximately ten years of experience. Her background includes RCRA permitting, RCRA- and CERCLA-based remedial investigations and feasibility studies at governmental and industrial facilities and abandoned hazardous waste sites, environmental sampling, compliance audits, emergency remedial actions, land transfer liability studies. She has also participated in closure designs for radioactive mixed-waste, hazardous, and sanitary waste TSD facilities, and general civil engineering design. Ms. Darnell has worked closely with both federal and state governmental agencies, and industrial clients. In addition, she has proven project management abilities and excellent communication skills.

Ms. Darnell's experience includes:

Part B Permit Applications

Developed and/or reviewed RCRA Part B permit applications for:

- RMW treatment and disposal facility, U.S. DOE Hanford Site
- Non-radioactive hazardous waste landfill, U.S. DOE Hanford Site
- Solvent recycling facility, Washington
- Petrochemical complexes in Texas and Louisiana
- Hazardous waste TSD facilities in New York, Ohio and Washington

Prepared and reviewed engineering reports, closure and post-closure plans, process information, waste analysis plans, inspection schedules, facility descriptions, training plans and security plans. In addition, she has worked on contingency plans, financial assurance packages, topographic maps, preparedness and prevention plans, waste minimization plans, and water management plans. Responded to NODs issued by permit application review agency (WSDOE).

RCRA Closure Plans

Formulated closure plans for a RMW surface impoundment and a non-radioactive dangerous waste storage facility at the U.S. Department of Energy Hanford site, for a plywood and hardboard prefinishing plant in Vancouver, Washington, and for an aluminum manufacturing facility landfill containing mercury and hexavalent chromium-contaminated waste in Texas. Assessed a post-closure permit application for a land disposal unit at the Hanford site.

CERCLA Remedial Investigations

Administered a $500,000 remedial investigation at a hazardous waste site in South Carolina under CERCLA. Responsibilities included regulatory compliance, cost and schedule preparation and tracking, client contact, subcontractor procurement, quality assurance, and report and presentation preparation. In addition, successfully managed

field investigation studies at three abandoned hazardous waste sites in Kentucky and South Carolina under CERCLA. Mobilized field equipment, created field sampling guidance documents, performed community relations, sampled environmental media, and assured conformance to rigorous EPA requirements.

Department of Ecology Hazard Ranking System (WARM)

Scored various hazardous waste sites located throughout Washington State using the Washington Ranking Method (akin to the Mitre Model) to provide basis for Ecology's program planning and priority assessment.

Lloyd Center Properties Land Transfer Liability Studies

Completed environmental assessments of properties in Oregon to determine potential liabilities associated with the properties through past improper waste disposal practices. Assessments included an historical background search using maps, aerial photographs, atlases, directories, a review of regulatory agency files including Oregon Department of Environmental Quality and Washington Department of Ecology, and site reconnaissance to identify any visual indications of activities presenting a risk of site contamination.

Globe SPCC Plan

Developed a spill control and countermeasures plan for a hydrocarbon spill recovery system located along a waterway in the Tacoma tideflats.

Buffelen Woodworking Company Remediation Project

Performed environmental assessment and managed subsequent phased remedial investigation of PCP contamination at a lumber/door manufacturing facility in Tacoma, Washington.

Portland Gas and Electric Feasibility Study

Performed feasibility studies at PCB-contaminated sites in Oregon. Identified and evaluated alternatives to remediate site conditions which included source control and management of migration resources. Evaluations were based on risk assessments, site conditions, contaminants, available technologies, effectiveness, costs, and compliance with ARARs.

John F. Gibbons, II, Ph.D.

Ph.D., Geomechanics, Regional Tectonics
Master of Science, Structural Geology
Bachelor of Arts, Structural Geology

Dr. Gibbons is the Senior Geoscientist at Applied Research Associates, Inc. (ARA). His present project work at ARA includes technical leadership and quality assurance responsibility for the development of a multi-technology site characterization system for hazardous, nuclear, and mixed waste contaminants in soils and alluvium sites. The project was funded under a contract to the USDOE RDDT&E program for over $5 million. Dr. Gibbons was sole author of the technical proposal, wrote the quality assurance plan for conformance with NQA1, and for RCRA and CERCLA Applications to DOE sites. Principal investigator and leader of geoscience tasks.

Dr. Gibbons is a principal consultant to the Illinois Department of Nuclear Safety in its effort to license an above-grade, low-level nuclear waste facility for the Central States Compact. He works directly for the director of IDNS and has reviewed project work and documents prepared by Batelle, Chem-Nuclear Systems, Shannon and Wilson and Hanson Engineers. He has assisted counsel in preparation of testimony and cross-examination. Site approval hearings before an Illinois siting commission have been in progress since June 1991 and are expected to conclude in February 1992. Design and licensing hearings will follow site approval.

Tectonic scenarios for the High Level Nuclear Waste Repository at Yucca Mountain, Nevada. Report to the NRC linking tectonic history and contemporary tectonic processes, including earthquakes, to the hydrologic setting of a repository in tuffaceous rocks in the Basin and Range. Principal focus on fracture hydrology. Technical support to Sandia National Laboratory as an ARA employee.

Senior Hydrogeologist in technical support of Sandia National Laboratory technical review and study of hydrostratigraphy models proposed for the Yucca Mountain High Level Nuclear Waste Repository for the USNRC. Reviewed existing models and prepared a report and presentation on the role of tectonic fracture, cooling and paleoweathering surfaces, and the influence of lithologic variation in tuffs on the hydrology of the repository host rock. Technical support contract to SNL as an ARA employee. (1988-1989).

Senior Hydrogeologist in support to SNL in-house hazardous waste assessment group. Performed preliminary hydrogeologic characterization of the hydrogeology of the southeastern part of Sandia-Kirtland Military Reservation. Region is a geologically complex area containing several generations of filled paleochannels whose position and history are influenced by the Tijeras and Hubble Springs Faults. Perched water flow and unsaturated flow in shallow aluminum combined in an area where the saturated groundwater level is influenced by structural geologic features in the bedrock. Technical support contract to SNL an ARA employee. (1988-1989).

Demonstration of probabilistic methods in performance assessment for the Yucca Mountain High Level Waste Repository. Demonstration of techniques for combining results of expert opinion, physical modeling, and statistical observation of earthquakes in the repository region to provide an integrated statement of probability of earthquake recurrence. Report to NRC, in preparation. (1988-1989).

Dr. Gibbons served as a session chairman in the Natural Systems Symposium of the International High Level Nuclear Waste Conference at Las Vegas, Nevada in 1990, and will serve as a session chairman in 1991. He has been appointed to the program committee in 1992 and will serve as Director of the entire Natural Systems Symposium in 1992. He is a member of the American Nuclear Society (sponsor of the meetings) and of the American Geophysical Union.

Management of Projects and Programs

Dames & Moore Earth Science Consultants. Firm-wide geology and seismology discipline leader. Responsible for capabilities profile, recruitment, internal professional development programs, and arbitration of technical disagreements for 370 geoscientists. Served on Technical Research and Development Committee which guided planning and growth for advanced technical areas within the firm. Principal investigator for geoscience aspects of site characterizations for investigator for geoscience aspects of site characterizations for PSAR reports on seven successfully licensed nuclear power plants.

Tectos Incorporated, Albuquerque, New Mexico. President and technical principal of a geotechnical consulting group specializing in the surface and subsurface hydrogeology of uranium tailings disposal sites. These included characterization of the hydrogeology of a four-quadrangle area surrounding the Church Rock, New Mexico Mine and Mill Site (Phillips Uranium Corp.), and the Marquez, New Mexico Mine and Mill Sites (Bokum Resources Co.).

Experience in Conducting Exploration and Development Studies for the Purpose of Defining the Characteristics of Geotechnical and Environmental Areas

Site characterization experience includes: direction of all geoscience aspects of nuclear power plant sites, dam sites, and radionuclide and hazardous waste disposal sites. Aspects of these sites directly addressed included hydrogeology, geomorphology, and pleistocene geology applied to erosional land surface stability and to fault chronology, structural geology related to faulting and to fracture hydrology of rocks in the subsurface, exploration seismology and microseismic monitoring, regional tectonics, geodesy and seismicity of interrelated fault systems, site database design and analysis, and the development of three-dimensional rock body models for hydrogeologic interpretation.

Assisted J.J. Prucha in a major N.S.F.-funded study of the structural geology and geomechanical aspects of Cayuga Rock salt mine, Meyers, New York, while a graduate student at Syracuse University.

Characterized the hydrogeology of the Rustler formation evaporate rocks which overlie the WIPP repository. Participated in scenario development and model parameter selection for thermomechanical and hydrologic modeling to the response of Rustler rocks to proposed high level waste experiments and contributed to proposed in-situ rock permeability experiments. Employed by Civil Systems/SAI, Albuquerque, New Mexico in consultation to Sandia National Laboratories.

Use of State-of-the-Art Geologic and Engineering Analyses Techniques

Dr. Gibbons' interest and involvement in three-dimensional computer modeling of rock body properties extends back to 1964 when he wrote one of the first practical programs for stereographic plotting and statistical analysis of fracture patterns. The graduate-level regional tectonic analysis course he taught at Rutgers University (1969-1972) included computer applications to three-dimensional problems in rock body fabric analysis. In 1977-1978 he worked with Dr. Billy Joe Thorne and Dr. Robert Wayland (Sandia Corp.) in developing scenarios and rock body input parameters for a three-dimensional thermomechanical model of rocks overlying the WIPP repository for high-level waste experiments. Dr. Gibbons developed a fractured-rock body model for hydrogeologic interpretation of seepage at the Church Rock, New Mexico tailings disposal site as a consultant to SAI and United Nuclear Corporation in 1981. In 1982 he published a well-received paper addressing the hydrogeologic properties of fractured rocks entitled "Progress in Modeling Natural Fracture Systems in Sedimentary Rocks" in New Mexico Geological Society's Special Publication #10 (Wells and Calendar, eds.).

Participation During Regulatory Hearing and Public Briefings

Throughout Dr. Gibbons' environmental permitting experience, he has often been required to go before federal, state, or local regulatory bodies to present either oral or written testimony. He has been involved in the licensing of ten nuclear power plants which required several hundred hours of testimony in front of AEC, ERDA, NAC, and State commissions. In the process of groundwater studies and permitting phases for two uranium mine tailings and mining facilities, Dr. Gibbons presented testimony to state and NRC regulatory agency hearings, and while completing three California dam seismic safety evaluations, he prepared submittals for California DSOD review.

Managing Subcontractors

Throughout Dr. Gibbons' career, he has directed the technical aspects of work performance by subcontractors in the areas of drilling, geophysical surveys, and laboratory analysis. His first assignment with Dames & Moore in 1972 included the field supervision of over 90 miles of seismic and gravity profiling by United Geophysical Inc. in the region around the Douglas Point, Maryland Nuclear Power Site. Field analysis of data and day-to-day field operations and scheduling were entirely his responsibility. He simultaneously performed photogeologic and field reconnaissance studies which provided the geologic framework for the seismic work. He supervised deep drilling studies of the Brandywine Fault Zone (1973)

by Warren and George, Inc., which utilized six drill rigs during peak activity and laboratory petrologic analysis of recovered samples. He also developed a testing plan and supervised extensive field testing of an exploration seismic array noise-suppression processing routine with Scott Science and Technology, Inc. of Lancaster, California. Testing was performed by the Colorado School of Mines Seismology Laboratory.

CHRONOLOGICAL EXPERIENCE

After completing course work toward his Ph.D. degree and field research for his dissertation, Dr. Gibbons taught at Lafayette College and Rutgers University. He successfully defended his dissertation, "Tectonics of the Eastern Ozarks" in February, 1971. Dr. Gibbons taught courses in structural geology, geomorphology, geomechanics, engineering geology, regional tectonics, and other topics at the undergraduate and graduate levels. Courses taught in geomorphology engineering, geology and geomechanics, had strong hydrogeology components.

In the summer of 1972 he joined Dames & Moore at its Cranford, New Jersey office. He participated in site studies at the Douglas Point, Indian Point, Ginna, North Anna, Calloway, Shearon Harris, and Virgil Summer nuclear power plants. He led field parties, prepared PSAR sections, prepared written testimony, and delivered hundreds of hours of expert testimony before State and Federal regulatory bodies. In 1974 he became firm-wide discipline leader for geology and seismology, and joined Dames & Moore's San Francisco office where he participated in studies of active faulting at several dam and public facility sites in California.

In 1976, he joined Civil Systems Incorporated of Albuquerque, New Mexico, a subsidiary of Science Applications Incorporated, as senior geoscientist. He wrote an Ultra Quiet Siting Manual for inertial guidance study facilities for the USAF. He participated in safety evaluations of three dam sites for the East Bay Municipal Utility District in Northern California. Hydrogeology studies for uranium mill tailings repositories, a regional plate tectonic characterization of the Rocky Mountains front ranges for Phillips Uranium Corporation, and hydrogeology studies for the WIPP, were projects in which he had principal technical responsibility.

In 1980, he formed a private consulting group (Tectos, Inc.), where he served as president and technical principal. Projects included the extensive hydrogeologic characterization of the Church Rock, New Mexico region, and licensing-related studies for several uranium mills.

In 1985, Dr. Gibbons rejoined Dames & Moore as a senior member of the major projects division. His responsibilities were to act as the principal geoscience interface between Dames & Moore and Federal Environmental and Waste Programs by writing proposals and leading the technical groups involved with those programs. He wrote the hydrogeology and quality assurance sections for proposals to act as the DOE Salt Site Contractor at Deaf Smith County Texas and the site contractor section of the proposal for the DOE SEDM

contract for the three candidate sites proposal. The quality assurance section was rated excellent by the DOE reviewers and the hydrogeology section for the Deaf Smith Site was rated outstanding. Rating for the SEDM section is unknown but the proposal was successful.

Dr. Gibbons joined Applied Research Associates in November, 1988. His project experience includes:

Piedmont Dam Study, East Bay Municipal Utility District, Oakland, California
Seismicity surface rupture, underflow studies, and risk evaluation for small covered reservoir near the Hayward fault. Consultant to C.S.I, San Leandro, California, and East Bay Municipal Utility District.

Nose Rock Uranium Mill Tailings Study (1981)
Study of surface hydrology and shallow subsurface hydrogeology near a large uranium tailings disposal area — consultant to Phillips Uranium Corporation.

Church Rock Seepage Study, United Nuclear Corporation, Grants, New Mexico (1981-1982)
Regional structural geology and rock fracture model for geohydrologic study of movement of radionuclides through a fractured sandstone aquifer. Consultant to Science Application, Inc. (SAI) and UNC.

Comanche Dam Study, East Bay Municipal Utility District, Oakland, California (1979-1980)
Seismicity seepage and fault rupture risk re-evaluation of California Foothills earth fill dam. Consultants to Civil Systems, Inc., Wahler Associates, and East Bay Municipal Utility District.

Bokum Resources Uranium Mill Site Studies (1980-1982)
Surface and subsurface hydrology erosion stability and bedrock faulting studies in support of design of first subgrade uranium mill tailings disposal site licensed by the State of New Mexico and NRC. Bokum Resources Corp., Santa Fe, New Mexico, consultant to Bokum and SAIC.

Waste Isolation Pilot Plant Study, Sandia Laboratories, Albuquerque, New Mexico (1979-1980)
Scenario analysis and modeling of mechanical and hydrologic effects of repository excavation and waste heat and gas generation on formations overlying the repository. Consultant to Sandia Laboratories. Employed by Civil Systems, Inc.

Plate Tectonics Model of the Rocky Mountain Front Ranges, Phillips Uranium Corporation, Albuquerque, New Mexico (1979-1980)
Synthesis of plate tectonic theory for the region applied to a remote sensing study at several scales for selected areas. Programmed an ongoing literature survey and made

recommendations for application to exploration. Resulted in the discovery of a previously unknown ore province. Employed by Civil Systems, Inc.

Low Earth Noise Siting Manual, U.S. Air Force, Holloman Air Force Base, Alamogordo, New Mexico (1979)

Senior author of 278-page manual on siting of inertial guidance study facility. This facility seeks sites at which mechanically damped test beds can achieve maximum accelerations of 10^{-9}g. Employed by Science Applications, Inc.

Geothermal Studies and Subsurface Waste Disposal Report, Dames & Moore (1975)

Authored an internal report on technical state-of-the-art and probable directions of development. Included literature search, extensive consultants. Employed by Dames & Moore.

Stanislaus Nuclear Project, Pacific Gas & Electric Company, San Francisco, California (1977)

Principal investigator in charge of a study of a major lineament zone near the site in the Sierra foothills. Employed by Woodward-Clyde Consultants.

Mid-Hudson Valley Project, Consolidated Edison Company, New York, New York (1977)

Principal investigator in charge of all aspects of investigation for nuclear power plant PSAR and state licensing requirements. Employed by Woodward-Clyde Consultants.

Santa Rosa Memorial Hospital Siting Study, S.R.M.H., Santa Rosa, California (1975-1976)

Principal investigator for site and site region study near a major active fault zone. Study included site and regional geology, selection of design parameters, and theoretical modeling of surface rupture potential and mechanisms. Employed by Dames & Moore Earth Science Consultants.

Zagros Mountains Study, Government of Iran (1976)

Principal review of a regional siting study for nuclear power plants in the Zagros Mountains region of Iran. Included review of geologic, geophysical, and seismic studies over a two-year period. Employed by Dames & Moore.

Ramapo Fault Study, Consolidated Edison Company, New York, New York (1976)

Principal investigator in charge of study of major fault zone near the Indian Point Nuclear Generating Station. Study of the newly-discovered fault zone included microseismal monitoring, field mapping, geophysical studies, remote sensing studies, and geochronology. Employed by Dames & Moore.

Calloway Nuclear Power Site, Union Electric Company, St. Louis, Missouri (1975)

Consultant to Union Electric and Dames & Moore on regional faulting and seismotectonic aspects of Southeastern Ozarks and the adjoining Mississippi Valley. Co-authored PSAR section. Testified before A.E.C. staff, U.S.G.S. reviewers, and Missouri Geologic Survey. Self-employed.

Municipal Emergency Facilities Siting Study, City of Pacifica, California (1975)
Principal investigator for surface rupture, seismic risk, and landslide potential studies of six sites in the San Andreas fault zone. Employed by Dames & Moore and Pacific Rim Association.

Warm Springs Dam Supplementary Study, U.S. Army Corps of Engineers, San Francisco, California (1975)
Study of surface rupture potential, foundation conditions, liquidation potential for licensing of Northern California flood control dam. Co-principal investigator with earthquake engineer and structural engineer. Employed by Dames & Moore.

The Kahe Project, Hawaiian Electric Company, Honolulu, Hawaii (1974)
Principal investigator for preliminary study of a potential nuclear generating site on the island of Oahu. Study included regional and site tectonic and volcanologic studies. Authored report and scope of PSAR study. Employed by Dames & Moore.

Supplementary investigation of the North Anna Nuclear Facility Site, Virginia Electric and Power Company, Richmond, Virginia (1973-1974)
Principal investigator in charge of all aspects of investigation of faulting found during reactor containment excavation. Authored report, assisted counsel in preparation of all exhibits, and testified before a hearing board. Employed by Dames & Moore.

St. Lawrence Valley Regional Fault Study (1973)
A research project funded by the State of New York and A.E.C. Principal investigator in charge of study design, literature search, field studies including mapping and regional reconnaissance> Co-authored report on Phase I studies. Employed by Dames & Moore Regional tectonics seminar (1973). An internal 12-week workshop in theory and techniques of regional geologic study and study design. Sole lecturer and author.

Brandywine Fault Study, Potomac Electric Power Company, and the Washington Gas Light Company, Washington, D.C. (1972)
Project geologist in charge of field, remote sensing, and geophysical study of a fault system near the Douglas Point Nuclear Power site. Co-authored report. Employed by Dames & Moore.

Elizabeth L. Hill, P.G.

Master of Engineering, Hydrogeology
Bachelor of Science, Geological Engineering
Registered Professional Geologist - Idaho, Oregon

Elizabeth Hill is the Lead Hydrogeologist at Parametrix. She has extensive experience in soil, groundwater and surface water sampling, flow system analysis, and remediation. She has conducted remedial investigations, feasibility studies, cleanups and site assessments, and is familiar with regulatory compliance issues. In addition to hazardous waste work, Ms. Hill has considerable experience with environmental issues and treatment technologies associated with the mining industry. She has conducted modeling research of fracture networks and groundwater flow.

Multnomah Model

Lead Hydrogeologist — Responsible for directing hydrogeologic work for this large groundwater modeling project. Project tasks include existing and new data collection and review, data base development, 3-D Modflow groundwater modeling, 3-D MT3D solute transport modeling, and geographic information system (GIS) applications. One of the primary project objectives is to evaluate alternatives to restore groundwater use. Possible alternatives include various pump and treat systems and hydraulic barriers.

Oregon Department of Environmental Quality On-Call Services: Nu Way Oil RI/FS, Portland, Oregon

Senior Hydrogeologist — Developing and implementing a detailed work plan for groundwater, surface water, soil and sediment contamination evaluation and cleanup. Responsible for reviewing technical scope of work and providing senior oversight during implementation.

Midway Landfill RI/FS, Seattle, Washington

Lead Project Hydrogeologist — Responsible for overseeing and providing technical direction to a team of hydrogeologists who are conducting pilot pump extraction tests for aqueous and non-aqueous fluids. Also responsible for related monitoring which includes fluid levels and non-aqueous phase fluid thicknesses. This project is characterized by complex saturated and unsaturated flow through heterogeneous anisotropic media. There are at least three major contaminated fluid phases at this site including aqueous groundwater, non-aqueous floaters, and gases. The team developed unique instruments and methods to obtain this critical information in a setting where traditional methods did not work. The team is currently investigating critical details of the flow system that will significantly influence the groundwater remediation technology selection. Currently overseeing performance monitoring for the cover to determine if shallow groundwater cutoffs are necessary.

Hydrogeologic Investigation, Renton, Washington

Lead Hydrogeologist — Managed the groundwater investigation on and around the PACCAR site in Renton, Washington. She collected and/or supervised the collection of all field data. The field activities included installing monitoring wells and soil borings, conducting slug tests, collecting water level data, and collecting groundwater and surface water samples. Data analysis included constructing cross-sections, calculating hydraulic conductivity, determining flow directions, flow rates, and travel times, locating a groundwater divide, evaluating the connection between surface water and groundwater characterizing the groundwater chemistry and analyzing pump test data. This work was coordinated with the City of Renton's aquifer protection plan. Groundwater remediation includes source control and pump and treat.

Confined Sediment Standards, Washington Department of Ecology

Hydrogeologist — Conduct a technical evaluation of confined disposal options for contaminated sediments. As the Design Team Leader for upland disposal facilities, she evaluated designs to see if they prevented contaminants from entering groundwater. This work included quantitative evaluation of existing facilities and computer modeling. Various containment remediation alternatives were evaluated.

Olympic View Landfill Hydrogeologic Assessment/Leachate Treatment, Kitsap County, Washington

Lead Hydrogeologist — Calculated travel times from various parts of the landfill to monitoring locations. The unique aspect of this project is the leachate collection, extraction, and treatment system that discharges treated leachate on the site surface. The surface water, vadose zone, and groundwater systems are routinely monitored to assess the impacts of the landfill and the discharged treated leachate. The flow dynamics, water chemistry, and treatment design at this site are complex. Environmental monitoring is used to assess the performance of the treatment system.

Cascade Center Redevelopment Project, King County, Washington

Project Manager — Assisted with the complex design feasibility study to evaluate redevelopment opportunities at a gravel mine adjacent to a Superfund site. Directed an interdisciplinary team of experts to develop and evaluate the hydrogeologic, engineering, and EIS related issues at the site that will control redevelopment opportunities. Key technical issues include: perched subsurface flow, slope stability, water quality and treatment, mine reclamation, fisheries protection, traffic control, recycling technologies, permitting, surface water controls, and grading plan development. Part of the design Feasibility Study focused on innovative concepts for collecting and treating potentially contaminated groundwater seeps to improve slope stability and water quality.

Tacoma City Waterway, City of Tacoma, Washington

Lead Hydrogeologist — Directed Phase I site investigations for key properties around Tacoma City Waterway. One of these properties is undergoing extensive environmental investigation under RCRA. Ms. Hill worked with the design engineers to evaluate the impact that groundwater and soil contamination around the waterway may have on plans to build a stormwater treatment system in the waterway. This work required a detailed

review of many hazardous waste regulations, a strong background in flow system analysis, knowledge of remediation technologies and associated costs, and experience with design feasibility studies.

Kootenai County Landfill, Idaho

Lead Hydrogeologist — The project work includes well placement, design, installation, water level monitoring, and hydraulic conductivity testing. Some of the key technical issues on the project include: location of a major fracture zone, bulk fracture flow, igneous and metamorphic relationships, flow along geologic contacts, and identification of boundary conditions. Ms. Hill participated in the collection of field data, provided technical input on the critical interpretation issues, and made recommendations to the design engineer regarding the hydrogeologic and structural suitability of the site for the proposed landfill design.

Underground Storage Tank, Washington

Project Manager and Hydrogeologist — Responsible for the removal of an underground tank. She characterized the surrounding soil and groundwater conditions and arranged for disposal of contaminated soils.

LOTT Wastewater Hydrogeologic Investigation, Olympia, Washington

Project Hydrogeologist — Developed and implemented the technical approach within the approved budget and schedule. As part of this work, soil and groundwater samples were collected, wells were installed, and slug tests were conducted. Ms. Hill evaluated the hydraulic properties and soil and groundwater chemistry at the site and made recommendations to the design engineers regarding: outfall alignment, soil removal, health and safety concerns, dewatering requirements, plume migration, and soil and groundwater disposal costs. Unique aspects of this project included: construction on and adjacent to a Superfund site, a shallow groundwater system with tidal influence, and complex urban stratigraphy. Ms. Hill worked closely with wastewater engineers and understands the complex technical issues associated with water treatment facilities and hazardous waste.

Consulting Hydrogeologist, Pennsylvania

Hydrogeologist — Ms. Hill conducted fourteen hydrogeologic investigations in Pennsylvania. These projects typically included collecting existing information, reviewing well logs, collecting field data, defining aquifers and aquitards, constructing cross-sections, developing structure contour and isopac maps, determining flow directions, evaluating water use, calculating recharge, examining local and regional groundwater quality and quantity, and evaluating the connection between surface and subsurface flow. Ms. Hill addressed regional groundwater quality issues and worked as part of a technical team to develop ways to improve regional groundwater quality and limit overall aquifer reduction. Acid mine drainage remediations included barrier, chemical, and biological techniques.

Thair A. Jorgenson, P.E.

Bachelor of Science, Civil Engineering
Registered Professional Engineer — Washington

Thair Jorgenson has 12 years of diversified engineering and management experience in Solid Waste Management and Public Works projects. He has been personally involved in all aspects of solid waste management including: waste collection and disposal; landfill operations; landfill liner systems; landfill gas control and utilization systems; resource recovery facilities; waste-to-energy technology; tipping/transfer facilities; recycling, composting and hazardous waste management programs; Federal and State Superfund laws; and solid waste regulations. He brings to Parametrix his engineering experience in the design of storm and sanitary sewers, residential and arterial streets, traffic engineering and building and land use code enforcement.

Prior to joining Parametrix, Mr. Jorgenson was Assistant Supervisor of Sanitation for the City of Tacoma, where he was involved with both collection and disposal operations. He was involved with designing recycling programs, policy analysis and establishment of rates.

Tacoma Landfill Closure

Project Manager — Responsible for overseeing the design, bidding, construction management/inspection/ quality control for the Stage 1 closure/capping projects at the landfill. The Stage 1 projects represents over $10 million in construction contracts. Construction management, inspection, and quality control is provided by City personnel.

Tacoma Landfill Superfund Projects

Project Manager — Responsible for all Superfund related activities at the Tacoma Landfill. Primary liaison with the oversight agencies. Direct oversight and administration of all engineering consultant contracts, grant programs and construction contracts involved in the Superfund projects.

Remedial Design/Remedial Action

Oversight of the preparation of a multitude of required reports and documents. Landfill closure design, groundwater pump and treatment system design, ongoing monitoring programs. Management of $2.0 million in consulting contracts.

Solid Waste Management

As Assistant Superintendent of the Refuse Utility, Mr. Jorgenson was involved with operations of collection and disposal systems. This included oversight of financial and rate-making, implementation of curbside recycling, other recycling programs, solid waste management planning, and managed design of capital improvements and construction management.

Resource Recovery Facilities

Project Manager — Responsible for overseeing the design contract and construction/ construction management contracts for a $4 million upgrade to Tacoma's Resource Recovery Facility. Project involved extensive research, site visits to other facilities in the U.S., and special design consideration for material handling and processing equipment that was required to be retrofitted into the existing facility. The plant is designed to mechanically recover materials and produce on RDF for City Light. Direct involvement in conceptual layout and design. Provided oversight and technical support for the start-up of the new facility.

Roosevelt Ash Landfill Design

Project Manager — Responsible for the design of the Roosevelt Ash Landfill in Klickitat County.

Hansville Landfill

Project Manager — Responsible for the remediation of groundwater contamination at the landfill, coordination with regulatory agencies, and overseeing the design of remedial actions to the site.

Tacoma Landfill Expansion

Project Manager/Engineer — Responsible for the design and construction of a 30-acre expansion to the landfill using state-of-the-art bottom liner technology. This $5 million expansion was completed under two contracts.

Landfill Gas Control Systems

Project Engineer — Responsible for oversight of the design, construction, and operation of the Tacoma Landfill's $4 million landfill gas collection and control system. Project Engineer for gas utilization study. Provided technical oversight in the gas system operation and maintenance.

Waste-to-Energy Facilities

Project Engineer — Responsible for Design/Build Proposal process for selecting a waste-to-energy facility to be built at the Tacoma Landfill. Conducted research and feasibility study into various waste-to-energy technologies, wrote a two-stage request for proposal, participated in design/build proposal evaluations, short-listing, and ultimate selection of a design/ build team and incineration technology.

William F. Kane

Master of Business Administration Candidate, Management Information Systems
Bachelor of Science, Chemical Engineering

Bill Kane has extensive professional training and experience in federal and state environmental laws and regulations governing the operation, liability, and cleanup of hazardous and radioactive waste sites, and the treatment, storage, and disposal of hazardous, radioactive, and mixed wastes.

Prior to joining Parametrix, Mr. Kane was the Advanced Quality Control/Waste Certification Engineer for Rockwell International at Rocky Flats, Colorado.

Mr. Kane is also experienced with the Non-Weapons Quality Assurance Program (NQA-1) as it applies to the traceability and credibility of Department of Energy waste management practices. Mr. Kane held a Department of Energy "Q" Clearance from 1985 to 1988. He has prepared budgets for estimating, scoping, and control of several site investigation and remediation projects ranging from $1,000 to $3 million. Mr. Kane's experience with RCRA and SARA has led to a comprehensive working knowledge of these statutes and their requirements. In addition, he has developed a broad understanding of Washington and Oregon State hazardous waste requirements.

Washington State Department of Ecology, Hanford Nuclear Reservation Cleanup

Project Manager — Responsible for the assignment, coordination and direction of staff and subconsulting firms for the technical and administrative review and comment on CERCLA RI/FS and RCRA RI/CMS documents, hazardous waste landfill design specifications, an environmental impact statement, and a background soil sampling plan related to the operation, cleanup, and closure of the Hanford site. Also responsible for budget development and negotiations with Ecology, and discussion of review findings with Ecology, EPA, and the Department of Energy.

Rockwell International, Rocky Flats Plant, Golden, Colorado

Lead Engineer — Responsible for overseeing the treatment, storage and disposal of hazardous, radioactive, and mixed wastes based on regulations administered by the Departments of Energy and Transportation, the EPA, and the Colorado State Department of Health. He was responsible for implementing waste process analysis and sampling plans, process immobilization of sludge wastes, waste minimization, waste volume reduction through compaction, and destructive and non-destructive testing of packaged waste forms. Mr. Kane also initiated and implemented Rockwell's Hazardous Waste Management audit program and an annual training program to certify inspectors responsible for verifying regulatory compliance of hazardous, radioactive, and mixed wastes. Also initiated and implemented a plant-wide quality education and training program for the minimization, handling, and disposal of radioactive wastes.

Rockwell International, Rocky Flats Plant, Golden, Colorado

Lead Engineer — Initiated and developed a computer program to track the analyses and regulatory compliance of all waste containers at Rockwell. With this information he was able to improve compliance to reduce rework.

Midway Landfill Remedial Investigation/Feasibility Study, Seattle, Washington

Project Manager — Responsible for coordination of staff and subconsultant firms and preparation of a feasibility study to identify and evaluate various remedial action technologies and alternatives for the cleanup of contaminated leachate and groundwater attributable to the CERCLA NPL site. Developed and coordinated the conceptual design and costing of the remedial alternatives. Responsible for budget Developments, negotiation, tracking, and contract development and negotiation. Responsible for coordinating staff and subconsultant firms in the development of the endangerment assessment, and assuring the performance and documentation of monthly and quarterly groundwater and liquid level monitoring. Prepared an Expedited Response Action plan to remove PCB contaminated oil from the landfill aquifer, determined the regulatory classification of the oil and aqueous leachate removed during implementation of the ERA, and established storage, transportation, and disposal procedures and requirements for the oil and aqueous leachate in accordance with RCRA, TSCA, CERCLA and DOT regulations. Presented documented site information to community action groups, and is actively involved in the public hearing process as part of the MTCA CAP (CERCLA ROD).

SAIC/Department of Ecology Site Hazard Assessments, Olympia, Washington

Project Manager — Responsible for coordinating staff, laboratories, drillers, and surveyors to collect, analyze, and evaluate samples and data as part of the hazard site ranking under the Washington Ranking Method (WARM). Data collected consisted of three environmental routes (surface water, groundwater, and air) and four modules (waste characteristics, systems, receptor targets, and potential for release to the environment). Responsible for budget and contract development, negotiation, and tracking.

Seattle Metro West Point Wastewater Treatment, Seattle, Washington

Project Engineer — Responsible for documenting the necessary steps for the development of a site-specific hazardous material/waste management plan that would comply with applicable federal, state, and local environmental laws and regulations.

Midway Landfill Treatability Study, Seattle, Washington

Task Manager — Responsible for coordination of staff and subconsulting firms and conducting a treatability study to evaluate remedial technologies, including oil/water separation, froth flotation, flocculation/sedimentation, aeration, and activated carbon, for the effective and cost-efficient removal of aqueous leachate contaminants including PCBs, metals, and volatile and semi-volatile compounds. Developed process alternatives from appropriate remedial technologies and coordinated the conceptual design and costing of the alternatives. Responsible for budget development, negotiation and tracking, and contract development and negotiation.

Treatment, Storage, and Disposal of Hazardous, Radioactive, and Mixed Wastes

Lead Engineer — Responsible for overseeing the treatment, storage, and disposal of hazardous, radioactive, and mixed wastes based on regulations administered by the Departments of Energy and Transportation, the EPA, and the Colorado State Department of Health. He was responsible for implementing waste process analysis and sampling plans, process immobilization of sludge wastes, waste minimization, waste volume reduction through compaction, and destructive and non-destructive testing of packaged waste forms.

Lone Star Northwest Remedial Action, Oregon City, Oregon

Project Manager — Responsible for coordinating staff and providing technical and regulatory assistance during the closure and remediation of soil contamination at an industrial facility in Oregon. Responsible for evaluating the existing remedial action plan, and assessing the remediation performed and closure plans prepared to federal, state, and local environmental laws and regulations. Determined appropriate sampling analyses and disposal requirements for the excavated material. Recommended soil excavation and storage protocol to minimize the spread of potential contamination.

Northwest Enviroservices Closure Plan Assessment, Seattle, Washington

Project Engineer — Responsible for evaluating and assessing the technical quality of a TSD facility closure plan to federal and state closure and post-closure regulations for hazardous waste sites. Evaluated and compared soil and groundwater analytical data from the facility to remediation already performed to determine if contamination attributable to the site had been adequately delineated and removed.

Bogle & Gates Environmental Audits, Seattle, Washington

Project Manager — Responsible for developing, coordinating staff, and conducting an environmental audit of twelve industrial processing facilities in Washington and Oregon. The audits involved the review of files and operating records, and conducting site inspections to assess the facility's compliance in daily operations to federal, state, and local hazardous waste regulations, water and air pollution control permits, surface water discharge requirements, and health and safety rules and regulations. Recommendations were made to bring facilities into environmental compliance and prevent future non-compliance.

Rabanco SPCC Plan, Seattle, Washington

Project Manager — Responsible for the review and development of a spill prevention control and countermeasure plan for a 20,000 gallon above ground diesel tank. The plan developed was consistent with he requirements of the Federal Water Pollution Control Act and local fire department.

Victoria B. Martinez

Master of Science, Geology — Hydrogeology
Bachelor of Science, Geology

Vicki Martinez is a Hydrochemist/Hydrogeologist for Parametrix. Her experience includes performing laboratory and field procedures used in the determination of standard drinking water parameters (as outlined in the RCRA Technical Enforcement Guidance Document), contaminant fate and transport, and the chemistry of natural waters, and physical flow characteristics.

In prior employment at Washington State University, she specialized in designing and implementing a groundwater sampling program. This program determined hydrochemical characteristics of the natural water system and the effect of wastes at the site on the water chemistry.

Ms. Martinez' computer modeling experience includes the use of finite element, finite difference and random walk groundwater flow models as well as WATEQ and PHREEQE geochemical models. This experience includes modeling the chemical evolution of hydraulically connected multi-aquifer system. She has collected monitoring well samples and analyzed them for most standard drinking water and Hazardous Substance List parameters. Ms. Martinez has coordinated sample collection and distribution to commercial laboratories for analysis, including identifying proper container types and methods of preservation. She has also participated in groundwater monitoring well installation and water level measurement programs.

Nu Way Oil Remedial Investigation/Feasibility Study, Portland, Oregon
Ms. Martinez is Assistant Project Manager and Project Hydrochemist. She assisted in development of the Quality Assurance Project Plan. Media being sampled includes groundwater, surface water, sediment, soil, sludge, and air. Ms. Martinez also researched site history, evaluated the regional flow system and local geology, and designed the groundwater soil and sludge sampling programs.

Nu Way Oil Remedial Investigation/Feasibility Study, Portland, Oregon
As part of the contract for the Oregon Department of Environmental Quality (DEQ), she researched site history and evaluated the regional flow system and local geology. Designed soil and groundwater sampling plans to meet requirements for both contaminant detection and determination of local hydrogeologic flow characteristics, including interconnectedness of multiple hydrogeologic units and interconnectedness of surface water and groundwater. Contaminants of concern include petroleum products, heavy metals (particularly lead), volatile organic compounds, semivolatile organic compounds, and PCBs. Major ion chemistry was also investigated.

Northwest Cooperage, Seattle, Washington

Project Hydrogeologist — Conducted a Site Hazard Assessment (SHA) for use in the state Hazard Ranking System, as part of a contract with the State Department of Ecology. Work included historical data review, and soil and sediment sampling. Contaminants of concern included volatile organic compounds, polynuclear aromatic hydrocarbons, organochlorine pesticides and PCBs, cyanide, and heavy metals. Ms. Martinez wrote the scope of work, carried out field work, and wrote the SHA Summary Report.

Old Lawson Road, Black Diamond, Washington

Project Hydrogeologist — Conducted a Site Hazard Assessment (SHA) for use in the state Hazard Ranking system as part of a contract with the Department of Ecology. Work included installation of wells, soil and groundwater sampling, determination of groundwater flow direction, surface water, and sediment and drum sampling. Contaminants of concern included petroleum products, metals, and volatile organic compounds. Ms. Martinez wrote the scope of work, carried out field work, and wrote the SHA Summary Report.

East Multnomah County Groundwater Model, Oregon

Project Hydrochemist — assisted in flow system evaluation and database development for a regional groundwater flow model. Ms. Martinez is determining transport characteristics of the contaminants of concern for use in chemical and flow modeling being carried out, in part, to determine remedial alternatives for the study area. Also evaluated regional contamination and developed Quality Assurance criteria for acceptance of historical data. Developed Quality Assurance Project Plan.

4-TEK, Maple Valley, Washington

Project Hydrogeologist — Conducted a groundwater and soil investigation at a former industrial site near an EPA Superfund site. The primary contaminants of concern are volatile organic compounds. Work includes well installation, and soil and groundwater sampling. This work is being monitored by the U.S. EPA.

St. John's Landfill, Portland, Oregon

Project Hydrochemist — Evaluated sampling procedures and communicated with lab and client for sampling at a landfill. Data are to be used as part of a risk assessment.

Washington State University, Pullman, Washington

Assistant Project Manager — Ms. Martinez participated in and managed hydrogeologic characterization of a proposed coal ash disposal site. She collected and/or supervised collection of all field data. Field activities included installing monitoring wells, conducting slug tests, collecting water level data, and collecting groundwater samples. Data analysis included constructing cross-sections, calculating hydraulic conductivity, determining flow directions and flow rates, constructing groundwater and bedrock contour maps, characterization of groundwater and surface water quality, surface water identification and description, calculation of a water budget for the site, and conceptual design of groundwater and surface water monitoring systems for the site.

Henrico County Landfill, Virginia

Project Geologist — Responsible for designing and carrying out a sampling program for a pilot study testing the effectiveness of an experimental remedial alternative for landfill leachate. This alternative included an experimental "filter" for treatment of heavy metal contamination.

Midway Hydrogeologic Characterization

Project Hydrochemist — Reviewed and refined field procedures for water sampling. Evaluate quarterly monitoring reports, which are monitoring the effectiveness of remedial actions being carried out at the facility.

Olympic View Landfill, Kitsap County, Washington

Project Hydrochemist — Involved with coordination with lab for analysis and proper level of QA/QC, in-house QA of laboratory data, contaminant and "clean water" chemistry. Contaminants of concern include heavy metals, volatile organic and semivolatile organic compounds, pesticides, herbicides, and minimum functional standards (MFS) parameters.

Newcastle Landfill, King County, Washington

Project Hydrochemist — Involved with groundwater monitoring. Responsibilities include collection of water samples, coordination with lab for analysis and QA/QC, in-house QA of laboratory data, contaminant and clean water chemistry. Contaminants of concern include heavy metals, volatile organic and semivolatile organic compounds, pesticides and herbicides.

Aberdeen Landfill, Grays Harbor County, Washington

Project Hydrochemist — Involved with groundwater monitoring. Responsibilities include collection of water samples, coordination with lab for analysis and QA/QC, in-house QA of laboratory data, contaminant and clean water chemistry. Contaminants of concern include heavy metals, volatile organic and semivolatile organic compounds, pesticides and herbicides.

Hansville Landfill, Kitsap County, Washington

Project Hydrochemist — Involved with groundwater monitoring. Responsibilities include collection of water samples, coordination with lab for analysis and QA/QC, in-house QA of laboratory data, contaminant and clean water chemistry. Contaminants of concern include heavy metals, volatile organic and semivolatile organic compounds, pesticides and herbicides.

Mason County Landfill, Washington

Project Hydrochemist — Involved with groundwater monitoring. Responsibilities include collection of water samples, coordination with lab for analysis and QA/QC, in-house QA of laboratory data, contaminant and clean water chemistry. Contaminants of concern include heavy metals, volatile organic and semivolatile organic compounds, pesticides and herbicides.

Indian Summer, Olympia, Washington

Project Manager — Designed and carried out a groundwater monitoring program for a golf course being constructed near a geologically sensitive area. The monitoring program was designed to meet county health department requirements. Work included well installation, groundwater monitoring, and analysis of results. Possible contaminants of concern include nitrogen compounds, sulfate, metals, organochlorine pesticides, and chlorophenoxy herbicides. An important aspect of this investigation is distinguishing whether groundwater effects are due to the golf course, or are of a more regional nature.

LOTT Sampling and Analysis Plan, Olympia, Washington

Project Hydrochemist — Designed soil and groundwater sampling and analysis plans for environmental evaluation of a construction site. Designed special analysis scheme with lab to screen for contaminants of concern in a cost-effective manner. This project also involved evaluation of the groundwater flow system. Wrote scope of work and budget for the project. Contaminants of concern included phenols, volatile organic compounds, metals, and petroleum hydrocarbons.

Corson Avenue, Department of Natural Resources, Seattle, Washington

Supervised monitoring well and test boring installation and collected soil samples for a hydrogeologic assessment to be used to choose and design a remedial alternative for the site. Contaminants of concern include petroleum products and associated volatile organic compounds and heavy metals.

Department of Ecology, Hanford, Washington

Performed a technical review of site investigations. Areas of review include field technique, contaminant characterization, chemical transport modeling.

Olympic View Landfill

As Project Hydrochemist, developed Quality Assurance Project Plan (QAPP) for the Sampling and Analysis Plan. Media being sampled includes groundwater, surface water, gas, and soil. Ms. Martinez is also involved with lab coordination for analysis and proper level of QA/QC, and in-house QA/QC of laboratory and field data. Laboratory protocols include EPA SW 846 and Standard Methods.

Oregon Hazard Ranking Model Field Testing

Performed data review and file search for data pertinent to contaminant toxicity and mobility in air, groundwater and surface water routes. Scored sites and assisted in quality assurance/quality control of site scoring for a field test of the hazard ranking model developed for Oregon Department of Environmental Quality.

Clyde N. Moore, P.E.

Bachelor of Science, Civil Engineering
Registered Professional Engineer — Washington

Clyde Moore is a Project Manager with Parametrix, Inc. with 23 years of professional experience in planning. He is particularly skilled in hazardous and solid waste management issues involving remedial investigations, feasibility studies, remedial actions, underground storage tanks, landfill siting, capacity evaluations, design, operations and closure plans, construction administration, gas control systems, leachate collection systems, and sewer and leachate pump stations. He participated in extensive interaction with federal, state and local regulatory agency officials on most of his projects. Mr. Moore has previously had a top secret security clearance.

Midway Landfill Gas Migration Control (CERCLA Site)

Section Manager — Responsible for the evaluation of alternative treatment technologies related to a landfill gas control system of gas monitoring probes, on-site migration and odor control wells in refuse and in soil, and off-site gas extraction wells, and for recommendations for additional facilities. He also managed the expedited response actions to control landfill gas migration at the landfill, which included design, construction management, and operation of migration control and odor control wells.

NuWay Oil Remedial Investigation/Feasibility Study

Project Manager — Responsible for the investigation of the site contamination pathways, receptors, etc. and evaluation of remedial alternatives.

Cathcart Landfill Odor Control/Energy Recovery Feasibility Study and Gas Control System Design

Section Manager — Responsible for feasibility of energy recovery, gas control, and evaluation of odor and air quality. Responsibilities included preparation of gas control plan, final design of the gas control system and construction administration assistance for the Gas Control System.

Kent Highlands Landfill Gas/Odor Control (CERCLA Site)

Project Manager — Responsible for landfill gas control study, and also responsible for an expedited response system of gas migration control wells, motor blower, flare, and gas monitoring probes. Innovative technology for this project includes conversion of an existing passive gas venting system to an active system.

Midway Landfill Remedial Investigation/Feasibility Study (CERCLA Site)

Project Manager — Responsible for evaluation of the geologic and utility migration pathways, gas characteristics, effectiveness of control methods, and other off-site sources of gas for this Superfund site.

Midway Landfill Remedial Investigation

Project Manager — Responsible for evaluation of the geologic and utility migration pathways, gas characteristics, effectiveness of control methods, and other off-site sources of gas for this Superfund site. He also managed the expedited response actions to control landfill gas migration at the landfill, which included design, construction management, and operation of migration control and odor control wells.

Gull Industries Exxon Station/AGI Vapor Recovery

Project Manager — Responsible for the design and implementation of a soil vapor recovery system for a 1,000 gallon leak at a service station in Issaquah. The system included a medium-depth well with a horizontal vacuum dispersion blanket, peripheral monitoring probes, and atmospheric discharge under a Puget Sound Air Pollution Control Agency permit. A test run was performed with a variable-speed diesel motor-blower. A long-term motor blower was selected and installed. The system was initially monitored daily, and then less frequently as conditions stabilized over a six-month period. The system remained in operation for several more months with occasional monitoring.

Boren Avenue Underground Storage Tank Investigation/Removal Project

Manager — Responsible for project coordination, budget development and negotiation, preparation of construction documents and reports, permitting, client and agency contact and project scheduling.

Washington State Department of Natural Resources Facilities

Manager — Responsible for preparation of construction documents and construction management for the removal/closure of 27 underground storage tanks at three Washington State Department of Natural Resources Facilities.

Additional Qualifications

Prior to joining Parametrix, Inc., Mr. Moore spent 11 years with the King County Solid Waste Division where he served as both Supervising Engineer and Solid Waste Supervisor for numerous Washington State Solid Waste and RCRA regulated projects. As the Solid Waste Supervisor, he directed all operations of the 3,000 ton per day Cedar Hills Regional Landfill including scheduling, budgeting, assignment and supervision of approximately 30 employees involved in refuse handling, cover excavation, sanitary sewer operation/maintenance and improvements, methane and leachate control facilities, water supply system, and site security. Additional responsibilities with King County included management of planning, evaluation of site capacity alternatives, design, construction, startup and monitoring of operation and maintenance on site contamination remediation and other Division projects, participation in consultant selection and contract negotiations, public involvement, and the preparation of interrogatories and depositions, as well as presentation of testimony as an expert witness at hearings and trials.

Richard M. Mullen

Master of Science, Environmental Radiological Sciences/Health
Bachelor of Science, Chemistry

Richard Mullen is an Environmental Scientist with Parametrix, Inc. He has experience with the analytical techniques (including SW-846) used in the qualitative and quantitative measurement of organic and inorganic compounds in soil, water, and air matrices. He has performed many analytical data QA/QC reviews following both CLP and non-CLP procedures. Mr. Mullen served as a laboratory technician at the University of Washington, specializing in gas chromatography and environmental radiation. He served as a Radiation Monitor for the Washington State Office of Radiation Protection. He has comprehensive knowledge of radiation/health physics through graduate work in Radiological Sciences at the University of Washington. Mr. Mullen is the Assistant Project Manager for the Hanford Environmental Services contract with the Department of Ecology.

Overall Hanford Contract Management

Responsible for Ecology's technical support during the month Unit Managers' meeting at the Department of Energy's offices on the Hanford Nuclear Reservation in Richland, Washington.

Hanford Liquid Effluent Study

Provided technical support and was the assistant project manager for the review of reports generated from the Hanford Liquid Effluent Study. These reports provide a detailed characterization (physical, chemical, and radiological) of all the liquid effluents that have recently been discharged to the soil column. Responsibilities included review of the *Waste Stream Characterization Report* and thirty-three *Stream-Specific Reports* for technical quality and completeness. Review categories included sampling and analysis, process information and evaluation, historical data, and quality assurance/quality control (QA/QC). Developed a spreadsheet and matrix to rank the wastestreams and receiving sites (liquid waste disposal areas) in the order of quantity of hazardous and radioactive material.

Hanford 100-NR-1 and 100-NR-3 Operable Unit RFI/CMS Work Plans

Provided technical support and was the assistant project manager for the review of the above-referenced Department of Energy documents. These work plans are for the cleanup of the 100-NR-1 and 100-NR-3 areas. These areas are RCRA operable units that include the N-Reactor and the Hanford Generating Plant. Project management responsibilities included scope and budget development, review team coordination (including subconsultants), document production coordination, and final product quality assurance. The review included technical adequacy and regulatory compliance.

Hanford 100-BC-1 and 100-BC-5 Operable Unit RI/FS Work Plans

Provided technical support and was the assistant project manager for the review of the above-referenced Department of Energy documents. These work plans are for the clean-up of the 100-BC-1 and 100-BC-5 areas. These areas are CERCLA operable units that include the B-Reactor. Project management responsibilities included development of the scope and budget, coordination of the subconsultant, communications with Ecology, coordination of document production, and quality assurance of the final product.

Hanford Low-level Burial Grounds Dangerous Waste Permit Application Design Documents

Provided technical support and was the assistant project manager for the review of the above-referenced Department of Energy documents. Specifically, Mr. Mullen evaluated the Liner/Leachate Compatibility Test Plan for the following:

- Consistency with EPA's Method 9090 test procedures
- Appropriateness of the simulated leachate, and
- Appropriateness of the radiation exposure portion of the test.

Project management responsibilities included scope and budget development, review team coordination (including subconsultant), document production coordination, and final product quality assurance. The design documents were for the construction of a new, lined trench (landfill) at Hanford for the disposal of containerized mixed waste.

Hanford Site-wide Background Soil Sampling Plan

Provided assistant project management to the review of the Site-wide Background Soil Sampling Plan for the Hanford site. The plan was developed in order to generate background chemical data to support RCRA clean-up activities at Hanford.

Tacoma North End Sewage Treatment Plant

Literature research regarding chlorine dioxide treatment of wastewater.

Pennwalt Corporation

Developed a closure plan for two treatment lagoons. The lagoons were used to physically and chemically treat brine used in the electrochemical production of chlorine and sodium hydroxide.

Aberdeen Landfill

Set up a screening program and acceptance criteria for disposal of contaminated soil at this landfill. Regulations consulted include:

- Maximum Contaminant Levels (40 CFR 141)
- Land Disposal Restrictions (40 CFR 268)
- Dangerous Waste Regulations (WAC 173-303)
- Model Toxics Control Act (WAC 173-340)

Terrace Heights Landfill Surface Impoundment

Set up acceptance criteria for liquids based on the following regulations:

- Identifying Hazardous Waste (40 CFR 261)
- Land Disposal Restrictions (40 CFR 268)

- Dangerous Waste Regulations (WAC 173-303)

Provided Yakima County Public Works Department, Solid Waste Engineering, with regulatory support.

Olympic View Sanitary Landfill, Kitsap County, Washington

Set up a screening program and acceptance criteria for disposal of contaminated soil at this landfill. Regulations consulted include:

- Maximum Contaminant Levels (40 CFR 141)
- Land Disposal Restrictions (40 CFR 268)
- Dangerous Waste Regulations (WAC 173-303)
- Model Toxics Control Act (WAC 173-340)

Responsible for evaluating and characterizing "problem" wastes using Washington State Department of Ecology's Dangerous Waste Regulations, Chapter 173-303 WAC. Wastes are accepted or rejected according to his recommendations.

St. Johns Landfill

Developed the sampling, analysis, and surveying program for low-level radioactive sludge disposal at this Oregon landfill.

Oregon Hazard Ranking System

Researched hazardous waste sites at the Oregon State Department of Environmental Quality (DEQ) offices through file review and interviews for later scoring. Scored sites using HRS model.

Washington Hazard Ranking System Model

Assisted in field testing the model and then using the model to rank sites for the Washington State Department of Ecology. Sites were ranked according to their overall hazard to the public and the environment.

Midway Landfill and ASARCO

Responsible for providing laboratory data quality assurance reviews of samples generated during RI/FS activities. He has reviewed data from the following matrices: leachate, NAPL, groundwater, gas, and flare scale. The analytical parameters included: volatile organics, semi-volatile organics, metals, PCBs, general chemistry, and dioxins (flare scale).

Cathcart Landfill

Performed laboratory data QA/QC on gas samples from the landfill. Analytical parameters included fixed gases and methane and volatile organics.

Washington State Environmental Radiation Monitoring Program

Responsible for quality control of data and preparation of the data tables for the Annual Report.

Midway Landfill RI/FS, Seattle, Washington

Calculated the quantity of PCBs moving into the landfill gas stream and reaching the flares. Developed a gas sampling and analysis plan for the gas migration control system permanent motor blower/flares. He was involved in the leachate treatability study and conducted bench scale testing including oil/water separation, froth flotation, flocculation, and aeration. Mr. Mullen was also involved in writing the Feasibility Study.

ASARCO Tacoma Plant RI/FS, Tacoma, Washington

Provided analysis of the laboratory data concerning the metals contamination of the surface soil.

Washington State Radon Program

Evaluated risks associated with indoor radon exposure and consulted with affected homeowners.

Additional Qualifications

In addition to these projects, Mr. Mullen has conducted field sampling at numerous project sites.

Mr. Mullen also has done research, including **U.W. Evaluation of Petroleum Effects on** Salmon. He was responsible for data management including sample preparation, GC analysis, quality control and presentation of the data.

Mr. Mullen is a member of the American Chemical Society (ACS) and the Sigma Xi Scientific Research Society. He is published in the international journal Health Physics.

Jonathan I. Shields

Master of Public Health, Environmental Sciences
Bachelor of Arts, Biological Sciences

Jon Shields is a Public Health Specialist with Parametrix, Inc. providing expertise in human health risk assessment, toxicology, health and safety planning, and other public health issues. His solid and hazardous waste experience includes preparation of: risk assessments and hazard evaluations; health and safety plans; sampling and analysis plans; solid, hazardous, and infectious waste management plans; and numerous technical reports and fact sheets.

Mr. Shields has served as Parametrix' Corporate Health and Safety Officer, and has assisted public and private sector clients with development of health and safety programs. His educational background includes toxicology, industrial hygiene, epidemiology, biology, ecology and environmental sciences, inorganic and organic chemistry, biochemistry, statistics, and environmental law.

Grant County Waste Management Facility Design and Permitting

Public Health Specialist — Responsible for reviewing emergency response contingency plans required as part of the RCRA Part B permit application. Proposed facility included a hazardous waste incinerator, inorganic liquids treatment facility, on-site waste stabilization, and an on-site hazardous waste landfill. Reviewed potential public health and environmental impacts of proposed design alternatives as part of Environmental Impact Statement associated with the RCRA Part B permit application.

Washington Department of Ecology/Technical Review and Comments on Hanford 100-BC-1 and 100-BC-5 Operable Units RI/FS Work Plan

Risk Assessment Specialist — Responsible for technical review and comments on U.S. Department of Energy RI/FS work plan sections discussing public health risks associated with historical spills and other unplanned releases of chemical and radioactive contaminants at the Hanford nuclear facility's 100-BC-1 and 100-BC-5 Operable Units.

Oregon Department of Environmental Quality - Oregon Hazard Ranking System

Assistant Project Manager — Responsible for reviewing and evaluating existing hazard ranking models for prioritizing cleanup of hazardous waste sites. Recommendations will be used by Oregon DEQ to develop, field test, and implement a hazard ranking system for the State of Oregon. Toxicologist responsible for development and implementation of supplemental toxicology database to be used for site scoring.

Washington Department of Ecology - Washington Hazard Ranking System

Senior Toxicologist/Task Manager — Responsible for development and field testing of toxicology-related components of Hazard Ranking System for prioritizing risks from hazardous waste sites in Washington state.

Review of Photographic and Video Imaging Technologies Applicable to Environmental Assessment of Marine Benthic Infaunal Communities

Environmental Scientist — Responsible for reviewing underwater photographic, video, and other imaging systems for potential application to surveys of environmental impacts to marine benthic infauna (bottom-dwelling organisms).

ASARCO, Inc./ASARCO-Tacoma Copper Smelter Facility RI/FS

Risk Assessment Specialist — Responsible for technical review of RI/FS documents to assist client in negotiating remedial action objectives (RAOs) for Superfund cleanup of former copper smelter facility in Tacoma/Ruston area, Washington. RAOs evaluation focused on risk-based water quality objectives, including reduction of risks to human health from ingestion of fish from Commencement Bay.

Seattle Engineering Department - Midway Landfill Feasibility Study (FS)

Assistant Project Manager/Risk Assessment Specialist/Corporate Health and Safety Officer — Responsible for technical oversight of all public health aspects of FS. Responsibilities included technical review of Endangerment Assessments for air/gas and groundwater/leachate pathways; drafting of Public Health sections of FS; and drafting and update of health and safety plan for field activities at a municipal landfill Superfund site in Kent, Washington.

Seattle Engineering Department - Midway Landfill Remedial Investigation (RI)

Technical Task Manager/Project Environmental Health Scientist/Corporate Health and Safety Officer — Responsible for design and implementation of sampling and analysis programs for RI at a municipal landfill Superfund site in Kent, Washington. Sampling and analysis programs included evaluation of contaminants in subsurface landfill gas and gas flare emissions, and studies of potential air quality impacts. Evaluated human health and environmental implications of RI sampling results. Corporate Health and Safety Officer responsible for development and oversight of health and safety plans for all RI sampling activities.

Kent Highlands Landfill Closure Plan, Remedial Action Plan (RAP), and Remedial Investigation/Feasibility Study (RI/FS) Project Plan

Technical Task Manager — Responsible for design of proposed sampling and analysis program for landfill gas and ambient air quality at a National Priorities List municipal landfill in Kent, Washington.

Midway Landfill Gas Monitoring and Off-site Control

Project Environmental Health Scientist — Responsible for evaluating subsurface landfill gas sampling results. Technical tasks focused on identification of volatile organic

compounds, toxic inorganic gases, and potential odor-causing components present in subsurface gases associated with a municipal landfill Superfund site in Kent, Washington.

Port Townsend Paper Corporation - Operations Manual and Spill Prevention Control and Countermeasures Plan

Risk Assessment/Risk Management Specialist/Corporate Health and Safety Officer — Responsible for review and update of client's existing emergency response plans for paper mill and dock facilities in Port Townsend, Washington. Developed new sections addressing revised State of Washington regulations for contingency planning for emergencies involving hazardous chemicals.

Oregon Department of Environmental Quality/Nu Way Oil Co. Remedial Investigation and Feasibility Study (RI/FS) and Site Security Report

Corporate Health and Safety Officer/Technical Task Manager — Responsible for recommending interim site security measures, developing health and safety plans for RI/FS activities, and participating in development of sampling and analysis strategies related to a former waste oil recycling site in Portland, Oregon. Site contaminants include waste petroleum products, solvent sludges, PCBs, volatile and semi-volatile organic compounds, and metals.

Washington Department of Ecology/Initial Evaluation Reviews for Hanford 100-NR-1 and 100-NR-3 Operable Units

Risk Assessment Specialist — Responsible for technical review and comments on U.S. Department of Energy RI/FS work plan sections discussing public health risks associated with historical spills and other unplanned releases of chemical and radioactive contaminants at the Hanford nuclear facility's 100-NR-1 and 100-NR-3 Operable Units. Comments focused on work plan conclusions regarding "imminent and substantial endangerment to public health and the environment" in relation to the known and suspected releases of contaminants.

Port Townsend Paper Corporation/Operations Manual and Spill Prevention Control and Countermeasures Plan

Risk Assessment/Risk Management Specialist/Corporate Health and Safety Officer — Responsible for review and update of client's existing emergency response plans for paper mill and dock facilities in Port Townsend, Washington. Developed new sections addressing revised State of Washington regulations for contingency planning for emergencies involving hazardous chemicals.

ASARCO, Inc./Assessment of Present and Future Risks to Human Health and the Environment from Acid Mine Drainage in the Upper Blackfoot River, Montana

Risk Assessment Specialist — Responsible for estimating potential human health risks from consumption of recreationally-caught trout near abandoned mine workings adjacent to the Upper Blackfoot River, Montana.

ASARCO-Glover Missouri Lead Co./Derivation of Site-Specific Water Quality Criteria for the ASARCO-Missouri Lead Company Facility

Risk Assessment Specialist — Responsible for deriving site-specific water quality criteria for thallium. Risk-based criteria were developed for fish consumption exposures based on measured thallium residues in fish collected near a lead smelter wastewater outfall.

Sydney Water Board/Risk Assessment for Wollongong, NSW Re-use of Secondary-Treated Sewage Effluent

Risk Assessment Specialist — Responsible for evaluating potential health risks to steel mill workers from proposed reuse of secondary-treated sewage effluent as industrial process water in the production of granulated slag. Potential risks evaluated were those associated with exposures to metals, volatile organic compounds, and pathogenic microorganisms (viruses, protozoa, bacteria, helminths) in the secondary-treated effluent.

Additional Qualifications

Mr. Shields' regulatory analysis experience includes: Federal and state health and safety regulations, including OSHA 29 CFR Part 1910.120 and State of Washington Chapters 296-62, 296-24, and 296-155 WAC; Federal, state, and local regulations for solid, hazardous, and infectious waste management; waste designation under RCRA; Remedial Investigations, Feasibility Studies, Endangerment Assessments, and health and safety planning under CERCLA and SARA; programs required under Community and Worker Right-to-Know regulations; effluent discharge limitations under Clean Water Act NPDES and SPDES permit regulations; and PCBs regulations under TSCA.

Mr. Shields' certifications toward Federal OSHA 29 CFR Part 1910.120(e) and State of Washington WAC 296-62-3040 health and safety requirements for Hazardous Waste Operations and Emergency Response include 40-hour health and safety training (U.S. Environmental Protection Agency Course 165.5, Hazardous Materials Incident Response Operations) plus 8-hour annual refresher training, and 8-hour training in supervising Health and Safety at Hazardous Waste Sites. Mr. Shields' continuing professional course work has included 24-hour training in Managing Your Infectious and Hazardous Wastes and a one-day seminar on SARA Title III and OSHA Right-to-Know.

Professional Affiliations

- American Public Health Association
- Pacific Northwest Association of Toxicologists

Gary F. Sorensen, P.G.

Master of Science, Geology 1985
Bachelor of Science, Geology 1980
Registered Professional Geologist — Idaho

Gary Sorensen is a Project Hydrogeologist with Parametrix who specializes in hydrogeologic investigation, site characterization, and environmental monitoring. In his five years with Parametrix, Inc., he has gained extensive experience in cost estimation, design, coordination, logistics, supervision, and management of hydrogeologic investigations. His technical skills include soil, surface, and groundwater sampling, bore logging, monitoring well design and installation, aquifer testing, and geologic mapping. Mr. Sorensen is also responsible for the evaluation and interpretation of existing hydrogeologic conditions, groundwater quality assessments, and production of final technical reports. His hydrogeologic work at Parametrix has involved him in a variety of projects including solid and hazardous waste, mining, water supply, and groundwater remediation. Relevant experience includes:

Oregon Department of Environmental Quality (ODEQ), Multnomah County, Oregon

Task Manager — This large project involves a detailed regional investigation and characterization of the hydrogeologic conditions of multiple aquifers within consolidated sedimentary rock and associated groundwater contamination in underlying Multnomah County in relation to the Portland drinking water well field. As Task Manager, Mr. Sorensen is responsible for collection, cataloging, and QA/QC of all existing pertinent data and development of the data base which will be used to run the physical groundwater flow model, contaminant transport model, and GIS system. He will also be responsible for the hydrogeologic characterization, the flow and contaminant transport modeling, and associated preliminary and final reports. He is a key figure in our relations with ODEQ and the City of Portland.

Lakewood Estates, Oregon Department of Environmental Quality (ODEQ), Oregon

Project Manager - Senior Project Hydrogeologist — Parametrix is currently investigating organic contamination of a community drinking water supply and is developing remedial actions, treatment alternatives, and an alternative water supply. Remedial alternatives include removal of contaminated soils and pump-and-treat of groundwater. Treatment alternatives include ultra-violet oxidation, carbon filtration, and air-stripping. Specific responsibilities as project hydrogeologist include characterization of hydrogeologic conditions within consolidated sedimentary rock, investigation of contaminant source, and assessment of contaminant extent, fate, and transport. His project management responsibilities include oversight of the selected treatment design, technical review, and overall development of project cost estimates, scoping, technical reports, and coordination along with client communication.

Olowalu and Makani Landfill Closure Plan, Maui County, Hawaii

Senior Project Hydrogeologist — Responsible for technical and administrative management of the hydrogeologic investigation and groundwater quality assessment for the

closure of both landfills. His responsibilities included supervision of the design and implementation of the groundwater/vadose zone monitoring systems, definition and interpretation of the hydrogeologic characterization within fractured basalt, groundwater quality assessment, and writing of technical reports and the closure plan. His work involves cost estimation, scoping, development and review of reports, and extensive communication with client, agency, and subcontractors.

Mason County Landfill, Mason County, Washington

Senior Project Hydrogeologist — Responsible for the assessment of the current groundwater monitoring program at the landfill. His assessment and subsequent proposal for an expanded off-site groundwater monitoring system and hydrogeologic characterization of the underlying unconsolidated glaciofluvial deposits was vital to the county in their negotiations with Health Department and Ecology in which he was a key participant. He also supervised the development of and provided technical review of the hydrogeologic characterization and groundwater quality assessment portions of the Closure Plan. He directed and supervised the expanded hydrogeologic investigation. He has continued responsibility for groundwater quality assessment and related technical issues at the site.

Lakeside Industries, Inc., Lacey, Washington

Senior Project Hydrogeologist — Responsible for the waste characterization, preliminary hydrogeologic characterization within the underlying unconsolidated glaciofluvial deposits, and groundwater quality assessment in order to determine waste containment requirements and closure of the facility in accordance with regulatory requirements. He was a key participant in proposing and negotiating a groundwater monitoring program with the Health Department and Ecology. He subsequently directed and supervised implementation of the groundwater monitoring system and final hydrogeologic and groundwater quality assessment report.

Palailai Sanitary Landfill Closure Plan, Oahu, Hawaii

Project Hydrogeologist — Designed and implemented both the hydrogeologic and methane gas migration investigations within fractured basalt. It included development of project cost estimates, contracting of subcontractors, and field logistics. His field tasks included bore logging, and sampling of groundwater and methane gas. He was also responsible for drafting of hydrogeologic cross-sections, determination of groundwater flow directions, assessment of groundwater quality, and final technical reports. He has on-going responsibility for assessment of groundwater quality and related technical issues at the site.

Newcastle Landfill, King County, Washington

Project Hydrogeologist — Designed and implemented the hydrogeologic investigation within folded and fractured sedimentary rock containing extensive underground coal mine workings. The coal mine workings have a significant and complex influence on groundwater occurrence and movement beneath the site. His design of the groundwater monitoring program was effective for assessing and distinguishing potential groundwater contamination due to the landfill and that due to the coal mine workings. The design was approved by both the County Health Department and the State Department of

Ecology. Mr. Sorensen is responsible for the continued assessment of groundwater quality and related technical issues at the site. Project includes performance monitoring of the designed final cover system.

Hansville Landfill Closure Plan, Kitsap County, Washington

Project Hydrogeologist — Assessed and expanded the existing groundwater monitoring program and hydrogeological characterization within underlying unconsolidated glaciofluvial deposits. He designed and implemented the gas migration monitoring program. Groundwater contamination recognized at the site led to an EPA investigation. Mr. Sorensen characterized the hydrogeologic conditions at the site and used computer modeling programs to assess the contaminant transport within the underlying unconfined aquifer to the satisfaction of the EPA. Because of Mr. Sorensen's work, EPA significantly reduced their proposed level of investigation. Remedial actions included closure and capping of the facility and initiation of an active gas control system to reduce the levels of organic contamination entering the aquifer. Mr. Sorensen drafted the hydrogeologic and contaminant assessment report for the closure plan. He has continued responsibility for evaluation of final cover performance and effectiveness of gas control system in reducing contaminate levels in groundwater and related technical issues at the site.

Olympic View Landfill, Kitsap County, Washington

Project Hydrogeologist — Assessed and expanded the existing groundwater monitoring program and hydrogeologic characterization within the underlying unconsolidated glaciofluvial deposits. He has responsibility for the on-going surface and groundwater monitoring programs for the landfill and the lysimeter and groundwater monitoring program for the treated leachate spray irrigation system. He is currently developing a groundwater monitoring program and assisting in the permitting process for the proposed expansion areas. Mr. Sorensen is a key figure in our public presentations and in our relations with the County, Health Department and Ecology. He has continued responsibility for groundwater quality assessment and related technical issues. He also wrote the appropriate sections in the EIS and Closure Plan concerning the site hydrogeology, groundwater monitoring program, and the groundwater quality assessment. Project includes performance monitoring for leachate treatment spray area and liner performance in newly active areas.

Aberdeen Landfill, Grays Harbor County, Washington

Project Hydrogeologist — Assessed the existing groundwater monitoring program and hydrogeologic characterization of the underlying fluvial and floodplain deposits. He has continued responsibility for groundwater quality assessment and related technical issues. The assessment of groundwater quality and hydrogeologic characterization is extremely complicated at this site due to the affects of both salt water intrusion and ocean tidal fluctuations.

Proposed Landfill Site Evaluations: King, Clark, and Mason Counties, Washington

Project Hydrogeologist — Conducted the preliminary hydrogeologic assessment of potential landfill sites for a number of clients within the guidelines of the Minimum

Functional Standards for Solid Waste Handling (WAC 173-304). It included preliminary field investigations which, on favorable sites, led to designing and implementing exploratory drilling and test pits to further characterize the hydrogeologic conditions at the site. On one project, Mr. Sorensen located a landfill within the boundaries of a county by conducting detailed research of the most favorable hydrogeologic conditions with consideration to potentially sensitive political and environmental concerns. After review of these considerations, Mr. Sorensen identified three sites for further field investigation. One was thoroughly characterized and went through public hearings in which Mr. Sorensen is a participant.

Additional Qualifications

Mr. Sorensen has also used analytical computer programs for one- and two-dimensional solute transport models to investigate contaminant movement through porous media in confined and unconfined aquifers. He has also used computer graphics for presentation of contoured chemical data. He has a good working relationship with clients, and local and state agencies.

In addition to Mr. Sorensen's hydrogeologic work, he has been involved in writing and review of Solid Waste Management Plans, EIS's, and other miscellaneous technical reports.

Prior to coming to Parametrix, Mr. Sorensen worked five years as a precious metals exploration geologist in the mining industry where he gained considerable experience in field investigations and operations. This experience greatly enhanced his geologic expertise and management skills prior to entering the environmental consulting field.

Master of Science, Applied Statistics, Biometry
Bachelor of Science, Mathematical Sciences, Emphasizing Applied Statistics and Computer Programming

Margaret Spence is a Computer Statistician at Parametrix, Inc. She has seven years of experience in computer support and programming in DOS, Unix, and VAX VMS environments. The last three years she has provided statistical computing support for environmental research projects, and for the past year she has also provided spatial analysis and cartographic support using ARC/INFO, a computer-based geographic information system, on a SUN workstation.

City of Metropolitan Seattle, Washington
Provided consultation concerning statistical methods used and conclusions reached in a natural resources damage assessment. Critiqued application of the statistical methods and recommended appropriate methods.

TBT Monitoring
Implemented a sampling design for preliminary butyltin sampling program in Puget Sound. Determined sampling sites and samples to be obtained at each site, including QA/QC samples.

ASARCO Tacoma Plant
Assisted with preparation of benthic analysis results for remedial evaluation. Explored other possible statistical methods for analysis of benthic data.

U.S. Environmental Protection Agency
Provided statistical computing support to address issues related to the sampling grid proposed for the Environmental Monitoring and Assessment Program. Explored statistical characteristics of the chosen grid and other possible grid designs.

Oregon Department of Environmental Quality, Portland, Oregon
Designed and generated maps of hydrogeological data to be used in analyzing groundwater flow and contaminant transportation in Multnomah County, Oregon. Maintained databases and program files used to generate the maps.

Fourth Corner Economic Development Group, Whatcom County, Washington
Designed and generated maps of property and wetland boundaries to be used in analyzing the distribution of wetland types within property boundaries. Used the geographic information system to obtain spatial distributions of wetlands and properties. Created and maintained databases and program files used in the analyses.

U.S. Environmental Protection Agency
Developed a sampling grid database to be used for the Environmental Monitoring and Assessment Program. Generated maps of this grid and augmented versions of the grid

for various areas of the United States for distribution to other research facilities. Wrote an internal technical report summarizing the cartographic and computer specifications associated with the sampling grid and its accompanying programs.

Terry L. Steinborn, Ph.D.

Ph.D., Geochemistry
Master of Science, Geochemistry
Bachelor of Arts, Chemistry
Professional Hydrogeologist, American Institute of Hydrology

Dr. Steinborn's experience includes:

Senior Staff Geochemist, URS Consultants, Seattle, Washington, November 1989 to Present

Manager of EPA ARCS Contract work in Region X. Responsible for tracking all ARCS projects in the Region and for liaison between EPA Region Management and URS Program Management in Sacramento, CA.

Site Manager for ARCS project to perform a RI/FS at the Allied Plating site in Portland, OR. Responsible for plans, operations and reports to meet EPA requirements, including RCRA and CERCLA.

Project manager and senior staff consultant/reviewer for hazardous waste cleanup projects for the U.S. Navy on the CLEAN contract in the Pacific Northwest.

Head of Hazardous Waste marketing efforts.

Manager, Environmental Sciences and Engineering Division, Hardy BB, Inc., Redmond Washington, July 19889 to November 1989

Providing chemistry and groundwater input to design of effluent disposal system at a new wood products facility to meet regulatory requirements.

Coordinating groundwater and soil contamination bioremediation for a property with gasoline contamination.

Responsible for hazardous waste investigations, property assessments, underground storage tank investigations and remediation, including marketing and operations.

Responsible for groundwater supply and contamination remediation work in the Seattle area office.

Consulting on groundwater chemistry and contaminant migration problems for all Hardy BBT (Ltd.). Cognizant of RCRA/CERCLA and state (Washington, Oregon, California) regulations.

Contributor on FERC permit proposal for natural gas pipeline expansion project in eastern United States.

Geochemistry Manager on Bechtel Systems Management Inc. team for integration of the U.S. Department of Ecology High Level Nuclear Waste program.

Manager of proposed Illinois Environmental Service Group (Chem-Nuclear, Dames & Moore, Numatec partnership) for development of the Central Midwest Interstate Compact low-level radioactive waste disposal facility.

Project Director on Radioactive Mixed Waste Alternatives Study for Westinghouse Hanford Company. Advised Westinghouse and U.S. Department of Ecology on RCRA/SARA requirements for their operations, and examined conflicts between hazardous material regulations and those for radioactive waste.

Senior Staff Consultant on geochemistry, radiochemistry, and chemistry on hazardous waste management and other environmental projects. Advises on groundwater problems including testing, chemical analysis, flow and transport modeling, especially as needed to meet RCRA/CERCLA requirements. Participated in several Superfund RI/FS projects at hazardous waste contaminated facilities in the Pacific Northwest.

Marketing Leader for U.S. Department of Ecology waste management and other environmental projects.

Proposal Manager for radioactive, hazardous, and mixed waste projects for federal and state agencies and private clients.

Quality Assurance advisor on in-house projects. Includes plan and procedure development, NQA-1 compliance, and document reviews.

Section Manager, Systems Analysis Department, ONWI, Battelle Project Management Division, Columbus, Ohio, November 1983 to July 1986

Section Manager for Site Performance Assessment on U.S. Department of Ecology Salt Repository Project (SRP). Responsible for hydrologic model development and application, geostatistical analysis, performance and risk assessments, and geochemical modeling. Managed in-house staff of up to 15, and subcontracted staff of about 50 professionals, with a total budget of up to $16 million.

Geochemistry Program Manager on SRP. Developed integrated program including all aspects of geochemistry required for repository licensing. Included field and laboratory analyses, model development, validation and application, technology development, and quality assurance. Managed in-house staff, commercial subcontractors, university and national (DOE) laboratories, and state agencies.

Quality Assurance. Developed quality assurance procedures for computer modeling. Served as technical member of quality assurance audit team on subcontractor audits.

Liaison with U.S. Department of Ecology technical staff at field office and headquarter levels.

Staff Geologist, Nuclear Projects Specialist, International Engineering Co., Inc. (now MK-Engineers), San Francisco, California, From July 1980 to October 1983

Marketing Specialist for nuclear waste projects, including proposal management. Notable successes include the Department of Ecology Uranium Mill Tailings Remedial Action (UMTRA) project and decommissioning of the Shipping Port Nuclear Reactor. Also contributed to hazardous waste and geothermal project marketing efforts.

Geotechnical Design. Developed requirements for uranium mill tailings caps for radon control, planned and executed a materials testing program. Resolved a tailings dam seepage problem.

Member of Design Review team for remedial action designs.

Performed studies of water flow and quality for water supply, contamination and remedial action projects. Evaluated extent of groundwater contamination from mill tailings.

Performed critical review and analysis of exploration and development techniques for geothermal resources in the United States, Mexico, and Nicaragua. This primarily involved direct and geophysical investigations of groundwater flow and quality.

Developed and managed a marketing plan for seepage from underground storage tanks in Silicon Valley. Provided regulatory analysis for compliance with state requirements.

Staff Geochemist, Earth Sciences Division, Lawrence Livermore National Laboratory, Livermore, California, From January 1977 to July 1980

Earth Sciences Task Manager for U.S. Nuclear Regulatory Commission technical assistance project. Provided geoscience input and review for development of High Level Radioactive Waste Regulations (10 C.F.R. Part 60). Performance and risk assessment modeling for long term geosystem performance. Managed team of eight professionals and subcontracts with four companies. Budget of $2 million per year.

Geochemist on National Uranium Resource Evaluation (NURE) hydrogeochemical exploration project for six western states. Planned and managed field sampling programs for resource evaluation surveys.

Staff Geochemist, Bendix Field Engineering Co., Grand Junction, Colorado, From August 1975 to December 1976

Developed Hydrogeochemical and Stream Sediment Reconnaissance of the U.S. Department of Ecology NURE program. Planned and interpreted results from geochemical studies of uranium resources and potential resource areas. Managed

Petrology Laboratory, coordinated field projects with the Chemical Analysis Laboratory. Managed in-house staff of eight professionals.

Professional Affiliations

American Nuclear Society
American Geophysical Union
American Institute of Hydrology

William F. Sullivan

Bill Sullivan is a Project Manager with Parametrix, Inc. He has more than twelve years experience in planning, design, and supervision of construction of oil and gas collection and refining projects. He is particularly skilled in design and supervision of construction and operation of methane gas recovery systems. Mr. Sullivan has designed a computerized data base which tracks and analyzes data recorded in the field, and has implemented this program on several landfill gas control projects.

Mr. Sullivan's projects involve extensive interaction with federal, state, and local regulatory agencies. In addition, Mr. Sullivan has undergone training and is certified to work on and supervise hazardous environmental projects using up to Class B level protection. The Parametrix monitoring program requires that personnel involved in hazardous waste projects undergo extensive training and baseline health monitoring to ensure a safe working environment on such sites.

Midway Landfill Remedial Investigation/Feasibility Study (CERCLA Site)

Team member — Responsible for development of remedial investigation report emphasizing gas control efforts to date and recommendations for future requirements. He is also responsible for the development of the feasibility study emphasizing air, gas, and stormwater pathways of off-site contamination.

St. John's Landfill Closure, Portland, Oregon

Gas Control Group Leader — Responsible for quality control and design supervision of an active gas and condensate collection for this 240 acre, mixed municipal landfill.

Skagit County Ash Management

Project Manager — Responsibilities include management and coordination for the development of permit applications and SEPA checklists for ash disposal, ash disposal operations planning, and odor and gas migration studies for the county's CDL/ash disposal facility.

Olowalu and Makani Landfill Closures, Maui, Hawaii

Gas Control Group Leader — Responsible for investigation and remediation of methane migration and subsurface refuse fires for these two major mixed municipal landfills.

Palailai Landfill Gas Control, Oahu, Hawaii

Project Manager — Responsible for the design and bid package preparation of an active gas and condensate system for this mixed municipal landfill. Mr. Sullivan was also responsible for management of the design, construction, and operation of an interim remedial gas control system which was installed to control migration of gas from the site.

Kailua Landfill Gas and Refuse and Fire Investigation

Project Manager — Responsible for investigation describing the probable extent of subsurface refuse fire, atmospheric discharge and subsurface migration of gas from the Kailua Landfill. The project will entail two tasks. Task 1 entails refuse fire data collection, including the installation of shallow temperature probes throughout the Landfill. Task 2 entails the collection of gas emissions and migration data. Based on the results of the two tasks, a draft and final report will be issued to the County of Hawaii, and the Hawaii Department of Health.

Midway Landfill Gas Migration Control

Project Manager — Responsibilities included design of the gas and condensate collection system, management of the gas field operations, evaluation of the effectiveness of the gas monitoring probes, on-site migration and odor control wells in refuse and in soil, off-site gas extraction wells, as well as recommendations for additional facilities.

Kent Highlands Landfill Gas/Odor Control

Project Coordinator — Responsibilities included conversion of an existing passive gas venting system to an active system, and the addition of shallow vertical extraction wells in selected areas. He was also responsible for implementation of a pilot system of gas migration control wells, motor blower, flare, and gas monitoring probes.

Cathcart Landfill Gas Management/Energy Recovery Feasibility Study

Project Manager — Responsible for study to evaluate odor and air quality, and determine feasibility of energy recovery from a mixed municipal solid waste landfill in Snohomish County. His responsibilities included coordinating the efforts of a large, multidisciplinary project team. Mr. Sullivan was also responsible for the design of an active gas control system.

Tacoma Sanitary Landfill Gas Management

Gas Control Group Leader — Responsible for the design of an active gas and condensate collection system for this major mixed municipal landfill.

Gull Industries Exxon Station/AGI Vapor Recovery

Project Coordinator for design and implementation of a soil vapor recovery system for a 1,000 gallon underground storage tank leak. The system included a medium-depth well with a horizontal vacuum dispersion blanket, peripheral monitoring probes, and atmospheric discharge under a Puget Sound Air Pollution Control Agency (PSAPCA) permit. The system, installed at a service station in Issaquah, operated for several months.

Additional Qualifications

Prior to joining Parametrix, Inc. Mr. Sullivan spent two years with a division of Occidental Petroleum Corporation as the Design Coordinator and Construction Manager for coal mine degasification projects in the Appalachian Mountain Range of the eastern United States.

In this position, Mr. Sullivan was responsible for the design, procurement and construction of facilities to extract methane gas from coal mines in advance of longwall mining.

Prior to working with Occidental Petroleum Corporation, Mr. Sullivan spent five years with Fluor Engineers, Inc., as a Senior Piping Designer for several oil and gas recovery and refining projects worldwide.

Julie Wukelic

Bachelor of Science, Mechanical Engineering
Washington State Department of Ecology, Registered Site Assessor
Washington State Department of Ecology, Licensed UST Supervisor

Julie Wukelic is an Environmental Engineer at Parametrix, Inc. She has more than 9 years of experience managing and coordinating multidisciplinary environmental and hazardous waste management projects. Ms. Wukelic is currently managing the Underground Storage Tank Management, Environmental Site Assessment, and Remedial Services Program. She has managed and participated in hundreds and environmental site assessments over the past six years and has extensive knowledge in the environment field and working with the regulatory agencies. Prior to joining the private consulting business, Ms. Wukelic was Program Manager for the U.S. Department of Energy (DOE) for several nuclear waste technology programs at Hanford.

She has experience and knowledge in RCRA/HSWA, CERCLA, SARA and TSCA and federal and state regulations for hazardous, solid and radioactive wastes. She has also been involved in reviewing, writing, and commenting on technical reports, DOE/NRC policies, and permit applications. She has played a key role in assessing the level of compliance at regulated facilities, developing strategies to bring facilities into compliance, and interpreting regulations for public and private clients.

Washington State Department of Ecology consulting Services for Environmental Cleanup Activities at Hanford

Provided technical input for the Part A review and regulatory analysis of 30 by-product facilities for Westinghouse Hanford Company, Richland, Washington. The analysis included a review of each facility's process and design; a review of each product and waste stream; an evaluation of waste management procedures, including interviews with facility operators; and a determination of the regulatory status of each unit at the facility. Facility Part A applications requiring RCRA/state permits were reviewed for completeness and consistency.

Washington State Department of Natural Resources On-Call Services

Completed a six year strategy plan for addressing hazardous waste management and cleanup of over one thousand sites in Washington. This plan also included the involvement of investigation, removal, and cleanup of contaminated areas.

Preparation of Plans and Specifications for Removal of Underground Storage Tank Removals, Contaminated Sediments, and Asbestos Containing Material (ACM) for Washington State Department of Natural Resources (DNR), Washington

Assisted in the preparation of necessary plans and specifications for a full bid package for DNR for the removal of USTs in Washington, cleanup of contaminated sediments in catch basins, and removal of asbestos containing material (ACM). These detailed

plans and specifications included explicit steps for the appropriate testing of c contents, removal and disposal of the UST and associated lines, verification soil sampling, removal and/or remediation of contaminated soils, cleaning of sumps and catch basins, and removal of ACM.

Site Characterization for Washington State Department of Natural Resources (DNR), Washington

Responsible for extensive soil and groundwater assessment of several sites in an industrial section of Seattle. The site characterization included an environmental background search on the properties, installation of soil borings and groundwater monitoring wells, preparation and implementation of a soil and groundwater sampling and analysis plan, sampling and analysis of potential asbestos-containing material (ACM), preparation and implementation of an underground storage tank removal plan, and preparation and implementation of a remediation plan.

Soil and Groundwater Quality Assessment for Finning, Ltd., Washington

Performed an environmental assessment at the site and managed the sampling and analysis of subsurface soils and groundwater. She also managed the implementation of a tank tightness test performed on two UST to determine leakage. Sampling and analysis of other surface soil on the property were also conducted.

Soil and Groundwater Quality Assessments for Confidential Clients, Washington

Assisted several confidential clients in assessing soil and groundwater quality following removal of leaking petroleum USTs at multiple sites. This work includes soil and groundwater evaluation, and development and implementation of remediation measures.

Environmental Site Assessment and Underground Storage Tank Removal for Chukar Corporation, Washington

Responsible for the site investigation, preconstruction coordination, and oversight of removal activities of several USTs. She performed data analysis of verification soil sample results and prepared the confirmation report.

Soil and Groundwater Quality Assessment for Finning, Ltd., Washington

Performed an environmental assessment at the site and managed the sampling and analysis of subsurface soils and groundwater. She also managed the implementation of a tank tightness test performed on two UST to determine leakage. Sampling and analysis of other surface soil on the property were also conducted.

Additional Qualifications

Ms. Wukelic has served as Project Manager and/or Lead Environmental Engineer for environmental audits and underground storage tank removals and hazardous waste and remediation projects for industrial, residential, landfill, and oil and gas clients. Her experience with underground storage tank assessments, removals, and cleanup have involved: exploration prior to removal to assess potential soil and groundwater contamination; plans

and specifications for removal and remediation; design of excavations and soil removal plans; treatability studies; negotiations with local and/or state agencies for cleanup standards; management of tank removal contractor activities; and analysis and recommendations for waste designation of excavated materials.

Terry L. Steinborn, Ph.D.

Ph.D., Geochemistry
Master of Science, Geochemistry
Bachelor of Arts, Chemistry
Professional Hydrogeologist, American Institute of Hydrology

Dr. Steinborn's experience includes:

Senior Staff Geochemist, URS Consultants, Seattle, Washington

Manager of EPA ARCS Contract work in Region X. Responsible for tracking all ARCS projects in the Region and for liaison between EPA Region Management and URS Program Management in Sacramento, CA.

Site Manager for ARCS project to perform a RI/FS at the Allied Plating site in Portland, OR. Responsible for plans, operations and reports to meet EPA requirements, including RCRA and CERCLA.

Project manager and senior staff consultant/reviewer for hazardous waste cleanup projects for the U.S. Navy on the CLEAN contract in the Pacific Northwest.

Head of Hazardous Waste marketing efforts.

Manager, Environmental Sciences and Engineering Division, Hardy BB, Inc., Redmond Washington

Providing chemistry and groundwater input to design of effluent disposal system at a new wood products facility to meet regulatory requirements.

Coordinating groundwater and soil contamination bioremediation for a property with gasoline contamination.

Responsible for hazardous waste investigations, property assessments, underground storage tank investigations and remediation, including marketing and operations.

Responsible for groundwater supply and contamination remediation work in the Seattle area office.

Consulting on groundwater chemistry and contaminant migration problems for all Hardy BBT (Ltd.). Cognizant of RCRA/CERCLA and state (Washington, Oregon, California) regulations.

Contributor on FERC permit proposal for natural gas pipeline expansion project in eastern United States.

Geochemistry Manager on Bechtel Systems Management Inc. team for integration of the U.S. Department of Ecology High Level Nuclear Waste program.

Manager of proposed Illinois Environmental Service Group (Chem-Nuclear, Dames & Moore, Numatec partnership) for development of the Central Midwest Interstate Compact low-level radioactive waste disposal facility.

Project Director on Radioactive Mixed Waste Alternatives Study for Westinghouse Hanford Company. Advised Westinghouse and U.S. Department of Ecology on RCRA/SARA requirements for their operations, and examined conflicts between hazardous material regulations and those for radioactive waste.

Senior Staff Consultant on geochemistry, radiochemistry, and chemistry on hazardous waste management and other environmental projects. Advises on groundwater problems including testing, chemical analysis, flow and transport modeling, especially as needed to meet RCRA/CERCLA requirements. Participated in several Superfund RI/FS projects at hazardous waste contaminated facilities in the Pacific Northwest.

Marketing Leader for U.S. Department of Ecology waste management and other environmental projects.

Proposal Manager for radioactive, hazardous, and mixed waste projects for federal and state agencies and private clients.

Quality Assurance advisor on in-house projects. Includes plan and procedure development, NQA-1 compliance, and document reviews.

Section Manager, Systems Analysis Department, ONWI, Battelle Project Management Division, Columbus, Ohio

Section Manager for Site Performance Assessment on U.S. Department of Ecology Salt Repository Project (SRP). Responsible for hydrologic model development and application, geostatistical analysis, performance and risk assessments, and geochemical modeling. Managed in-house staff of up to 15, and subcontracted staff of about 50 professionals, with a total budget of up to $16 million.

Geochemistry Program Manager on SRP. Developed integrated program including all aspects of geochemistry required for repository licensing. Included field and laboratory analyses, model development, validation and application, technology development, and quality assurance. Managed in-house staff, commercial subcontractors, university and national (DOE) laboratories, and state agencies.

Quality Assurance. Developed quality assurance procedures for computer modeling. Served as technical member of quality assurance audit team on subcontractor audits.

Liaison with U.S. Department of Ecology technical staff at field office and headquarter levels.

Staff Geologist, Nuclear Projects Specialist, International Engineering Co., Inc. (now MK-Engineers), San Francisco, California

Marketing Specialist for nuclear waste projects, including proposal management. Notable successes include the Department of Ecology Uranium Mill Tailings Remedial Action (UMTRA) project and decommissioning of the Shipping Port Nuclear Reactor. Also contributed to hazardous waste and geothermal project marketing efforts.

Geotechnical Design. Developed requirements for uranium mill tailings caps for radon control, planned and executed a materials testing program. Resolved a tailings dam seepage problem.

Member of Design Review team for remedial action designs.

Performed studies of water flow and quality for water supply, contamination and remedial action projects. Evaluated extent of groundwater contamination from mill tailings.

Performed critical review and analysis of exploration and development techniques for geothermal resources in the United States, Mexico, and Nicaragua. This primarily involved direct and geophysical investigations of groundwater flow and quality.

Developed and managed a marketing plan for seepage from underground storage tanks in Silicon Valley. Provided regulatory analysis for compliance with state requirements.

Staff Geochemist, Earth Sciences Division, Lawrence Livermore National Laboratory, Livermore, California

Earth Sciences Task Manager for U.S. Nuclear Regulatory Commission technical assistance project. Provided geoscience input and review for development of High Level Radioactive Waste Regulations (10 C.F.R. Part 60). Performance and risk assessment modeling for long term geosystem performance. Managed team of eight professionals and subcontracts with four companies. Budget of $2 million per year.

Geochemist on National Uranium Resource Evaluation (NURE) hydrogeochemical exploration project for six western states. Planned and managed field sampling programs for resource evaluation surveys.

Staff Geochemist, Bendix Field Engineering Co., Grand Junction, Colorado

Developed Hydrogeochemical and Stream Sediment Reconnaissance of the U.S. Department of Ecology NURE program. Planned and interpreted results from geochemical studies of uranium resources and potential resource areas. Managed Petrology Laboratory, coordinated field projects with the Chemical Analysis Laboratory. Managed in-house staff of eight professionals.

Professional Affiliations

American Nuclear Society
American Geophysical Union
American Institute of Hydrology

Kirk Winges

Master of Science, Chemical Engineering
Bachelor of Science, Geophysics

As a Principal Air Quality Scientist with TRC, Kirk Winges has been involved in the conduct of air quality investigations since 1970. During that time he has managed or directed over 100 major air quality studies for a variety of source types throughout the U.S. and abroad. His primary area of expertise is in air quality modeling. He has personally conducted over 50 air quality modeling studies of a variety of industrial sources for sulfur dioxide impacts, oxides of nitrogen impacts and other pollutants. He has personally developed models including a fugitive dust model, a post-processor for the SHORTZ Model now on the UNAMAP system of air quality models, a stack model for rough terrain stack impacts and a carbon monoxide model for highway tunnels.

Mr. Winges also has extensive experience with odor issues and in particular has been instrumental in the development of TRC's odor model. He has personally conducted odor investigations for numerous sewage treatment plants, automobile assembly plants and other sources with significant odor impacts. Mr. Winges has prepared numerous air quality permit applications for various industries including pulp mills, coal gasification plants, coal mines, smelters, oil shale developments, oil production facilities, aluminum reduction plants, copper mining and processing plants, geothermal developments, and coal-fired electric generation plants. The projects have involved estimation of emission rates, air quality impact analyses with models and development of mitigation plants and control technology plans. A number of air quality field investigations have been carried out by Mr. Winges, including the management and technical direction of a major field experimentation program using tracer gases. Mr. Winges has acted as an expert witness on a number of occasions, including testimony before the Under Secretary of the Interior and the Direct of the Office of Surface Mining.

Project specific experience includes:

- Mr. Winges has extensive experience with odor issues and in particular has been instrumental in the development of TRC's odor model. He has personally conducted odor investigations for numerous sewage treatment plants, automobile assembly plants and other sources with significant odor impacts.

- He has prepared numerous air quality permit applications for various industries including pulp mills, coal gasification plants, coal mines, smelters, oil shale developments, oil production facilities, aluminum reduction plants, copper mining and processing plants, geothermal developments and coal-fired electric generation plants. The projects have involved estimation of emission rates, air quality impact analyses with models and development of mitigation plans and control technology plans.

- Mr. Winges has conducted several investigations of transportation related projects including an air quality evaluation of the entire street network for downtown Portland, Oregon. One area of special expertise is evaluation of air quality impacts related to vehicular tunnels, including the development of an air quality model to simulate impacts within a major freeway tunnel. Another area of expertise is the impact from diesel bus operation.

- Mr. Winges has been retained as a technical expert on air quality issues by organizations such as the National Coal Association, the American Mining Congress and the American Petroleum Institute. He has been retained by the Environmental Protection Agency to incorporate his own theories on the retention of dust within mining pits into existing EPA models.

A number of air quality field investigations have been carried out by Mr. Winges, including the management and technical direction of a major field experimentation program using trace gases. Mr. Winges has acted as an expert witness on a number of occasions, including testimony before the Under Secretary of the Interior and the Director of the Office of Surface Mining.

4. PROJECT UNDERSTANDING AND APPROACH

Project Understanding

The Waste Isolation Pilot Plant (WIPP), located in southeastern New Mexico, is a U.S. Department of Energy research and development facility designed to demonstrate safe disposal of transuranic radioactive wastes resulting from the nation's defense programs.

The WIPP site was chosen after a selection process that began in the mid-1950s. At that time, the National Academy of Sciences recommended salt deposits as a promising medium for storage of radioactive wastes. The characteristics of the nearly 3,000-foot-thick salt beds in the vicinity of the WIPP site have been extensively studied. The 255-million-year-old salt rock has remained essentially stable and unaffected by earthquake or faulting activity since it was deposited. There are no deep boreholes from petroleum or mineral exploration. Because the site is located in a remote area, it is removed from any potentially disruptive geologic features such as earthquake faults.

The Parametrix team understands that the New Mexico Environment Department is seeking technical and regulatory compliance expertise and experience in the review and evaluation of the RCRA permit application and other technical documents from the Department of Energy for the disposal of mixed waste at its WIPP site.

The review process will entail a completeness determination, technical evaluation, evaluation of engineering components, evaluation of responses from the applicant, decision analysis and administrative support of general permitting activities, and technical evaluation of WIPP-related documents.

Other WIPP technical documents for review could include, but would not be limited to: hydrogeological reports; waste packaging and placement criteria; waste treatment; explosiveness, gas production and emergency response reports; sampling and statistical programs; radiation standards and protection; and long-term impacts on public health, safety, and the environment.

Approach

Parametrix has developed a project management approach that has proven successful for over 20 years in completing work assignments in a broad range of environmental services for both public and private clients. Although this approach has been effective on other projects,

Parametrix is extremely flexible and welcomes the opportunity to work with the state in refining an approach to meet your needs.

Parametrix is very experienced in negotiating and working with regulatory agencies to facilitate good working relationships between the client and involved agencies. The key team members discussed in Section 3 have extensive experience in managing complex environmental projects as well as small, rapidly paced projects. For the on-going Ecology/Hanford assignments, these projects have ranged from the technical and administrative review of Part A and Part B Permit applications to waste stream characterization reports, RCRA site-wide background sampling and characterization plans and facility investigation/corrective measure study work plans, as well as CERCLA remedial investigation/feasibility study (RI/FS) work plans and reports. For other public and private clients, Parametrix has conducted multi-million dollar hydrogeological investigations and RI/FSs under state and federal Superfund statutes, as well as major construction administration of engineering projects for solid waste landfills, wastewater treatment facilities, and the cleanup of hazardous waste sites.

Parametrix has been successful in maintaining these types of service contracts and completing the related projects. To have a successful project requires not only an organization with outstanding technical skills, but also a proven record of managing projects within budget and according to expected schedules. Hazardous, radioactive, and mixed waste projects may be controversial and complex with respect to regulatory compliance. Proper planning and scheduling are essential to ensure that these challenges are anticipated and planned for.

Parametrix project management typically emphasizes the following elements:

- Project team Management;
- Cost Control;
- Scheduling;
- Quality Assurance/Quality Control; and
- Reporting.

Project team Management. Initial contact will be made with the Program Manager, Clyde Moore, or Project Manager, Bill Kane. They will be responsible for preparation and implementation of a project work plan to meet the requirements of the assigned work order. They will also work with the state to completely understand the state's project requirements. Time carefully spent at the beginning of the project will accelerate the process of preparing the project work plan, receiving the state's approval of that plan, and implementing the plan.

The availability of project team members is managed using the Parametrix Management Information System (MIS). On a monthly basis, project managers enter project staffing needs into MIS to determine staff availability and staff allocation needs. By using MIS, we are able to closely manage staffing needs on our projects and react quickly to client needs.

Cost Control. Before beginning the project, a project work plan -- including a detailed budget and schedule -- will be developed based upon your project needs and our experience with other projects of similar nature. A draft budget estimate will be submitted to the state for review and comment, and a final budget and schedule will be prepared. The budget will include specific professional labor costs, overhead, and all outside direct expenses to be incurred. Once approved, this document (scope, budget, and schedule) will become a working management tool to assure the state and Parametrix of compliance with all of the agreed-upon terms and anticipated work products.

Parametrix manages all projects on a strict cost control basis. Labor costs for each staff member and direct expenses are input to our computer tracking system on a weekly basis. Output reports are prepared biweekly (or more often, if necessary) and delivered to the Project Manager who then compares the actual project expenditures by task to budgeted amounts. The month-end output report will be used as input for a progress report. These progress reports will be submitted to the state with the monthly invoices. This tracking system allows the Project Manager to compare the level of effort on completed projects with the budget so that cost overruns can be prevented. This system greatly enhances our financial tracking of project performance, and should assist the state in reviewing our work progress. If an alternative format would be useful for the state review, we will submit progress reports in that format.

Scheduling. Details from the project work plan's scope of work will be utilized to develop an overall schedule for the project. This schedule will be flexible and easily changed according to your project needs. The schedule will include dates when key decisions by the state are needed, and will identify the dates when key technical products are to be delivered. Internal Quality Assurance and Control periods will also be shown, as well as the state's review periods. This schedule will be submitted to the state and used along with the cost control information to monitor projects and to assure that the overall project is meeting important deadlines.

Quality Assurance/Quality Control. It is the policy of Parametrix that quality assurance/quality control (QA/QC) should be an integral part of the management process. Our project management manual (see Section 11) reflects the need for the project managers to actively oversee production of their projects to ensure that potential problem areas are recognized and corrected at the earliest opportunity.

We propose to use our established methods on this State of New Mexico contract, but we will gladly incorporate specific QA/QC requirements outside our normal procedures into our program. The Parametrix QA/QC system will ensure that all the state's requirements are met.

Parametrix' formal QA/QC program is managed by a senior staff engineer with all project managers and project engineers receiving a manual and training in the proper implementation of the system. Responsibility for coordinating the quality assurance review lies with the project manager. The project manager and each team member share responsibility for quality control in developing the product, including ongoing oversight and review of work in progress.

Parametrix adheres to a policy of strict project documentation, including establishing project files for retaining design criteria development, correspondence, telephone conversation documentation, meeting minutes, design calculations, and any other information pertinent to the project. All team members assigned to a project are given a project notebook summarizing the requirements for documenting and retaining information. Using an example of a design project, under the guidance of the QA/QC manager, specific experienced senior staff are assigned to a project to review all work products at the preliminary (10%), concept (35%), intermediate (60%), and final (100%) design stages. To ensure that these reviews have been conducted, the appropriate division or office manager must approve final delivery of products to the client.

Reporting. The Parametrix team is committed to providing the state with the best product in the most cost-effective manner at all stages of the project. This includes work plan and budget development, progress reports/meetings, draft reports, and final reports. The key element is good communication throughout the project's process. Revisions will be minimized and a higher quality product will be delivered. Progress reports, as discussed above, are routinely provided for each project work assignment on a monthly basis. Informal reporting takes place routinely as a result of the normal communication process for Parametrix projects.

Parametrix takes great pride in its ability to perform projects of this type with a very high level of overall effectiveness and client satisfaction, while also maintaining cost-efficiency. Parametrix has developed and refined its management approach to handling these types of service contracts in a manner that promotes flexibility, interaction, and cooperation with our clients.

5. RELEVANT PROJECT EXPERIENCE

Parametrix has completed thousands of work assignments since it was founded in 1969. These services have included a broad range of environmental projects, for both public and private clients. Several of our relevant projects are described below.

Washington State Department of Ecology Consulting Services for Environmental Cleanup Activities at Hanford

The Hanford Federal Facility Agreement and Consent Order (or Tri-Party Agreement) provides a framework for the coordination between the State of Washington Department of Ecology (Ecology), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Energy (Energy) for the cleanup of the Hanford nuclear site. In support of the Tri-Party Agreement, Parametrix has been contracted to assist Ecology in the technical review and to comment on the Hanford cleanup and permitting documents. Parametrix has reviewed and presented findings to Ecology, EPA, the Department of Energy and its contractors on:

- Double-shell tank system dangerous waste permit application
- RCRA site-wide background soil sampling plan
- RCRA characterization and use of soil and groundwater background
- RCRA facility investigation/corrective measure study work plans
- Waste stream characterization reports
- CERCLA remedial investigation/feasibility study work plans
- Design plans and specifications for land disposal of hazardous, radioactive, and mixed wastes
- New production reactor capacity environmental impact statement.

Hanford Double-Shell Tank System Dangerous Waste Permit Application

Parametrix performed a review of the Part A and Part B dangerous waste permit application for the Double-Shell Tank (DST) System at the Hanford Site. The Hanford DST System consists of 28 million-gallon tanks, 4 smaller tanks in concrete vaults, and ancillary equipment such as diversion boxes and waste transfer pipelines. This document review focused on the technical and design adequacy of the permit application and its completeness based on the requirements specified in federal and state RCRA regulations.

Hanford Site-Wide Background Soil Sampling Plan

Parametrix performed a technical review of a soil sampling plan. This plan outlines the sample collection and analysis effort necessary to establish site-wide background soil concentrations at Hanford. The results of this effort will be used as the goal for cleanup of all RCRA operable units. This review focused on the regulatory compliance of the sampling plan and its supporting documents with RCRA, CERCLA, Model Toxics Control Act (MTCA), and Dangerous Waste Regulations. This review also evaluated the statistical and analytical requirements necessary for the plan to produce valid and justifiable results.

Characterization and Use of Soil and Groundwater Background for the Hanford Site

The Characterization and Use document describes and provides justification for a site-wide approach to the determination and use of soil and groundwater background for environmental restoration activities at the Hanford Site. This site-wide approach is a proposed alternative to the existing practice of determining specific background concentrations for each individual RCRA operable unit. Parametrix performed a review of this document to assess its technical adequacy and compliance with federal and state RCRA regulations. This review focused on the adequacy of the geologic and hydrogeologic assumptions, assessments, and conclusions, the correct and appropriate application of the proposed statistical analyses, and the scope of the work described to achieve the goals outlined in the document.

RCRA Facility Investigation/Corrective Measure Study Work Plans for the Hanford Site

Parametrix conducted a technical and regulatory review of two RCRA Facility Investigation/Corrective Measure Study (RFI/CMS) work plans for Ecology. These work plans outline the proposed activities for the cleanup of the Hanford 100-NR-1 and the 100-NR-3 RCRA operable units. The 100-N Area, which includes 100-NR-1 and 100-NR-3, is the site of the Hanford Generating Plant and the N Reactor. Parametrix's comments were based largely on federal and state statutory and regulatory requirements, including RCRA corrective action requirements defined in proposed amendments to 40 CFR Parts 264-271, Interim Final RCRA Facility Investigation Guidance, and Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Comments were also based on documents specific to implementation of the Hanford Federal Facility Agreement and Consent Order.

Hanford Waste Stream Characterization Reports

Parametrix performed a technical review of reports submitted to Ecology in accordance with the Hanford Federal Facility Agreement and Consent Order. The reports included all four volumes of the Waste Stream Characterization Report, thirty-three stream-specific reports, the Groundwater Characterization Data Report, and the Final Project Report. These reports were generated to: provide a detailed characterization (physical, chemical, and radiological) of all the liquid effluents; assess receiving (waste disposal) sites; assess groundwater contamination in area wells; and evaluate the potential for contaminant migration within the soil at receiving sites (flow and transport modeling). In addition, Parametrix performed loading calculations to estimate the total amount of radiological and chemical constituents discharged to the 27 receiving sites at Hanford. These loading calculations were then used to rank each receiving site by the amount of material that was disposed. In addition, the effluent streams were ranked according to the amount of material per month that is currently being discharged.

CERCLA Remedial Investigation/Feasibility Study Work Plans for the Hanford Site

Parametrix performed a technical and regulatory review of two CERCLA Remedial Investigation/Feasibility Study (RI/FS) work plans. These work plans discussed the proposed cleanup activities for the 100-BC-1 and 100-BC-5 operable units at the Hanford Site. The 100-BC-1 operable unit is an assemblage of individual waste units associated primarily with the B Reactor. This unit contains facilities, generally liquid and sludge disposal sites, that are potential sources of radiological and/or hazardous substance contamination. The 100-BC-5 operable unit consists of the groundwater and surface water affected by past activities in the 100-BC Area.

Review of the Hanford Site Low-Level Burial Grounds Permit Application Design Documents

Parametrix performed a technical review of the Department of Energy's Low-Level Burial Grounds Dangerous Waste Permit Application Design Documents. The design documents are for the construction of a new, lined trench (landfill) at Hanford for the disposal of containerized mixed waste. The trench must meet the landfill requirements of RCRA as well as the Washington State Dangerous Waste Regulations. The design documents were reviewed for technical adequacy as well as regulatory compliance. In general, the review identified various technical concerns, including issues that warrant

further analysis, as well as potential weaknesses that could diminish or destroy the project's effectiveness.

Review of the Hanford Site New Production Reactor Capacity Environmental Impact Statement

Parametrix performed a technical review of an environmental impact statement (EIS). This EIS, which was reviewed in accordance with the requirements of the National Environmental Policy Act, analyzes the programmatic and environmental impacts of siting, constructing, and operating one or more new production reactors and associated support facilities at Hanford. The production reactor would provide new capacity to produce tritium safely and reliably in order to meet the nation's defense requirements into the 21st century.

Grant County Dangerous Waste Management Facility Permitting

Parametrix was initially retained to assess the status of the Grant County Dangerous Waste Management Facility permit applications and supporting documentation. The facility, to be located near Vantage on the Columbia River, was proposed to handle non-liquid dangerous wastes for waste generators in the State of Washington and possibly in Oregon. Available studies and application materials were evaluated using guidelines that are based on 40 CFR 264, 270 and WAC 173-303. Evaluated were the waste analysis, security, inspections, contingency and closure/post-closure plans, as well as preparedness and prevention measures. Parametrix identified deficiencies and suggested an appropriate scope of work for completion of the permit application and subsequent environmental review. The scope of our services was expanded to include design of the dangerous waste management facilities and preparation of the Part B application.

Preston-Thorgrimson Continuing Consulting Services

Parametrix provided technical environmental and regulatory assistance on hazardous waste issues on an ongoing basis. These services include assistance in applying RCRA, CERCLA/SARA and the Washington State Dangerous Waste Regulations. Projects have involved permitting, interpretation of regulations, analysis of enforcement orders, and performing environmental monitoring. Recent work has included site investigations at a facility in south Seattle, assistance in RCRA permitting processes, and technical review and comment on a Negotiated Consent Decree between the Washington State Department of Ecology and an industrial party for performance of an RI/FS.

Additional Experience

Midway Landfill, Remedial Investigation/Feasibility Study

Parametrix conducted a CERCLA-mandated Remedial Investigation (RI) and Feasibility Study (FS) at the Midway Landfill site for the City of Seattle Solid Waste Utility. This municipal landfill site was placed on the National Priority List of hazardous waste sites by the U.S. EPA in 1986. While preparing the RI, Parametrix developed engineering design reports, plans and specifications, and construction cost estimates for work necessary to both close the landfill and expedite mitigation of the immediate threat related to landfill gas that had migrated off-site.

Following the discovery of methane in residences adjacent to the Midway Landfill, Parametrix was retained by the City of Seattle Solid Waste Utility to determine the extent and causes of the problem, and to install remediation measures. Landfill gas, a complex mixture of volatile organic compounds, had migrated more than 2,500 feet from the refuse. The services of Parametrix included preparation of design plans and specifications, construction management, emergency installation, and operation of a complex methane gas migration control system. It included installation of 37 gas extraction wells into the refuse, 38 gas extraction wells in the soil around the perimeter of the site, vacuum motor-blowers, flares, manifold pipes to connect the above features, off-site gas extraction wells to prevent gas from seeping into buildings and removing the gas reservoir that had migrated off-site, and installation of many gas monitoring probes around the site to confirm the effectiveness of the system and its operation. Parametrix also designed and installed a permanent, fully shrouded automatic gas flare facility. City personnel were trained in the operation of the system.

The RI included surface water and groundwater monitoring and underground gas and ambient air quality monitoring and modeling. The hydrogeologic portion of the RI was conducted to define the complex saturated and unsaturated flow through heterogeneous anisotropic geologic media, and to assess the nature and extent of groundwater contamination beneath the landfill. The investigation included geologic studies of subsurface stratigraphy, groundwater sampling and analysis, and landfill leachate sampling and analysis. Unique instruments and methods were developed to obtain critical field data in a setting where traditional methods were not effective. Hydrogeologic evaluation included characterization of aquifer/aquitard relationships, flow direction, travel times, aquifer yields, pump tests, water balance calculations, recharge rates, discharge calculations, and transient flow analysis. The subsurface water was found to contain both aqueous and

nonaqueous phase contaminated fluids. Unique hydrogeologic challenges of this project include non-aqueous migration pathways, non-aqueous thickness measurements, and extraction of non-aqueous fluids.

A special gas characterization investigation was conducted as part of the Midway Landfill RI. The purpose of this particular study was to develop a method for distinguishing methane gas produced by the decomposition of Midway Landfill materials from methane gas produced by other sources (e.g., peat bogs and wetlands). Subsurface gases from the landfill and surrounding areas were analyzed for differences in activity levels of naturally occurring radionuclides. (carbon-14 and tritium).

The original goal of the Midway Landfill special gas characterization investigation was to establish the age of the subsurface gas samples collected from on-site and off-site locations by analyzing their carbon-14 (C-14) content. It was believed that methane produced by the Midway Landfill would exhibit a higher level of C-14 activity, due to medical waste disposal, than other natural sources. Unfortunately, C-14 analysis was not as valuable as had been hoped in distinguishing between methane from the landfill and methane from other sources. As a result, tritium was studied as a means for making the distinction. The study was successful. Tritium levels measured on-site were three times higher than background or off-site levels.

The FS and Endangerment Assessment developed by Parametrix quantified the health risks and compiled and compared alternative remedial actions for the contaminant pathways not already remediated by Expedited Response Actions (ERA) designed by Parametrix. The FS included a groundwater extraction pilot test and treatability study. Parametrix, using in-house experts and two subconsultants, identified and evaluated the technologies for removing volatile organics, including TCE, DCE, PCBs, and VC from the aqueous leachate. In addition, Parametrix identified, evaluated, and conceptually designed and determined the costs of remedial alternatives as part of the FS.

The major issues addressed in the Environmental Impact Statement and Closure Plan, both developed by Parametrix, were the impacts of surface water management on an adjacent 10-acre wetland considered as a natural detention basin and on water quality, flow, and fisheries resources of Smith Creek.

St. John's Landfill Closure (METRO-Portland, Oregon)

Parametrix was selected to prepare plans and specifications for the closure of the 200-acre St. John's Landfill. The project included the design of a final cover, surface water management, and a landfill gas collection and permanent flare system. The final cover system will entail utilizing existing on-site clay materials used as part of the interim cover with 40 MIL flexible membrane liner over most of the landfill site. Gas collection to protect the cover system and to control odors will include installation of approximately 100 wells. A vacuum condensate collection system will also be installed to separate water out of the gas collection system. To control the gas, a permanent motor blower and flare system will be installed. Parametrix will provide services during construction and administer the construction contracts. The total construction project will occur between 1990 and 1995.

During closure of this landfill, a number of remedial activities will occur onsite. To proceed with these activities, it was necessary to investigate past radioactive sludge disposal. A file search confirmed that low-level radioactive sludge had been disposed of at the landfill. The radioactivity was primarily due to thorium-232 (Th-232) and originated from manufacturing processes at a metal parts manufacturer in the area. To insure the health and safety of the workers at the landfill, Parametrix developed a sampling, analysis, and surveying program for the low-level sludge disposal areas.

Oregon Department of Environmental Quality On-call Services

Parametrix has a contract with ODEQ for on-call hazardous waste services. Multiple project arrangements have been issued under this contract which is in its second year of authorization. Most of the work has been in the area of hazardous waste cleanup and site investigations. A more detailed discussion for representative projects is provided below:

Nu Way Oil Remedial Investigation/Feasibility Study

Parametrix is conducting an RI/FS at a former oil recycling facility located adjacent to the Columbia Slough in Portland, Oregon. The remedial investigation includes surface soil, subsurface soil, groundwater, surface water, and sediment data collection and analysis. Unique characteristics of this site include floating product, multiple waste types, and groundwater/slough interactions. In addition to the RI/FS, Parametrix developed recommendations for short-term site

management. To date, a detailed RI/FS work plan and a site security report have been developed and approved.

East Multnomah Groundwater Model Study, Portland, Oregon

Parametrix is currently working with Oregon Department of Environmental Quality to identify the extent of contamination of groundwater and develop an aquifer rehabilitation plan in East Multnomah County. The objective of the current phase of the project is to determine strategies for safe use of the groundwater in the area. Groundwater flow modeling and contaminant transport modeling will be used to predict safe pumping scenarios. Parametrix has developed an extensive database which contains key information including geologic logs, well construction information, water level data, water chemistry data, water use data, and pump test data. An extensive well inventory has been conducted in the area of high groundwater use. We have integrated available USGS data into the investigation.

Monthly water levels are collected by Parametrix and others and are used to determine groundwater flow directions. We are currently conducting the flow analysis and using the data to calibrate Modflow. We have conducted an extensive geologic investigation and are updating the interpretation with geophysical data obtained as part of the project. This project demonstrates our ability to perform technically complex hydrogeologic investigations on high visibility projects and to develop realistic, cost-effective solutions to groundwater contamination problems.

Oregon Department of Environmental Quality - Lakewood Estates

Parametrix is currently investigating organic contamination of a community drinking water supply and is developing remedial actions, treatment alternatives, and alternative water supply. The investigation of the source of contamination includes a hydrogeologic study, soil and water sampling, and an assessment of chemical handling at industries in the vicinity of the community. Remedial alternatives under development include ultra-violet oxidation, carbon filtration, and air-stripping. Potential remedial alternatives include removal of contaminated soils and/or pump-and-treat of the affected aquifer.

Risk Assessment/Toxicology

Washington Hazard Ranking System – Washington Department of Ecology

Parametrix staff developed and field tested toxicology-related components of the Washington Ranking Method (WARM), a hazard ranking system for prioritizing risks from hazardous waste sites in Washington state. Components developed included modules based on existing ambient standards (drinking water standards, ambient air quality standards), acute toxicity, chronic toxicity, carcinogenicity, and environmental toxicity (protection of aquatic and terrestrial wildlife).

Oregon Hazard Ranking System – Oregon Department of Environmental Quality

Parametrix reviewed and evaluated existing hazard ranking models for prioritizing cleanup of hazardous waste sites, modified the toxicology components of the Washington Ranking Method to meet the requirements of the Oregon Department of Environmental Quality for use in ranking Oregon hazardous waste sites, and developed and implemented a supplemental toxicology database to be used for scoring sites using the Oregon Hazard Ranking System.

Anaconda Smelter Remedial Investigation/Feasibility Study (RI/FS) – Anaconda Minerals Co., Anaconda, Montana

Conducted risk assessment evaluating human health risks associated with soils contaminated with arsenic and other heavy metals near a 6,000-acre Superfund site near Butte, Montana. Site contamination resulted from copper smelting and metals processing activities. Wastes evaluated included copper smelter flue dust, slag, tailings piles, and off-site residential soils affected by stack emissions fallout.

Endangerment Assessment for Mill Creek – Anaconda Minerals Co., Anaconda, Montana

Conducted risk assessment for evaluation of human health risks in a small residential community 1.5 miles from the Anaconda Copper Smelter Superfund site. Evaluated human health risks related to elevated levels of arsenic, lead, and cadmium in residential soils, house dust, and indoor and outdoor ambient air. Conducted technical review of urinary arsenic biomonitoring methods for assessing arsenic exposure in children.

Midway Landfill Remedial Investigation/Feasibility Study (RI/FS) – Seattle Engineering Department

Parametrix developed the public health and residual risk component of the *Midway Landfill Feasibility Study: Groundwater, Surface Water, Seeps, and Soils Pathways*. The predicted post-remedial public health risks associated with each of the proposed alternatives for remediation of groundwater contamination in the landfill vicinity were determined. Additionally, Parametrix developed the receptors investigation and preliminary endangerment assessment as part of the RI Summary Report, and provided detailed technical review of the FS endangerment assessments conducted for air/gas and groundwater/leachate pathways.

6. ESTIMATED COSTS FOR THE TOTAL CONTRACT AND COST PER TASK

The Parametrix team certifies that it has arrived at the offered prices independently, and no collusion, as defined by the Federal and State anti-trust laws, occurred during proposal preparation. Furthermore, the Parametrix team certifies that it has not and will not knowingly disclose prices to any other possible offeror prior to bid opening or contract award. No attempt has been made to influence any offeror or competitor to submit or not submit an offer.

Ramin H. Pelude — 12/24/91

Signature — Date

This section discusses the cost estimates developed by the Parametrix team to provide services to the New Mexico Environment Department in the review of WIPP-related technical documents. In developing these costs, the following elements were used:

- Labor rates are specified on an hourly basis for each team member identified and discussed in this proposal. These rates include salary costs, benefits, all other indirect costs, and profit.

- The percentage markup on labor and expenses for Applied Research Associates (ARA) and TRC Environmental Consultants is 10%. The markup on subconsultant labor is included in the total labor estimate for each task. Parametrix' employee-reimbursed expenses and in-house expenses are invoiced at cost with no markup by Parametrix. The percent markup on Parametrix' outside expenses is 10%. The markups for Parametrix' outside expenses are specified as a line-item in the budget estimates.

- It is our understanding that travel associated with the contract is limited to one visit per month for the projects, and to a total of four visits for public meetings.

- The State of New Mexico gross receipts tax (6.125%) is specified as a line-item for each cost estimate.

Labor Rates

Listed below are the 1992 labor rates for each of the Parametrix team members identified and discussed in this proposal. These rates include salary costs, benefits, all other indirect costs, and profit. These rates apply for standard hours, mid-week overtime, and weekend overtime.

—— PARAMETRIX, INC. ——

Personnel	Hourly Labor Rate	Personnel	Hourly Labor Rate
C. Moore	$ 116.94	D. Klopfer	$ 52.50
W. Kane	$ 94.23	V. Martinez	$ 62.44
P. Allen	$ 71.40	D. McReynolds	$ 77.77
L. Baltzell	$ 61.11	D. Miller	$ 90.90
M.S. Brancato	$ 80.78	R. Mullen	$ 67.19
T. Campbell	$ 63.11	J. Shields	$ 67.13
R. Cardwell	$ 132.09	G. Sorenson	$ 79.10
K. Darnell	$ 87.50	M. Spence	$ 66.29
D. Drennen	$ 117.78	B. Sullivan	$ 76.83

K. Easthouse	$ 80.78	T. Thompson	$ 62.83
L. Gilbert	$ 81.66	J. Volosin	$ 60.59
S. Gilbert	$ 107.35	K. Wells	$ 100.28
J. Good	$ 67.34	G. Williams	$ 55.06
G. Hayman	$ 63.95	E. Wu	$ 74.03
E. Hill	$ 96.74	J. Wukelic	$ 96.25
T. Jorgenson	$ 100.98	C. Zehner	$ 67.31
J. Kao	$ 111.98		

—— APPLIED RESEARCH ASSOCIATES, INC. ——

Personnel	Hourly Labor Rate	Personnel	Hourly Labor Rate
F. Maestas	$ 98.84	B. Gaither	$ 83.51
T. Steinborn	$ 107.17	K. Gaither	$ 69.59
J. Bratton	$ 145.48	J. Gibbons	$ 92.47

—— TRC ENVIRONMENTAL CONSULTANTS, INC. ——

Personnel	Hourly Labor Rate
K. Winges	$ 126.00
E. Hansen	$ 97.00

Cost Estimates

Cost Estimate: Review of the Part B Permit Application

With the basic understanding of the Part B Permit application as it has been discussed by the New Mexico Environment Department and in the request for proposals, Parametrix has developed a cost estimate of $180,000.00 to conduct a technical review of this document and provide associated support to the State. If appropriate, costs may be adjusted to reflect the State's specific needs and requirements to perform the technical review, which may not have been defined in the RFP.

Labor estimates are provided below as total amounts by task and include a 10% markup for subconsultant labor. We anticipate that ARA labor will represent approximately 20% of the total labor cost. TRC labor will represent approximately 10% of the total. It is likely that all or most of the team members identified and discussed in this RFP will be utilized in the review of the permit application. Expense estimates by task are also provided below. A line-item is provided to indicate a 10% markup on Parametrix' outside expenses.

Task 1. Initial Completeness Review

Labor Estimate:	$9,137.00	
Expense Estimate:	Travel (1 trip) (outside)	$1,500.00
	Reproduction (in-house)	$ 200.00
	Postage (outside)	$ 200.00
	Misc. Supplies (in-house)	$ 100.00
	Expense Subtotal:	$2,000.00
	Markup:	$ 170.00
	Expense Total:	$2,170.00

Estimated Task 1 Subtotal:	$11,307.00
Gross Receipts Tax:	$ 693.00
Estimated Task 1 Total:	$12,000.00

Task 2. Technical Evaluation Reviews

Labor Estimate:	$100,816.00	
Expense Estimate:	Travel (2 trips) (outside)	$3,000.00
	Reproduction (outside)	$1,000.00
	Postage (outside)	$ 200.00
	Misc. Supplies (in-house)	$ 100.00
	Expense Subtotal:	$4,300.00
	Markup:	$ 420.00
	Expense Total:	$4,720.00

Estimated Task 2 Subtotal:	$105,536.00
Gross Receipts Tax:	$ 6,464.00
Estimated Task 2 Total:	$112,000.00

Task 3. Evaluation of Responses

Labor Estimate:	$12,691.00	
Expense Estimate:	Travel (2 trips) (outside)	$3,000.00
	Reproduction (in-house)	$ 250.00
	Postage (outside)	$ 200.00
	Misc. Supplies (in-house)	$ 500.00

	Expense Subtotal:	$3,950.00
	Markup:	$ 320.00
	Expense Total:	$4,270.00

Estimated Task 3 Subtotal:	$16,961.00
Gross Receipts Tax:	$ 1,039.00
Estimated Task 3 Total:	$18,000.00

Task 4. Decision Analysis

Labor Estimate: $4,660.00

Expense Estimate:	Reproduction (in-house)	$100.00
	Postage (outside)	$200.00
	Misc. Supplies (in-house)	$250.00
	Expense Subtotal:	$550.00
	Markup:	$ 20.00
	Expense Total:	$570.00

Estimated Task 4 Subtotal:	$5,230.00
Gross Receipts Tax:	$ 320.00
Estimated Task 4 Total:	$5,550.00

Task 5. Administrative Permit Process

Labor Estimate: $22,432.00

Expense Estimate:	Travel (4 trips) (outside)	$6,000.00
	Reproduction (outside)	$ 750.00
	Postage (outside)	$ 200.00
	Misc. Supplies (in-house)	$ 500.00

Expense Subtotal:	$7,450.00
Markup:	$ 695.00
Expense Total:	$8,145.00

Estimated Task 5 Subtotal:	$30,577.00
Gross Receipts Tax:	$ 1,873.00
Estimated Task 5 Total:	$32,450.00

Total Estimate - Review of Part B Permit Application: $180,000.00

Cost Estimate: Review of Other Technical Documents

Other WIPP technical documents to be reviewed as part of this contract would include, but not be limited to, hydrogeological reports; waste packaging and placement criteria; waste treatment; explosiveness, gas production, and emergency response reports; sampling and statistical programs; radiation standards and protection; and long-term impact on public health, safety, and the environment.

It is the understanding of the Parametrix team that funding for the review and evaluation of WIPP-related documents by the New Mexico Environment Department has been established at $300,000. With the balance of funds that would remain after the review of the Part B Permit application ($120,000), the Parametrix team would be able to review and evaluate up to 600 pages of technical documentation from these other reports. This review and evaluation would include meetings with the state to discuss the findings. Based on our experience with technical documents from the Hanford site, 600 pages of documentation could correspond to the review and evaluation of up to 10 different technical reports.

Total Cost Estimate: $300,000.00.

7. DOCUMENTATION OF LOCAL OFFICE

Parametrix, Inc., Applied Research Associates, Inc., and TRC Environmental Consultants, Inc. have teamed on this project to provide the New Mexico Environment Department with comprehensive technical review of the RCRA permit applications, and other technical documents.

Parametrix will serve as the prime consultant and provide technical direction and oversight, and will facilitate communications with NMED. Applied Research Associates is a strong team member for this project; their staff have extensive technical and local experience. In addition, its office is located near the project site and can assist Parametrix in ensuring close client/consultant interaction. TRC has extensive, nationally recognized experience in air quality, meteorology, and hazardous waste.

Parametrix has successfully completed projects throughout the U.S. We are confident we can provide the same level of service and responsiveness to the NMED that we have provided for the Oregon Department of Environmental Quality (DEQ), the Kootenai County Commissioners (Idaho), the State of Maine and clients located in other states.

8. REFERENCES

Parametrix has provided technical review and assistance for hundreds of clients, including many RCRA/CERCLA projects. We encourage you to contact the following clients with regard to Parametrix' ability to complete technically sound projects on schedule and under budget.

RCRA Technical Experience

Mr. Larry Goldstein
Washington State Dept. of Ecology
RCRA Corrective Measure Studies
(206) 438-7018

Ms. Megan Lerchen
Washington State Dept. of Ecology
Review of DST Permit Application, Site-Wide Background Soil Sampling Plan, and Characterization and Use Document
(206) 438-3089

Mr. Joe Witczak
Washington State Dept. of Ecology
Review of Low-Level Burial Grounds Permit Application
Design Documents
(206) 438-7557

Mr. Brad Martin
Preston-Thorgrimson
RCRA, CERCLA/SARA Assistance
(206) 623-7580

Dr. Gerald Smedes
Environmental Security Corporation
Grant County Waste Management Permitting
(206) 725-1700

Mr. Bruce Jones
City of Seattle Solid Waste Utility
Midway Landfill, RI/FS
(206) 684-7687

Mr. Dennis O'Neil
Portland METRO
St. John's Landfill Closure
(Portland, OR)
(503) 221-1646

Mr. Steve Campbell
Oregon Dept. of Environmental Quality
On-Call Hazardous Waste Services
(503) 229-6715

9. SUBCONTRACTOR QUALIFICATIONS

Applied Research Associates, Inc., located in Albuquerque, New Mexico, is a 75-member firm which offers professional engineering, research, and program development in the following areas:

- Nuclear Engineering and Radiation Applications
- Explosive Mechanics
- Impact Mechanics
- Optimization, Risk, and Decision Analyses
- Civil, Structural, and Geotechnical Engineering
- Earthquake Engineering
- Wind Engineering
- Computer Simulation.

Their experience includes technical review and comment on documents which must be in compliance under RCRA/SARA regulations. ARA has completed over 125 projects for more than 50 different clients. Their client list includes the U.S. Department of Energy, the U.S. Nuclear Regulatory Commission, and the New Mexico Engineering Research Institute.

RCRA Documentation and Waste Treatment Procedure Review

ARA assisted a major GOCO contractor with review of hazardous materials documentation and waste treatment procedures under RCRA compliance requirements. ARA provided findings and recommendations to this client for his use in preparing an Environmental Protection Agency audit.

Consultation for Waste Isolation Pilot Plant (WIPP) Project

ARA was retained to direct the study of consequences of natural resource extraction and flow of pressurized brine through the radioactive waste storage facility. They also provided consultation on repository level selection, drill and blast excavation, site validation programs, rock support systems, installation/operation/data acquisition and interpretation of geomechanical instrumentation. In addition, ARA staff directed the instrumentation data acquisition and handling systems development, and assisted with underground mapping and rock behavior assessments.

Nuclear Waste Repository Development

ARA directed all geologic and geotechnical reviews and studies and supervised the geotechnical and environmental assessment activities for this project. ARA staff also developed plans for additional site studies and assisted in the preparation of the Site Validation Program Plan. This Plan was the first program used to achieve validation of a radioactive waste repository site.

Chemical Waste Manifesting and Labeling

ARA assisted a U.S. government facility in preparing its first waste shipment for transport and disposal in accordance with federal regulations. Their responsibilities included verification of inventoried wastes, preparation of manifests, and formulating labeling instructions.

TRC Environmental Consultants, Inc., have over 20 years experience conducting air quality modeling studies. TRC maintains the complete UNAMAP series of air quality models endorsed by the U.S. Environmental Protection Agency (EPA). TRC's Seattle office has authored the Fugitive Dust Model (FDM) for EPA. FDM is a dedicated fugitive dust modeling package. This model will be proposed for addition to Appendix A of the Guideline on Air Quality Models. The model has been used to evaluate dust migration from Superfund sites.

TRC was selected by the City of Mountain View, California, to provide air quality consulting services in relation to permits for a major landfilling operation for municipal solid waste. The major issues were odors and emissions of airborne toxic materials from the landfill. TRC estimated the impact of odors using an odor model and computer expected concentrations of a series of airborne toxic chemicals as a result of the landfill. TRC also examined the impact of milling the waste first with a rotary mill before landfilling. The results were submitted in a report to the City of Mountain View and were included in a permit application to the Bay Area Air Quality Management District. Prior to award of permits, the City of Mountain View made a policy decision to suspend all landfilling operations indefinitely and to close existing landfills. The permits were removed from consideration by the agency.

TRC also evaluated sulfur dioxide and particulate matter emissions from the Scott and Weyerhaeuser pulp mills in Everett, Washington. TRC created a 5-year sequential meteorological database from local wind data and SeaTac stability information for use in EPAs SHORZ, ISCST, and COMPLEX1 dispersion models. TRC evaluated the

ground level concentrations resulting from the mills operating at both actual and maximum permitted conditions.

TRC staff evaluated the potential emissions from a municipal solid waste incinerator for the Snohomish County Department of Public Works. The effort included coordination with air quality permitting agencies, developing an emission inventory for the main combustion process, conducting screening modeling of potential impacts, developing siting criteria, evaluating a number of sites for each air quality criterion, and conducting detailed air quality investigations of the final candidate sites.

With Parametrix, TRC is evaluating air quality considerations for an RI/FS for ASARCO's Ruston smelter. TRC is calculating emission factors for fugitive dust from the facility and using dispersion models to estimate the concentrations of windblown dust at off-site locations.

10. CONFLICT OF INTEREST FORMS

Neither Parametrix, nor its subconsultants assigned to this project, have received payment from any state agencies in New Mexico as defined on the attached "Conflict of Interest - Persons on Retainer or on Contract."

The Parametrix team warrants that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in a manner or degree with the performance of services required under this contract. Parametrix, Inc. further warrants that it does not hold any other contract with the Department of Energy for the writing and review of the Part A and Part B applications or any other WIPP activities related to these applications. Conflict of Interest forms follow at the end of this section.

STATE OF NEW MEXICO

OFFICE OF THE SECRETARY OF STATE
EXECUTIVE LEGISLATIVE BUILDING
SANTA FE 87503

Clara Jones
SECRETARY OF STATE

ADMINISTRAT
BUREAU OF ELEC
OPERATIONS DIV
(505) 827-36

CONFLICT OF INTEREST
PERSONS ON RETAINER OR ON CONTRACT

"Any individual, not an employee, who directly or through a business in which such individual has a financial interest, or any business which receives more than five thousand ($5,000), in any one twelve-month period, in the aggregate from one or more state agencies by contract for professional services rendered such agencies, shall disclose such fact in writing to the secretary of state, together with the names of the agencies for which such services were rendered and the total amounts paid by each agency." (Section 10-16-12, NMSA, 1978 Comp.)

Winges	Kirk	
Last Name	First Name	Initial

TRC Environmental Consultants 21907 64th Avenue W., Suite 230, Mountlake Te
Home Address: Number Street City Zip Cod
WA., 98043

STATE AGENCIES FROM WHICH YOU ARE BEING PAID	AMOUNT FROM EACH
Neither TRC Environmental Consultants nor	
its employees assigned to the project have	
received payment from any state agencies	
in New Mexico.	

Above not Applicable

Signature

December 20, 1991
Date

(REV. 1/83)

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Bulding
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2850

BRUCE KING
GOVERNOR

JUDITH M. ESPINOSA
SECRETARY

RON CURRY
DEPUTY SECRETARY

CONFLICT OF INTEREST
PERSONS ON RETAINER OR ON CONTRACT

The Contractor warrants that it does not hold any other Contrac with the Department of Energy for the writing and/or review of th Part A and Part B applications for the permit required by th Resource Conservation and Recovery Act or any other WIPP activ ities related to these applications. The Contractor also assure the same for its Subcontractors working on this Contract.

Winges Kirk

Last Name First Name Middle Initial

Vice President

Title

TRC Environmental Consultants, Inc.

Corporation Name

21907 64th Avenue W, Suite 230, Mountlake Terrace, WA 98043

Corporation Address: Number Street City Zip Code

Signature

December 20, 1991

Date

Clara Jones
SECRETARY OF STATE

STATE OF NEW MEXICO

OFFICE OF THE SECRETARY OF STATE
EXECUTIVE LEGISLATIVE BUILDING
SANTA FE 87503

ADMINISTRATI
BUREAU OF ELEC
OPERATIONS DIV
(505) 827-36

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Bratton	Jimmie	
Last Name	First Name	Initial

Applied Research Associates, Inc. 4300 San Mateo Blvd., Suite A-220, Albuquerq
Home Address: Number Street City Zip Code
NM 87110

STATE AGENCIES FROM WHICH YOU ARE BEING PAID	AMOUNT FROM EACH
Neither Applied Research Associates, Inc.	
nor its employees assigned to the project	
have received payment from any state agencies	
in New Mexico as defined above.	

Above not applicable.

J. L. Bratton
Signature Jimmie L. Bratton

December 17, 1991
Date

(REV. 1/83)

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Bulding
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2850

BRUCE KING
GOVERNOR

JUDITH M. ESPINOSA
SECRETARY

RON CURRY
DEPUTY SECRETARY

CONFLICT OF INTEREST
PERSONS ON RETAINER OR ON CONTRACT

The Contractor warrants that it does not hold any other Contrac with the Department of Energy for the writing and/or review of th Part A and Part B applications for the permit required by th Resource Conservation and Recovery Act or any other WIPP activ ities related to these applications. The Contractor also assure the same for its Subcontractors working on this Contract.

Bratton Jimmie L.
Last Name First Name Middle Initial

Principal
Title

Applied Research Associates, Inc.
Corporation Name

4300 San Mateo Blvd. NE, Suite A220 Albuquerque, NM 87110
Corporation Address: Number Street City Zip Code

Signature Jimmie L. Bratton

December 17, 1991
Date

Clara Jones
SECRETARY OF STATE

STATE OF NEW MEXICO

OFFICE OF THE SECRETARY OF STATE
EXECUTIVE LEGISLATIVE BUILDING
SANTA FE 87503

ADMINISTRAT
BUREAU OF ELEC
OPERATIONS DIV
(505) 827-36

CONFLICT OF INTEREST
PERSONS ON RETAINER OR ON CONTRACT

"Any individual, not an employee, who directly or through a business in which such individual has a financial interest, or any business which receives more than five thousand ($5,000), in any one twelve-month period, in the aggregate from one or more state agencies by contract for professional services rendered such agencies, shall disclose such fact in writing to the secretary of state, together with the names of the agencies for which such services were rendered and the total amounts paid by each agency." (Section 10-16-12, NMSA, 1978 Comp.)

Beluche	Ramon	A.
Last Name	First Name	Initial

Parametrix, Inc.	13020 Northup Way	Bellevue	98005
Home Address: Number	Street	City	Zip Cod

STATE AGENCIES FROM WHICH YOU ARE BEING PAID	AMOUNT FROM EACH
Neither Parametrix, Inc. or its employees	
assigned to the project have received	
payment from any state agencies in New	
Mexico as defined above.	

Ramon Beluche
Signature
PRINCIPAL

12-16-91
Date

(REV. 1/83)

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Bulding
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2850

BRUCE KING
GOVERNOR

JUDITH M. ESPINOSA
SECRETARY

RON CURRY
DEPUTY SECRETARY

CONFLICT OF INTEREST
PERSONS ON RETAINER OR ON CONTRACT

The Contractor warrants that it does not hold any other Contrac with the Department of Energy for the writing and/or eview of th Part A and Part B applications for the permit required by th Resource Conservation and Recovery Act or any other WIPP activ ities related to these applications. The Contractor also assure the same for its Subcontractors working on this Contract.

Beluche	Ramon	A.
Last Name	First Name	Middle Initial

Principal
Title

Parametrix, Inc.
Corporation Name

13020 Northup Way — Bellevue — 98040
Corporation Address: Number Street — City — Zip Code

Signature

December 13, 1991
Date

11. STANDARD OPERATING PROCEDURES MANUAL

Parametrix developed a project management handbook based on the collective experience of Parametrix managers over the more than 20 years of operating the company. The *Parametrix Project Management Handbook* is included in the attached pages.

DRAFT PARAMETRIX

PROJECT MANAGEMENT HANDBOOK

OVERVIEW

You are the project manager. There is help available, but ultimate responsibili for project success is yours. That philosophy has guided the development of th handbook. The project management approach presented here is based on th collective experience of Parametrix managers over the more than 20 years operating the company. As project manager at Parametrix, you are responsib for the wide range of activities discussed throughout this handbook.

While it is a dynamic tool to be updated whenever additions may benefit its user the *Parametrix Project Management Handbook* is based on these three goals:

- To serve as a resource document to all Parametrix project managers in th routine fulfillment of their project management responsibilities
- To ensure project management performance is consistent with Parametr standards
- To serve as a training tool for new project managers at Parametri whether they are newly developing staff or more senior staff who hav recently joined the company.

The handbook addresses these goals by discussing all the responsibilities of th Parametrix project manager. These responsibilities include those duties, such using the Management Information System (MIS) and client billing, required f successful project management. Recommendations or suggestions, however, a also made on helpful approaches to project management that may not b required of all projects.

It is our desire to make project management at Parametrix as easy and effecti as possible without creating cumbersome procedures or unnecessary requiremen As we continue to strive for individual and corporate success, we will continue refine this handbook. We sincerely encourage your suggestions for its continue improvement.

HANDBOOK STRUCTURE

For your ease, the handbook separates the elements of project management into four basic areas of project responsibility:

- Client Relations
- Technical
- Administrative
- Financial.

After a brief introductory chapter on the role and responsibilities of the project manager, the client relations, technical, administrative, and financial aspects of projects are presented in separate chapters of the handbook. Each of these categories is further subdivided into specific elements further explained through a question-and-answer format that repeats the following questions in each chapter:

- Why is the element important to project managers?
- When does the element need to be completed?
- How is the element accomplished?

The four categories of project responsibility do not represent a chronological sequence of project management. Many of the elements within each category interweave during the life of a project. Instead, we have chosen the handbook structure presented here because:

- Each category can be taught as a separate workshop
- There are many facets to project management
- Learning all aspects of project management takes time and experience. Parametrix staff may be introduced to project management by initially only fulfilling the responsibility of one or two categories
- Depending on the project, one category may be more important than the others.

Workshop Concept

Separating the project management process into distinct units will enable new project managers to learn the Parametrix system through workshops. We envision this handbook as a resource project managers use, not as something that sits on a bookshelf. One way to encourage its use is to provide workshops that elaborate on each area of project management. These introductory workshops will provide

CERTIFICATE OF INSURANCE

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ISSUE DATE (MM/DD) 01/09/92

PRODUCER

HURLEY ATKINS & STEWART
1800 NINTH AVE #1500
SEATTLE WA 98101

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COMPANY LETTER D	
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PARAMETRIX INC
P O BOX 460
SUMNER, WA 98390

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

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A	GENERAL LIABILITY	02CC2947473	10/20/91	10/20/92	GENERAL AGGREGATE	$ 2,000
	X COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG.	$ 2,000
	CLAIMS MADE X OCCUR.				PERSONAL & ADV. INJURY	$ 1,000
	OWNER'S & CONTRACTOR'S PROT.				EACH OCCURRENCE	$ 1,000
	X WA STOP GAP				FIRE DAMAGE (Any one fire)	$ 50
	X EMPLOYEE BENEFI				MED.EXP. (Any one person)	$ 5
A	AUTOMOBILE LIABILITY	02CC2947473	10/20/91	10/20/92	COMBINED SINGLE LIMIT	$ 1,000
	X ANY AUTO				BODILY INJURY (Per person)	$
	ALL OWNED AUTOS				BODILY INJURY (Per accident)	$
	SCHEDULED AUTOS					
	HIRED AUTOS					
	NON-OWNED AUTOS				PROPERTY DAMAGE	$
	GARAGE LIABILITY					
A	EXCESS LIABILITY	01SU08710930	10/20/91	10/20/92	EACH OCCURRENCE	$ 1,000
	OTHER THAN UMBRELLA FORM				AGGREGATE	$
	WORKER'S COMPENSATION AND EMPLOYERS' LIABILITY				STATUTORY LIMITS	
					EACH ACCIDENT	$
					DISEASE-POLICY LIMIT	$
					DISEASE-EACH EMPLOYEE	$
B	OTH. PROFESSIONAL LIABILITY	NTF2015876	11/12/91	11/12/92	$1,000,000 EACH CLAIM AND $2,000,000 IN THE AGGREGATE	

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

PROJECT: RCRA PERMIT APPLICATION/TECHNICAL DOCUMENT. REVIEW FOR DEPARTMENT ENERGY WASTE ISOLATION PILOT PLANT.

CERTIFICATE HOLDER

NEW MEXICO ENVIRONMENTAL DEPARTMENT
P O BOX 26110
SANTA FE, NM 87502-6110

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE T
EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO
MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO
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AUTHORIZED REPRESENTATIVE

Diane K Brooke

examples of each element of project management and allow new and incoming managers to ask questions on how projects are managed at Parametrix.

Project Management as an Evolving Process

While the basic elements of project management may not change, the process by which these elements are accomplished could change. As Parametrix grows, it will probably be necessary to adopt new project management techniques. Therefore, we have designed this handbook so that each chapter can be revised, updated, and replaced as necessary.

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Chapter 1
Role and Responsibilities of Project Manager

Chapter 1 Objectives

This chapter briefly defines what we think your role is as project manager at Parametrix. How your role is perceived by the other key players in the project is also spelled out.

Roles and Responsibilities of Project Manager

1.1 INTRODUCTION

The role of the project manager is to serve the company and the client with the highest quality, most cost-effective, and timely service possible. At the same time, project managers must operate in a manner consistent with our three basic corporate goals: to grow, to be profitable, and to have fun.

This means that in addition to the client service and business aspects of what gets done, the project manager also needs to focus on *how* things get done. As much as possible, the project manager must approach the project in a way that considers the whole project team. We want Parametrix to continue to be a professional, yet fun place to work. This means that projects need to be managed in a way that provides challenge and opportunity for the project team without imposing unrealistic expectations upon them.

The responsibilities of the project manager are discussed in detail within this handbook and are the focus of the four functional areas of client relations, technical, administrative, and financial project management.

In short, the role of the project manager is multifaceted and can be expressed differently based on the expectations of the players in the project:

The Client: The best service possible. That means work performed quickly and at reasonable rates, within budget and on schedule, and without unnecessary problems.

The Team Members: Project leadership. Most important to your team is keeping the project and team on schedule, organized, involved, and well enough informed to do their work. Team members need opportunities, challenges, mentoring, and good management of their schedules and workloads.

The Project Manager: A successful project. Success means meeting client and agency objectives on time, within budget, and profitably. A well-run project is a career building block.

Parametrix: As a project manager, you are Parametrix. That makes you responsible for all of the above. *Your understanding of your role and responsibilities as a project manager at Parametrix is the key to our continued success.*

1.2 PROJECT MANAGEMENT PROCESS

To produce a successful product, you must attend to many details. These details follow in a sequence best described as the project management process. That process can be grouped under the following headings:

- Successful proposal
- Completed work plan
- Contract development
- Kickoff meeting
- Project coordination
- Document production
- Closing a job
- Maintaining the client relationship.

These steps are summarized in Figure 1-1. Within each step are numerous elements you will need to complete as your project progresses. Figure 1-1 codes each element to the section of this handbook where it is explained in detail.

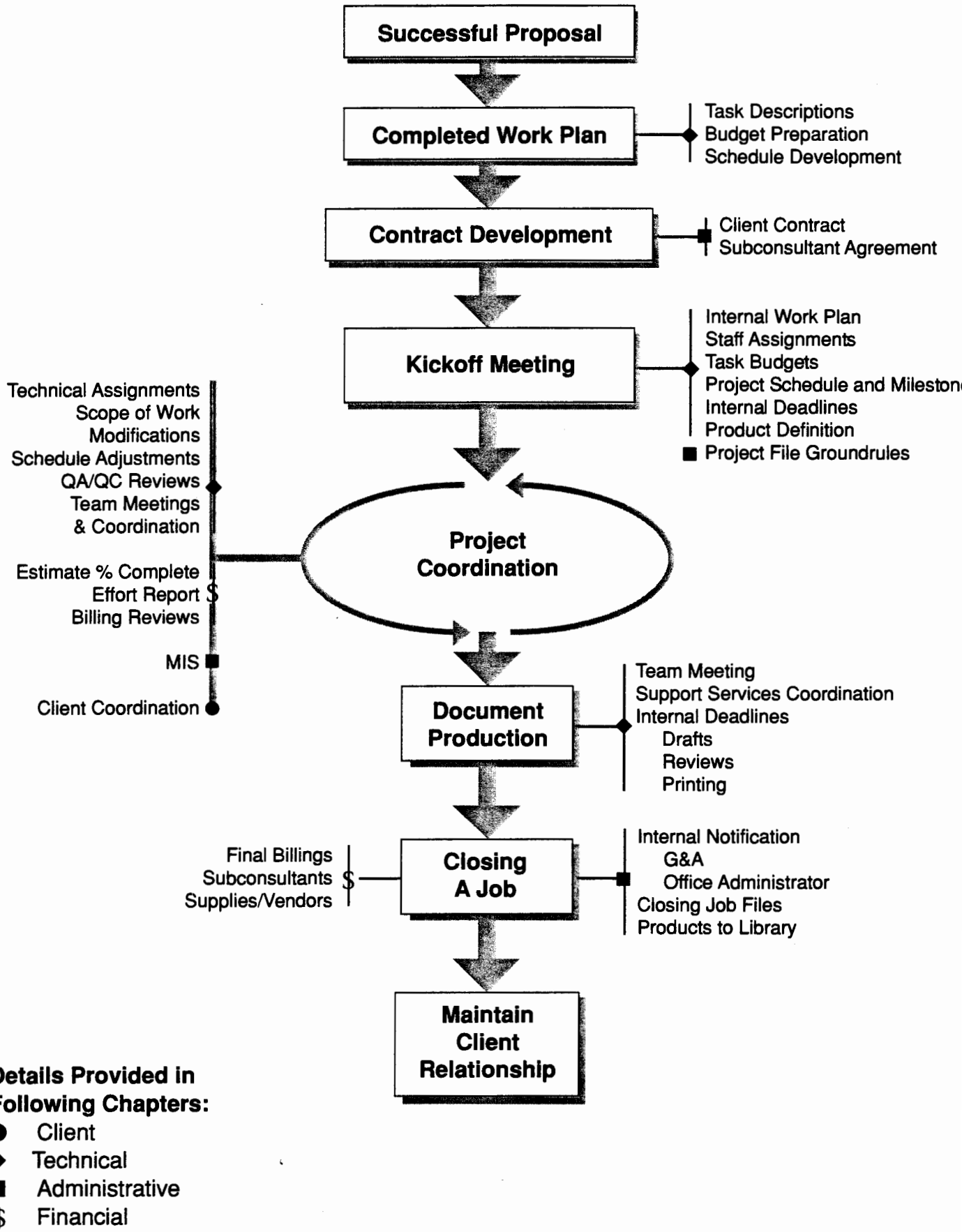


Figure 1-1.
Project Management Proces

Chapter 2
Client Relations

Chapter 2 Objectives

Good client relations are key to our success. In this chapter you'll learn how to:

1. Manage contracts so that clients clearly understand the terms of our scope of work and the impact of any changes to it.
2. Communicate with clients so that project details are quickly and clearly conveyed.
3. Find equitable solutions to any problems that may arise.
4. Develop and keep good working relations with clients.

Client Relations

2.1 INTRODUCTION

Why are client relations important?

For each project, the project manager is by definition the primary client contact. You represent Parametrix to the client. While there may or may not be higher level contacts between Parametrix and the client, you are the person upon whom the client depends for the following:

- Work done on schedule, within budget, and according to the client's needs
- Clear, concise information about the progress of the job
- Accountability for quality of work
- The professional and technical competence of the firm and the project manager.

The importance of effective client relations cannot be overemphasized. Good client relations promote:

- The client's perception of Parametrix and their satisfaction with our work
- Prompt, full payment for our services
- Additional services we may provide the client
- A good reference the client will gladly give to other potential clients.

In short, confidence in the project manager means confidence in Parametrix. Effective client relations will establish and maintain the client's confidence through the life of the project.

What are the key areas most important to client relations?

Several key areas of client relations are important to our work—contract management, communication, problem resolution, and developing and marketing our clients. *Contract management* is important because it is the primary agreement between our client and the firm. It is the legal foundation upon which we do our work and get paid. *Communication* with both clients and potential

clients directly shapes our working relationship with them, their perception of our ability to meet their needs, and our ability to win new projects. Nearly every human interaction can involve disagreement. Consequently, *problem resolution* is key to good client relations. With satisfactory project performance and client relations, *developing and marketing our clients* can lead to long-term working relationships and new projects.

2.2 CONTRACT MANAGEMENT

Why does the project manager need to worry about contract details?

As the person responsible for directing Parametrix technical staff and subconsultants, the project manager must assure that all terms of our project contractual agreements are met (see Section 4.3, Contracts). The client looks to you to ensure that all contract conditions are met. This means that you must read and understand the contract terms, the scope of work, and any relevant attachments to the contract. You must closely monitor progress against the scope of work, costs incurred versus the project budget, and the project schedule and milestones.

What happens if the scope of work changes?

Although at Parametrix we do not work outside an authorized scope of work, frequently as the project proceeds, the scope of work, the schedule, key personnel, or the budget need to be changed. New work may be added, unavoidable delays may occur, or some parts of the scope of work may be deleted. Anytime changes or new scope of work elements occur, you *must* ensure that the contract is appropriately amended. This means that you must obtain *written* authorization from the client's designated representative (the person specified in the contract) to make any necessary changes. *The client is not legally bound to pay us for any work we perform that is not specifically stated in the contract or its amendments*. Verbal agreements may not be binding or legally enforceable. *Get it in writing*!

Ideally, you should get this written authorization *before* proceeding with the work. By obtaining this agreement in advance, the client can review and comment on the scope changes. This early review minimizes the chances of a client objecting (and refusing to pay for) the work when the invoice is presented. In the "heat of battle" while conducting a project, written authorization cannot always be obtained before work is done.

Many clients may give only verbal authorizations. In this event, however, you should:

- Consider whether it is appropriate to proceed with the work solely on verbal authorization. If the authorization is a major change, it may be advisable to get it in writing, or get the authorization of a Parametrix principal before proceeding.
- Immediately prepare a Record of Communication documenting the client's directive. Place it in the project file.
- Immediately send a letter that documents this change to the client. This letter will allow the client to confirm their verbal request.
- Confirm that the client has received the letter.
- Strongly encourage the client to prepare the written authorization as soon as possible.

Why do changes need to be documented right away?

Because the changes to work can be numerous and occur frequently during a project, it is easy to allow the paperwork to slide. If not properly managed, documenting contract modifications can be a source of problems with a client. As project manager, you must keep up with the amendments as they happen. It is impossible to reconstruct days, weeks, or months later what specific changes the client actually agreed to. Generally, clients will respect your professional approach to contract management and will cooperate to keep the paperwork managed.

What happens if some contract terms are not met?

It is important for project managers to understand what risks are involved if contract terms are not met. If the terms are not met, then technically Parametrix is in "breach of contract." This can result in several potential client responses:

- The client may overlook minor contractual items
- Complaints, either verbal or written
- Refusal to pay for all or part of the work performed
- Requiring Parametrix to perform additional work or rework without compensation
- Filing a lawsuit against the firm for "specific performance" (requiring that contract terms be met) plus payment of court costs and attorney fees
- Filing a lawsuit against the firm for damages determined by the court
- All of the above.

These are all responses that harm the reputation of the firm (and the project manager). When contract terms are not met, the results can be costly and time consuming. *In the end, you are responsible for ensuring that no work outside the contracted scope and budget takes place without the proper written agreements from the client.*

2.3 COMMUNICATION

Communicating with our clients and potential clients is the primary way we transfer information about our projects and proposals. It is extremely important to avoid potential project problems and to enhance the client's understanding of, and satisfaction with, the project's progress and deliverables.

How do we communicate with clients?

Once the project begins, communication with the client generally increases. Your communications can be written, in person, or by telephone (including fax), and may be formal or informal. Formal communications include:

- Any reports called for in the contract, such as monthly written status reports and draft and final deliverables
- Regularly scheduled meetings with the client or regulatory agencies
- Other written correspondence, such as project billings, and letters from or to the client.

How do we document communications?

All incoming formal correspondence is ultimately sent to the project files. All outgoing formal correspondence must be copied, and the original and copies sent to the project file. All written documentation should have the project number on it. If the client has a project correspondence numbering system, that number should also appear on each document.

Informal communications are typically the more routine, day-to-day communications by Parametrix staff. Whether by telephone or in person, any substantive project communications with the client or other parties must be documented by completing a Record of Communication form or a memo.

Good management practice is to include on all project documents the project number, the date, and the name of the preparer. All outgoing reports, faxes, or other information should have a transmittal letter or form. Copies of the transmittal letter or form must be sent to the project file to document that the

materials were sent. For fax transmittals, the report generated by the fax machine at the end of transmission should also be attached to the material sent. That report is the official record of transmission and, done routinely, provides legal evidence the material was faxed.

How do we communicate with the client about project changes?

As discussed in Section 2.1, whenever deviations to the contracted scope of work become apparent, you must define those changes in scope and their implications on the project's schedule and budget. Any such changes *must* be clearly and quickly communicated to the client and Parametrix management. The changes must be fully documented in writing with the client and copies of that correspondence placed in the project file.

How do we communicate with the client when we close the project?

In closing the project, you express to the client an appreciation for choosing Parametrix and identify and discuss any potential areas for future work. Sincere and open discussions with the client at this stage of the project can also identify ways in which the project and your own work can improve.

2.4 PROBLEM RESOLUTION

Most projects begin in an atmosphere of enthusiasm, optimism, and cooperation. Goodwill is at its highest point, and no problems or conflicts have arisen to slow progress or dampen enthusiasm. Yet experience has shown that conflicts can arise as the project proceeds. It is important to be prepared to handle any complications.

How do I avoid problems on my project?

While optimism is nice, it cannot replace good project management. In the complex technical areas for which we provide services, lay people (such as many of our clients) do not really understand the duties and limits of our services. In this environment, our clients can have unrealistic expectations of the services we provide. *Your key role as project manager is to clearly define for the client, Parametrix staff, and Parametrix management, the problems or anticipated problems that arise during the course of the project.*

When there is a problem, what does the company expect me to do about it?

Parametrix is a problem-solving company. This means that the firm expects our project managers to present the client with potential solutions to the problem. In situations beyond your experience, you must present the problem to senior

Parametrix management for immediate assistance. Normally, the necessary communications with the client will take place with the recommended solutions already identified, unless essential to do otherwise.

What kinds of problems can I expect?

Problems encountered on a project can be either contractual or technical. Contractual problems can include:

- Change(s) in project conditions
- Falling behind schedule
- Exceeding project budgets
- Missing deliverables
- Changing key personnel without client approval.

Technical problems on a project can include:

- Technical errors in work performed
- Not following the work plan
- New technical developments/requirements.

Problems to the client may be actual problems with our job performance or *perceived* problems. Perceived problems generally occur when communication with the client has not been effective. Such problems, however, can also be the easiest to resolve when identified by providing the client with factual information.

How can I recognize when there may be problems?

Some warning signals to alert the project manager that problems may arise include:

- **Additional work outside the scope including:**
  - Extra work requested by the client
  - Extra work requested by agency staff
  - Work due to delays at the site or with subconsultants
- **Client not expressing satisfaction with project progress, product, or expenses**
- **Client not returning telephone calls.**

What can I do when there are problems?

Some potential actions you can take to remedy such problems are these:

- Keep calm, act professionally.
- Talk to the assigned principal.
- Have frequent and documented telephone or personal communication or meetings with the client.
- Submit timely and detailed status reports documenting progress and budget expenditures (see Figures 5-5 and 5-6, Billing Transmittal Letter).
- Get signed revisions to the scope of work, budget, and contract *before* work continues.
- Have frequent project team or client meetings.
- If the project manager and the client have reached a point of disagreement unresolvable by negotiations and discussions, ask for help from senior management.

2.5 CLIENT DEVELOPMENT AND MARKETING

The best possible marketing comes from clients satisfied with Parametrix' services. When clients are happy with our work, they desire continued assistance and provide us with repeat business.

What can I as project manager do to help with marketing?

You can greatly assist the firm's marketing success with a client by:

- Developing good working relationships through clear and timely communications
- Maintaining good quality control of deliverables
- Meeting or bettering established project schedules and budget limitations.

Successfully completing a project does not mean, however, that Parametrix will automatically be hired for the next job. There will always be hungry competitors out there marketing heavily for the work.

How can I market my clients?

Effective marketing of existing clients is done actively in two ways:

1. **Determine if additional services are needed during the project.** Always seek opportunities to provide the client with additional services during the

course of an existing project. During a project you may be able to identify other services the client needs which can be provided by another division of the firm. Many clients have more than one site or project that they may be working on simultaneously. During informal discussions with the client or staff working on the project, you can gain additional information about other potential work.

2. **Determine if additional work is needed when the project closes.** At the successful conclusion of the job and immediately after, clients may be aware of and concerned with subsequent projects their companies may work on. The client's awareness of Parametrix is still high at the end of the project and for a period afterwards.

   Use this close association to discover potential opportunities with the client, and be prepared to ask the client for the opportunity to do the work. You are responsible for informing your client of Parametrix' capabilities and our interest in the work. This does not necessarily mean giving the client "the hard sell." Instead, it means keeping the client informed in the most appropriate way by showing them our active interest in their work.

   If you feel unfamiliar with the services offered by our other technical groups, discuss with senior management the best way to approach communicating this information to your client.

   By becoming aware of opportunities early on and approaching them through well-established, effective working relationships, this proactive marketing strategy can be successful for Parametrix and our clients.

Chapter 3
Technical Project Management

Chapter 3 Objectives

At Parametrix, we pride ourselves in providing high quality technical consulting services. The primary objectives of this chapter are to show you how to:

1. **Plan the project.** This is the essential first step in project management.

2. **Communicate the plan to the project team.** You must effectively communicate the project plan to the team so that team members can direct their talents toward the project goals.

3. **Start and guide the project.** There are many ongoing responsiblities of the project manager over the length of the project. Persistent attention to these duties is an essential component of successful project completion.

4. **Ensure quality control and frequent communication.** A project manager must keep the client, the project team, and the relevant agencies up to speed on project progress and changes.

Technical Project Management

3.1 INTRODUCTION

The overall goal of technical project management is to provide the client with the services they request and make a fair profit. Typically, technical work takes place in four phases (Figure 3-1). They are (1) planning the project, (2) communicating the goals to the project team, (3) starting and guiding the project, and (4) ensuring quality control and frequent communications.

Each phase of technical work on your project includes steps vital to successfully completing the project. To give our clients the best technical service and keep Parametrix profitable, you must complete each step along the way. These steps and the four phases they occur in are as follows:

Step 1 - Plan the project

- Work with the client to define the project goal (understand what the client expects, not what you think they need)
- Identify the key technical issues
- Identify the appropriate regulatory framework and plan for coordination with agencies
- Select the appropriate project team
- Develop a step-by-step plan to achieve the project goal
- Estimate a budget and schedule for completing each step of the work

Step 2 - Communicate the plan to the project team

- Hold kickoff meeting
- Hold regular team meetings

Step 3 - Start and guide the project

- Begin to implement plan
- Direct, guide, and control the project

Step 4 - Ensure quality control and frequent communication

- Keep the team up to date on project progress and changes in plans
- Always keep clients involved in the project direction—it's their money.
- Provide quality assurance and quality control (QA/QC)

Plan the Project

- Work with the client to define the project goa (understand what the client expects, not what you think they need)
- Identify the key technical issues
- Identify the appropriate regulatory framework and plan for coordination with agencies
- Select the appropriate project team
- Develop a step-by-step plan to achieve the project goal(s)
- Estimate a budget and schedule for completi each step of the work

Communicate the Plan to Project Team

- Hold kickoff meeting
- Hold regular team overview meetings

Start and Guide the Project

- Begin to implement plan
- Direct, guide, and control the project

Ensure Quality Control and Frequent Communication

- Provide quality assurance and quality control
- Keep the team up to date on project progress and changes in plans
- Always keep clients involved in the project directior it's their money

Figure 3-1.
The Four Phases of Technical Project Managem

Why is technical project management important?

Clients typically come to consultants because they want help in achieving a goal on time and within budget. When clients come to a technically based firm like Parametrix, they usually want help dealing with a set of technical issues. If we want to remain successful, we must focus on providing excellent technical assistance to our clients—that is our product.

3.2 ELEMENTS OF TECHNICAL PROJECT MANAGEMENT

Several elements of technical project management are your responsibility as project manager:

- Set the stage
  - Determine the "big picture"
  - Define the goal of the project
  - Identify the key technical issues
  - Select the project team
  - Structure the project
- Develop the work plan
- Develop the project schedule
- Develop the project budget
- Hold a kickoff meeting
- Complete QA/QC procedures
- Give ongoing direction, guidance, and control of all technical aspects of the project
- Give feedback
- Update the marketing database.

Technical project management is complex. How you carry out each of these duties directly shapes the technical quality of your project. Yet each of these jobs has many highly detailed parts. These details are fully explained in Sections 3.3. through 3.11.

3.3 SET THE STAGE

Setting the stage means determining the "big picture" of the project. It includes, at a minimum, clarifying the project goal, identifying the key technical issues, selecting technical task managers for each discipline, and selecting a project structure.

Why is setting the stage important?

Setting the stage is very important to all projects and essential to large, interdisciplinary jobs requiring answers to complex technical problems. It means deciding on a goal, assembling the key players, and directing them toward the targeted goal in a coordinated way. By setting the stage, the project's goal becomes clearly defined, making it easier for you to direct team members during the life of the project.

When does the stage need to be set?

The project manager must develop the big picture before the work plan, schedule, and budget are developed, and before the kickoff meeting. If you begin without a clear understanding of the project goal, your project could soon run into trouble. It is difficult to change the course of a project after it has begun. *Know and communicate the project goal to your staff at the kickoff meeting.* Be sure to select and arrange for all key team members to attend the kickoff meeting.

Many people rely on the work done during the proposal phase to set the stage. However, given the common delay between proposal preparation and starting a project, you must revisit these critical issues once you receive Notice to Proceed.

How do you set the stage?

A project manager develops the big picture of the project with the client. Explore the client's motives for using a consultant. Then identify the key technical issues. Often in-house brainstorming with senior technical people is very useful at this stage. If a project team has not already been organized during the proposal stage, you should contact the appropriate technical group manager and request that a qualified technical task manager be assigned to your project. For example, if you need a hydrogeologist, you would contact the lead hydrogeologist.

Organizational charts (Figures 3-2 to 3-5) will help you identify the appropriate technical group leader. The technical task manager can work with the technical group leader to identify junior staff with the skills and availability to work on the project. Once the necessary staff are selected, you develop a project team organizational chart (see Figure 3-5). This team chart can often be revised from the organizational chart used in the proposal.

The big picture is communicated to the team at the kickoff meeting. Because the entire team must understand the big picture and what role they are to play on the team, you must require that all team members attend. That means including an appointed person from support services, drafting, and surveying in the kickoff meeting. During the kickoff meeting, the project manager provides an overview

meeting. During the kickoff meeting, the project manager provides an overview of the project, the overall project goals, and a project organizational chart. More details on the kickoff meeting are provided in Section 3.7, Hold Kickoff Meeting.

Many projects change with time. As project manager, you must make a personal commitment to keep all team members up to date on any changes in the overall project scenario.

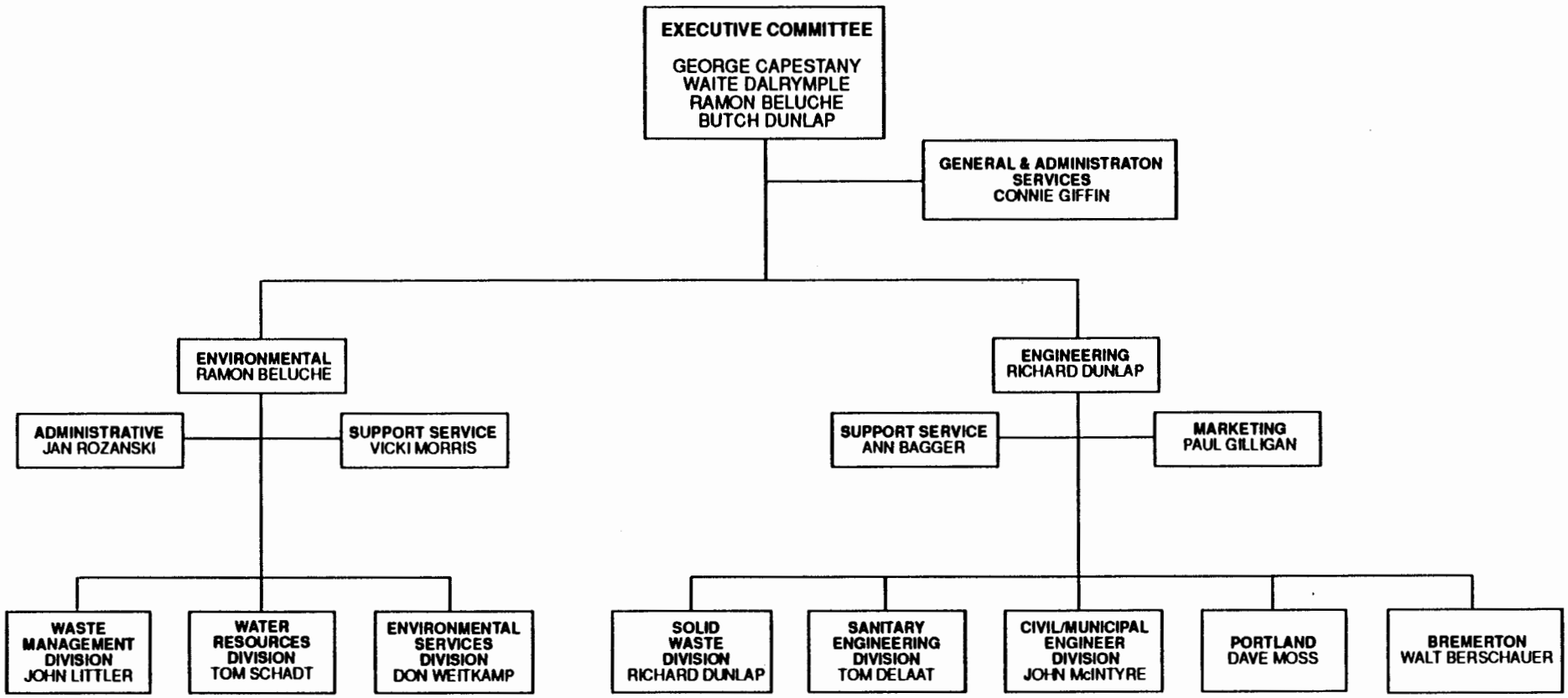


Figure 3-2.
Parametrix Corporate Organization

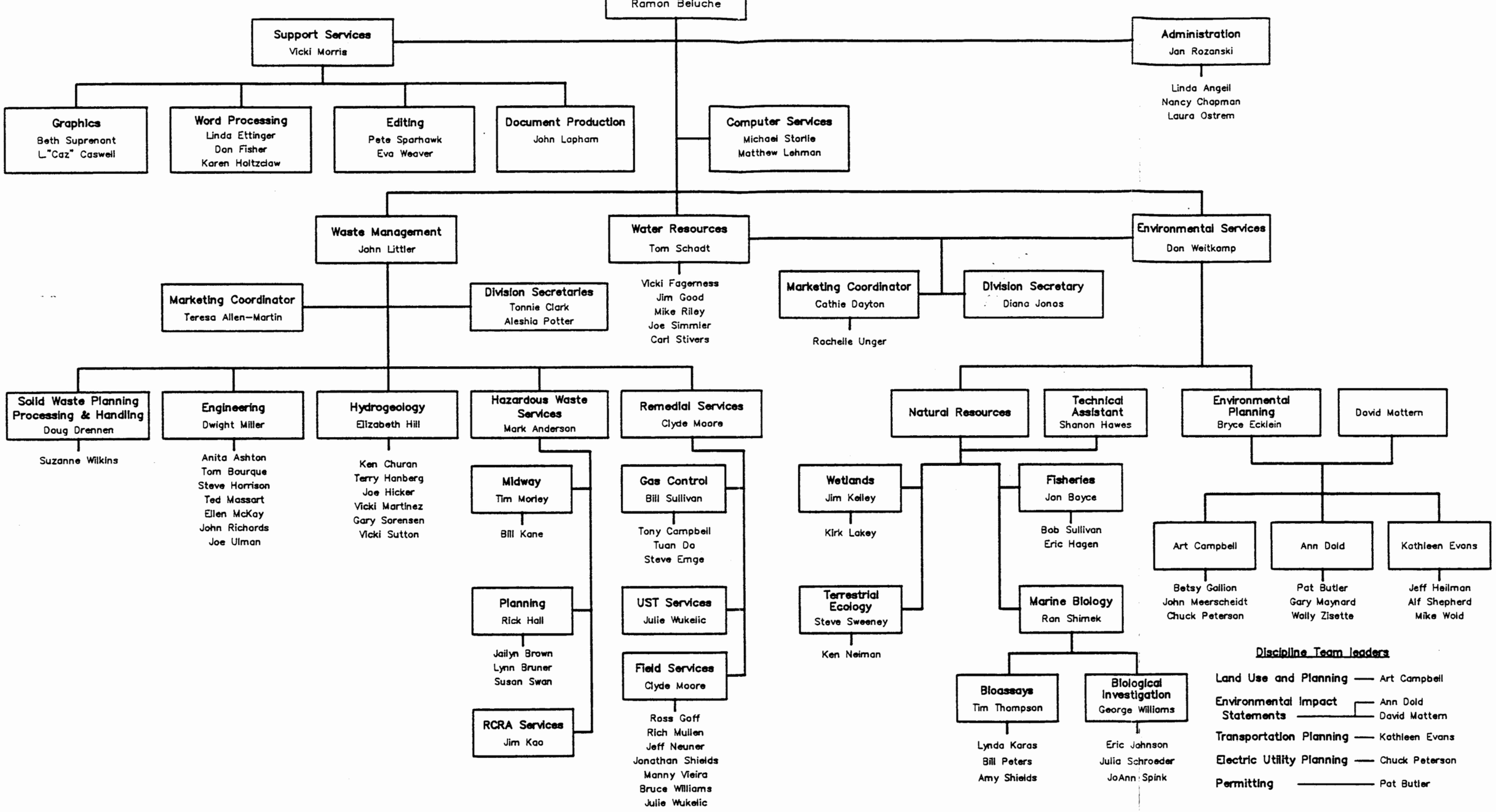


Figure 3-3
Bellevue Office Organization Chart

Revised 6/11/90

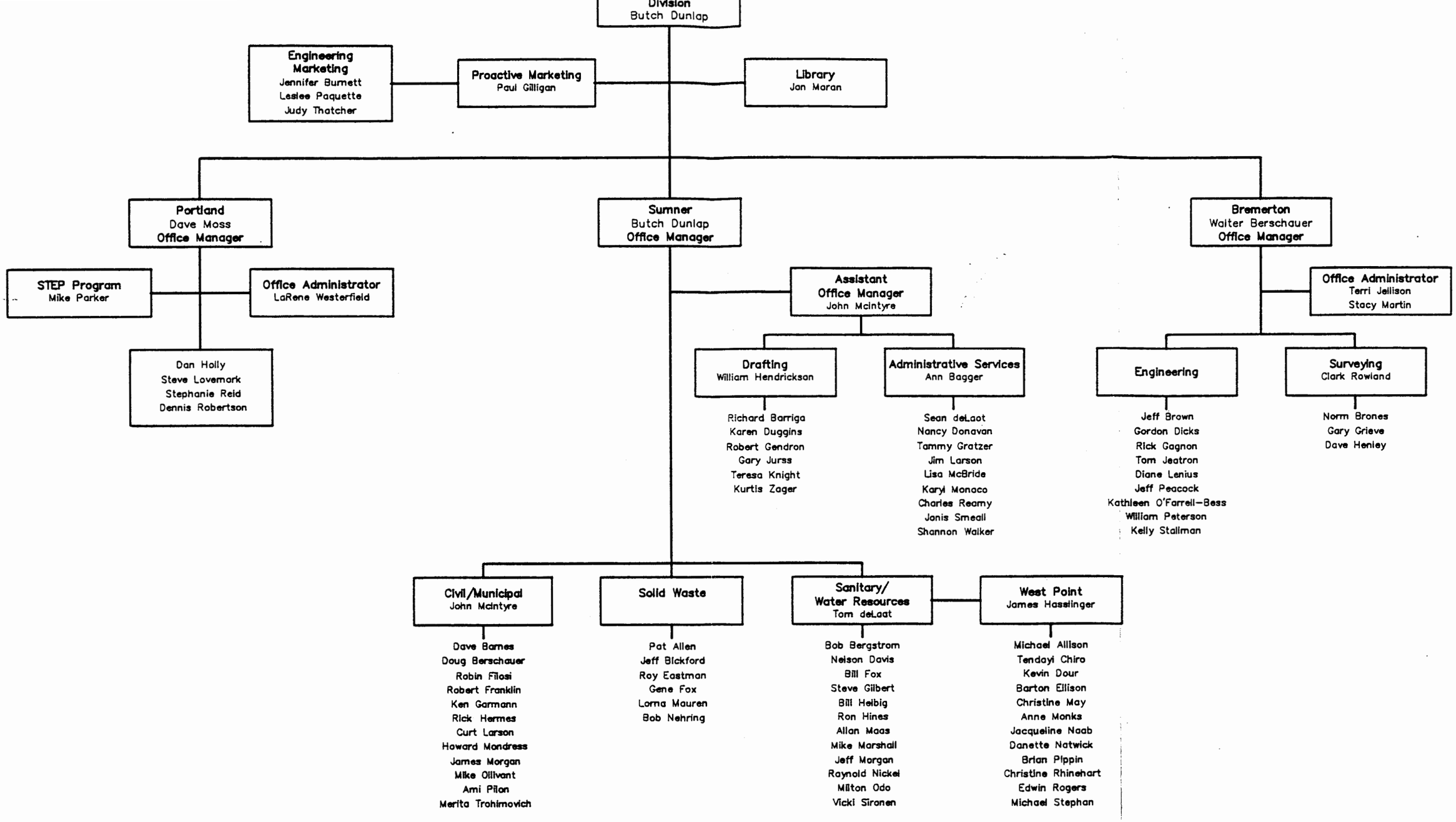


Figure 3-4.
Engineering Division Organization Chart

Revised 6/11/90

Parametrix, Inc. Team Organization for the Toxic Sediment Hot Spot Elimination Master Program Plan

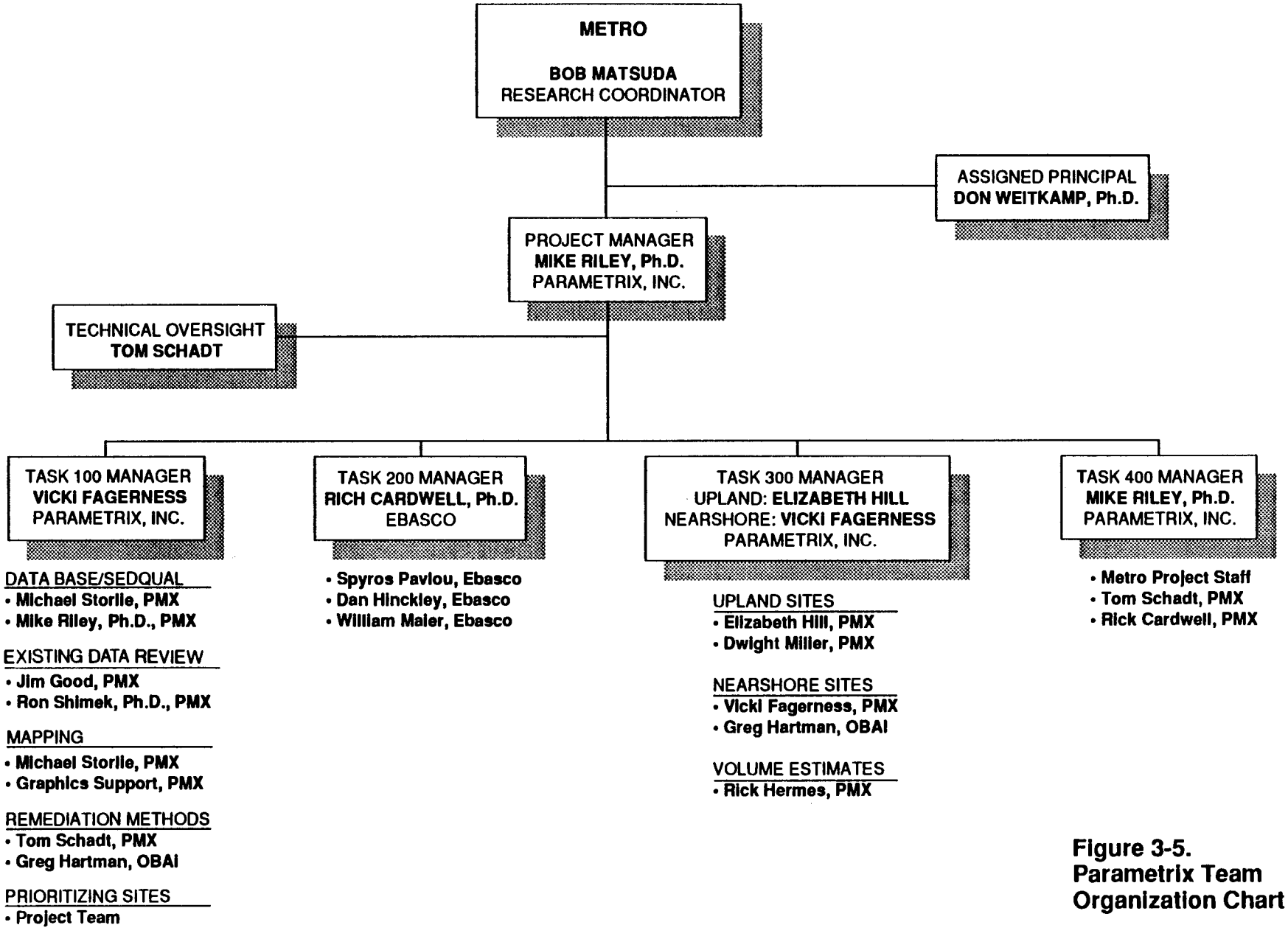


Figure 3-5. Parametrix Team Organization Chart

3.4 DEVELOP THE WORK PLAN

The project manager must develop a written plan that outlines how the team will complete the work we have agreed to do for the client. As you write your work plan, use the checklist shown in Figure 3-6. This written work plan includes the scope of work, a discussion of key technical issues, a project schedule, key milestone dates, a project budget, and a discussion of project quality assurance/quality control (QA/QC). The scope of work in the work plan is typically broken into tasks with each task linked to a detailed budget. Because scopes of work often become part of the contract, they must be clearly defined.

The work plan is a tool that helps you lay out the details of how the work will be done to meet the project goals and satisfy the client. In addition to being an essential in-house "recipe" for a successful project, the project work plan is often submitted to clients, agencies, and other parties for approval. For example, when we work on Superfund sites in Washington, we typically submit an extremely detailed work plan to the client and to the Department of Ecology for their review and approval. In such a case, the work plan is often structured so that the material intended only for in-house use can easily be detached from the submitted work plan. *Always consider the needs of all potential readers when developing the work plan for your project.*

Why is developing the work plan important?

The work plan serves several important needs. It is a tool that forces a project manager to plan a project in detail. When preparing the work plan, the project team identifies the challenges of the many key technical issues of the job. When the work plan is complete, it informs team members, the client, agencies, and other interested parties of how the project will be done.

When does the work plan need to be done?

The work plan must be completed before the project begins or as the first element of work. This is particularly true for projects that require field activities. Often a work plan is developed as part of the proposal. Before the job starts, you should review your work plan to see that it contains adequate detail.

WORK PLAN CHECKLIST

☐ **Introduction**

- ▫ Briefly discuss the project background information
- ▫ Briefly discuss the client's concern or problem
- ▫ Present an understanding of why the consultant team has been requested to provide assistance
- ▫ Present an understanding of regulatory guidelines
- ▫ Present an understanding of legislative or political mandates and developments

☐ **Task descriptions**

- ▫ Describe tasks. Tasks will be designed to address technical and regulatory issues. A well-defined task objective should be included under each task.Where regulatory guidelines apply, the specific requirements for each task must be addressed in detail. That way, work can be completed according to the work plan **and** existing regulations.

☐ **Name key staff and subconsultants**

☐ **Budget**

- ▫ Summarize task budgets and total project costs
- ▫ Give a detailed budget for each task
- ▫ Give a detailed list of cost assumptions
- ▫ Discuss how scheduling may influence the budget
- ▫ Give a detailed budget for each subconsultant

☐ **Project schedule -- Milestones and deliverables**

☐ **Health and safety plan (if required)**

☐ **Description of work to be subcontracted**

☐ **Deliverables**

- ▫ Describe the type and quantity
- ▫ Describe progress reports, preliminary draft, draft, final

☐ **Work not to be provided**

- ▫ Identify any work not provided in the project. To clarify and limit the scope of the project, the work plan should identify what services Parametrix and the subcontractors will not provide during the project. These limitations can be based on information obtained from the client. Parametrix can assume these limitations as unnecessary or infeasible due to client restraints on the project scope or budget.

Figure 3-6.
Work Plan Checklist

How do you develop a work plan?

The work plan is a step-by-step approach for reaching the project goal. When preparing a work plan, it is often useful to use as a model an existing work plan from a similar job. However, don't allow an existing work plan to make you overlook the unique characteristics and requirements of your project. Make certain you work with the client early on to make your work plan fit their specific needs. Until you are a seasoned project manager, always use the work plan checklist (see Figure 3-6) to identify all the elements necessary to work out the technical details of the project.

3.5 DEVELOP PROJECT SCHEDULE

Why is developing the project schedule important?

Setting up a project schedule is important: it is the track upon which your project will run. When well-developed, a project schedule helps you meet the commitments Parametrix has made to the client. Project schedules allow you to:

- Obtain required staff
- Shape task work
  - Identify when to start tasks
  - Identify how long tasks will take to complete
  - Clarify task relationships
- Identify and resolve potential bottlenecks
- Monitor project progress
- Communicate with client and project staff regarding progress and needs
- Identify data you will later submit to the client.

When does it need to be done?

Scheduling is a key activity at several points in the life of a project. The first project schedule is done during the initial planning process. It is an integral part of the work plan and budget preparation.

The first schedule is always presented to the client before work begins. It forms the basis for negotiating the *master* project schedule that features firmly agreed-upon milestones and deliverables. Typically, the master project schedule is a general listing of the milestones and our deliverables.

For pulling together the many pieces of most Parametrix projects, you must draw up a highly detailed *in-house* project schedule. That schedule is your working schedule for getting the project done on the timeline you identified in your master schedule. It deserves your careful attention.

Although many smaller projects do not need an in-house schedule, it is wise to create and follow one. Experienced project managers know the importance of internal coordination. Relying solely on the master schedule can cost you time and money when it comes to final production of project deliverables.

Even if a master schedule was developed during the proposal phase, you must revisit the project schedule before the kickoff meeting. That way, you can make any required changes and communicate those changes to the staff. Ideally, you'll present your team with a clearly detailed in-house project schedule based on the master schedule. Check and adjust the schedule periodically throughout the project. Let the client, project team, and support services manager know of any changes in your project schedule.

How do you develop a project schedule?

As project manager, you will develop the master and in-house project schedules. To build involvement and project ownership by team members, have task managers develop or comment on individual task schedules. Project and task schedules have the same basic elements. The schedules can be developed in many ways, depending on the size and complexity of the job and your preference. There are several software packages available to help in the scheduling process. Among them are (1) Quick Schedule, (2) Super Project Manager Expert, (3) Insta Plan, and (4) Timeline (Appendix A). Samples of Quick Schedule and Timeline are shown in Figures 3-7 and 3-8, respectively.

The schedule given to the client must be complete. However, it usually does not have to be as detailed as the working project schedule you use as project manager. The project schedule should include:

- Start date, typically a specified number of days after Notice to Proceed
- Critical path for tasks and subtasks
- Key milestones and dates
- Meetings (team, public, coordination, etc.)
- Field work
- Outside services turnaround time (for example, lab turnaround time)
- Subconsultant deliverable dates
- Routine administrative functions (MIS or billing)
- QA/QC review
- Document production schedule (Bellevue office see *Document Production Guide*)
- Deliverable dates.

UW BRANCH CAMPUSES - EIS DRAFT SCHEDULE - 10/19/89

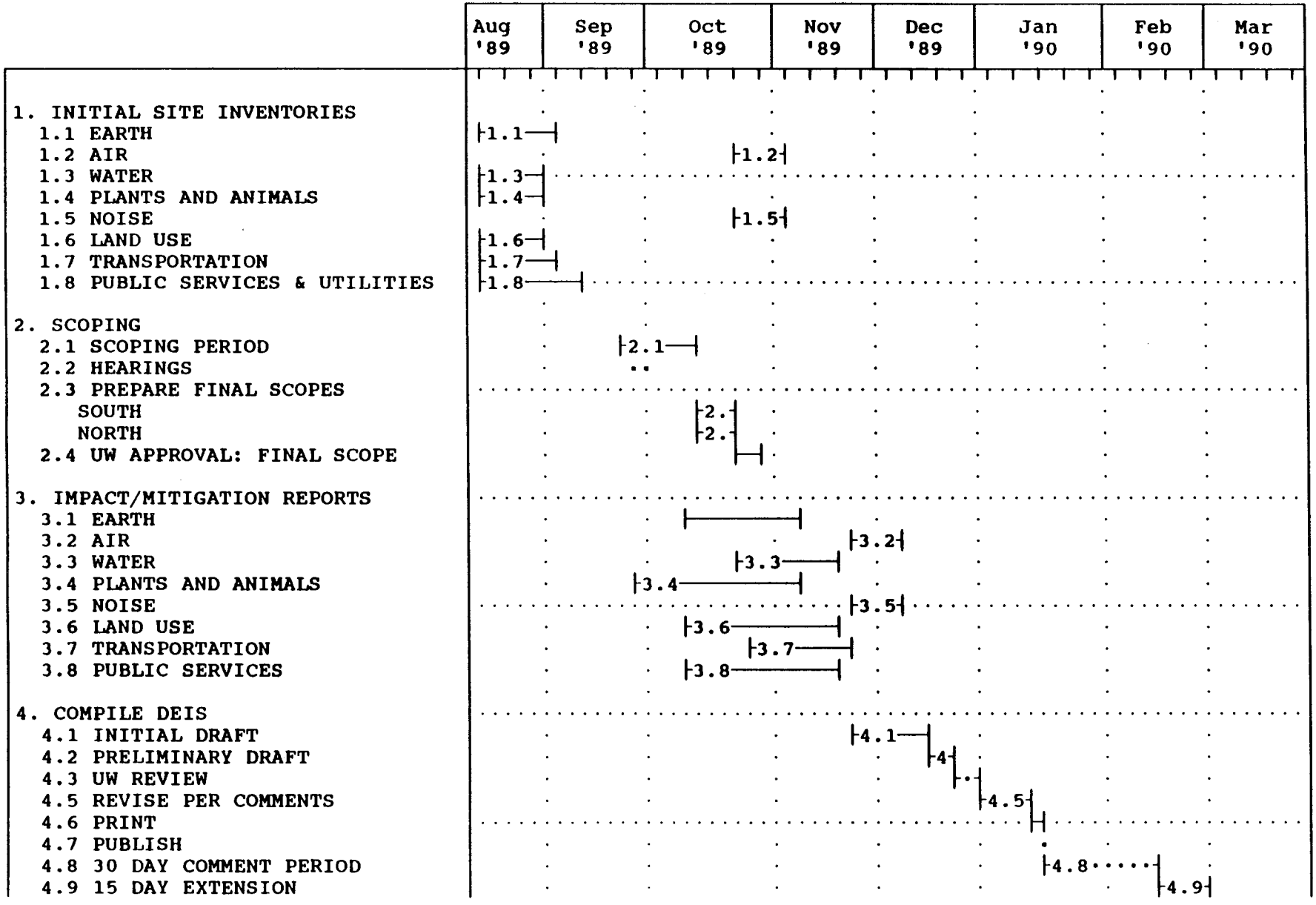
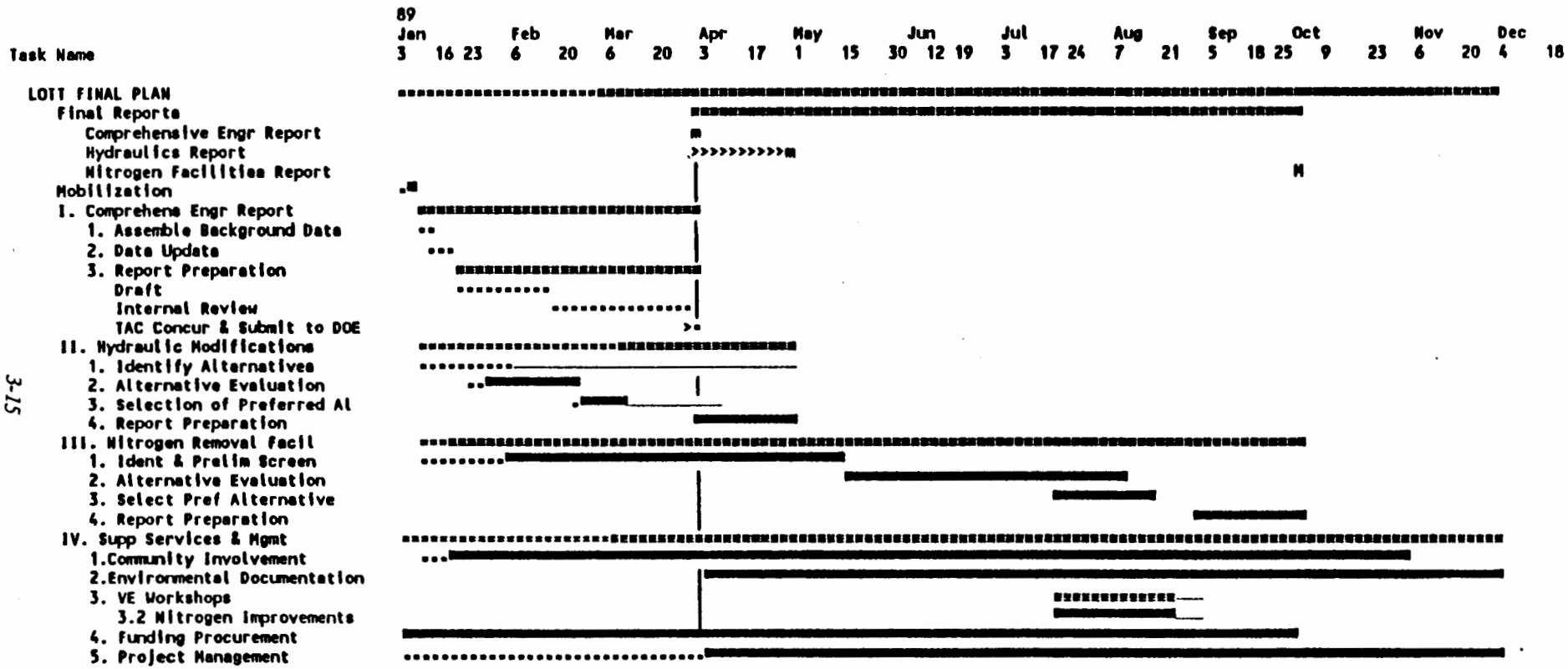


Figure 3-7.
Project Schedule Done on
Quick Schedule Software Program

Schedule Name : LOTT Hydraulic Modifications and Nitrogen Removal
Responsible : Parametrix, Inc.
As-of Date : 31-Mar-89 Schedule File : A:\LOTTREV1



Detail Task (Started) (Slack)
Summary Task (Started) (Slack)
M Milestone
>>> Conflict
Resource delay
Scale: 2 days per character

TIME LINE Gantt Chart Report, Strip 1, Page 1

Figure 3-8.
Project Schedule Done on Timeline Software Program

3.6 DEVELOP PROJECT BUDGET

The project budget is a detailed estimate of how much a proposed set of services will cost. It includes all of the items for which a client will be billed over the life of the project.

Why is developing the project budget important?

The project budget is developed to communicate to the client how much the proposed set of services will cost and to determine our level of involvement. The budget should directly relate to the scope of work and should be developed by task (Figure 3-9). A list of assumptions must be developed during the budgeting process and included in the scope of work, so that it is very clear what the estimate covers and what it does not.

If project conditions or requirements change, this budget documentation may later be used to request client authorization for additional work and a corresponding budget increase. Get the appropriate team members involved so they "own" the budget and will therefore be more able and committed to completing each task within the project budget. Each task manager and the support services representative should be given a final task budget at the kickoff meeting.

When does a project budget need to be done?

Depending on the client and the type of project, the first budget may have been prepared during the proposal stage of the project. However, costs are not often considered in the selection process. In any case, budgets cannot be done until the scope of work and the key project personnel have been identified. Like the scope of work and the schedule, the budget should be reviewed just before work actually begins on the project. Throughout the life of your project, you must monitor and revise the budget when necessary. The process for reviewing project budgets is discussed in Section 5.3, Project Effort Details Report Review. *As project manager, you must always consider any budget constraints when you make decisions.*

How do you do develop a project budget?

Budgets can be prepared several ways. They should be as detailed as possible and should be structured by task. Because many things must be considered when preparing a budget, these items are listed in the budget checklist (see Figure 3-9). Always use this list when preparing your project budget.

BUDGET CHECKLIST

In preparing a budget, consider all the following items:

- ☐ **Labor (including overhead markup) for the following:**
  - ☐ Technical work
  - ☐ Fieldwork
  - ☐ Status reports
  - ☐ Budget reviews
  - ☐ Staffing coordination
  - ☐ Management
  - ☐ Principal overview
  - ☐ Editing
  - ☐ Graphics preparation
  - ☐ Computer support
  - ☐ Health and safety
  - ☐ QA/QC
  - ☐ Technical and final reviews (Peer review)
  - ☐ Word processing
  - ☐ Proofreading
  - ☐ Admin/clerical
  - ☐ Travel time
  - ☐ Meeting time (client, presentations, public, team)
  - ☐ Anticipated salary increases
- ☐ **Direct costs of the following:**
  - ☐ Couriers
  - ☐ Graphic supplies and outside services
  - ☐ Mailing/postage
  - ☐ Shipping
  - ☐ Analytical labs
  - ☐ Travel, per diem
  - ☐ Printing (internal and external)
    - – Special items
    - – Number of drafts
    - – Number of copies
    - – Number of pages or sheets
  - ☐ Oversized exhibits
  - ☐ Parametrix equipment lease
  - ☐ Outside equipment lease or rental
  - ☐ Equipment purchase (if part of budget, it belongs to the client)
  - ☐ Subcontractor(s)
  - ☐ Outside services
  - ☐ Reference literature/maps
  - ☐ Film processing
- ☐ **Markup on subconsultants**
- ☐ **Markup on analytical lab**
- ☐ **Markup on other outside services**
- ☐ **Recovery of proposal labor and direct costs**
- ☐ **Project schedule**
- ☐ **Degree of customizing required for routine client communication**
- ☐ **Contingencies**
- ☐ **Profit (Fee)**

Figure 3-9. Budget Checklist

It is typical to have a target budget that may be imposed by the client or your own sense of the market. Usually, it works best to prepare individual task budgets, sum them, compare the total to the overall target, and then make the necessary revisions task by task. Because budgets typically require several revisions, it is useful to use computerized spreadsheets to prepare them.

To help you prepare your budgets, several software programs are available. One program, Budget Master, contains all the necessary budget elements such as staff names and billing rates (Figure 3-10).

Budget Master is a Lotus 1-2-3 based program customized for Parametrix. As shown in Figure 3-10, Budget Master will give you a total job cost summary compiled from individual task budgets. It lets you do cost estimates for staff time, direct costs (things like travel, materials and printing and reproduction), subconsultant fees, and equipment.

Because it allows you to set overhead and profit fees you can easily adjust as contract or client needs dictate, Budget Master is a flexible management tool. You can also use Budget Master to fillout the staff hour estimates for MIS. (See Section 4.7, MIS.)

Some individuals choose to create their own budget spreadsheets with Lotus 1-2-3 or Excel. An example of a customized spreadsheet may be found in Appendix B. Regardless of the software or tool you use to produce the budget, use the budget checklist to be certain all elements are considered (see Figure 3-9).

3.7 HOLD KICKOFF MEETING

The kickoff meeting is the first meeting the project manager holds with the full project staff, including subconsultants.

Why is the kickoff meeting important?

The kickoff meeting is critical to the success of your project. It is your opportunity to get the entire project team together, provide them with the big picture, direct them toward the overall goal, and present them a detailed outline and document schedule. Kickoff meetings get all projects off to strong, well-organized starts. Without the background and perspective you build at the kickoff meeting, your team can spend frustrating and costly hours chasing down information you can freely give.

Total Job Cost

JOB COST SUMMARY

Landfill Design — Project #: 55-1660-07

Task Number	Task Name	Total Labor Costs	Direct Costs	Task Total
1	Hydrogeo. & Wetlands Assessment	$8,508.72	$163,959.72	$172,468.44
2	Solid Waste Permit Appl.	$17,289.68	$7,525.00	$24,814.68
3	Access Rd & Permit Assistance	$14,178.18	$23,699.00	$37,877.18
4	Design Report	$47,967.42	$31,905.00	$79,872.42
5	Plans & Specifications	$149,250.56	$16,180.00	$165,430.56
6	CQA Plan Preparation	$16,584.40	$2,230.00	$18,814.40
7	Project Mgmt. & Admin.	$17,593.62	$12,604.00	$30,197.62
TOTAL		271,372.58	258,102.72	529,475.30

Project Name: Lndf Dsgn — Project Number: 55-1660-07
Task Name: Design Report — Task Number: 4
Date: 04-Jan-90 — Total Cost: $79,872.42

STAFF	HOURS	BILLING RATE	TOTAL LABOR
Principal	4	107.54	430.14
Project Manager	48	85.74	4,115.48
Project Eng.	140	61.73	8,641.96
Design Eng.	200	51.71	10,342.62
Engineer 1	100	44.94	4,494.00
Senior Eng.	100	68.02	6,801.99
Wastewater Eng.	48	84.52	4,056.93
Traffic Eng.	8	82.66	661.26
Drafter	80	45.61	3,649.13
Graphics	40	36.02	1,440.65
Wordprocessing	80	30.50	2,439.60
Clerical	24	37.24	893.66

TOTALS
Hours 872 — Labor Cost $47,967.42

DIRECT COSTS		
Travel (no direct cost fee)		0.00
Materials		500.00
Printing and Reproduction		1,000.00
WORD PROCESSOR	hours @ $6/hour	480.00
SUBCONTRACTORS		
George Maddox and Associates		1,000.00
Traffic Engineer & Surveyor		1,000.00
Land Application Consultant		15,000.00
Geotech. Analysis (Contingency)		10,000.00

Subtotal	$28,980.00
Direct Cost Fee	2925.00
Total Direct Costs	$31,905.00
TOTAL COSTS	$79,872.42

Figure 3-10. Budget Master Job Cost Summary and Task Breakdown of Design Report Costs

When does a kickoff meeting need to be done?

The kickoff meeting should be held after the scope of work, budget, and schedule are final, and Parametrix has received Notice to Proceed. All team members, including subconsultants, should be required to attend the kickoff meeting. Be certain to clear your team assignments with the technical group leaders before finalizing the project team. The technical group manager will be aware of any scheduling conflicts between projects. (See Section 4.7 for a description of the MIS process and further details on how to select your team.)

How do you conduct a kickoff meeting?

Be well prepared for the kickoff meeting—it sets the tone for the entire project. Begin by using the kickoff meeting checklist to make certain you discuss all the points that will keep your project within budget and on time (Figure 3-11). Successful projects all begin with a well-organized start.

You should notify all task managers and key members of support services as to where and when the meeting will be held. It may take some coordination to find a time when all key members can attend, but the time is well spent. To keep your team on target from the start, complete and distribute a Project Assignment Form to each member (Figure 3-12). *Never let a team member guess at what their role might be. Spell it out.*

3.8 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) RESPONSIBILITY

Why is QA/QC important?

QA/QC is important because we need to provide complete and accurate deliverables to our clients. Our work is often used in court cases and therefore must be legally defensible.

When does QA/QC need to be done?

QA/QC is an ongoing process and must occur throughout the life of the project. it is part of the planning, implementation, analysis, and reporting process.

KICKOFF MEETING CHECKLIST

- ☐ Project overview (the big picture: the client, the regulatory setting, the driving force of the project)
- ☐ Project goals
- ☐ Scope of work
- ☐ Project structure (structure of team/task managers)
- ☐ Individual responsibilities (see Figure 3-12)
- ☐ Team coordination/communications (including multi-office coordination)
- ☐ Client coordination requirements
- ☐ Availability and location of reference materials
- ☐ Schedule of milestones and deliverables (includes critical path and internal deadlines)
- ☐ Project and task budgets
- ☐ Products or deliverables:
  - ☐ Use mock-ups and refer back to the big picture
  - ☐ Identify deadlines for first draft, second draft, editorial reviews, and printing (Bellevue office see *Parametrix Document Production Guide)*
- ☐ Project job and task number(s)
- ☐ Ground rules for project file
- ☐ Document production coordination
- ☐ Special project challenges
- ☐ Unique requirements set by the project manager
- ☐ Schedule for future project meetings
- ☐ Task managers, first assignment: to conduct detailed planning of their task including:
  - ☐ Task staffing needs -- people hours and schedule
  - ☐ Task schedule
  - ☐ Task technical requirements
  - ☐ Products/deliverables.

Figure 3-11.
Kickoff Meeting Checklist

Project Title _____

Job Number _____

Team Member's Name _____

Primary Task and Number _____

Role on Project _____

_____

_____

_____

Relationship to other tasks _____

_____

_____

_____

Type of Product expected _____

_____

_____

_____

Schedule of when input is due _____

_____

_____

_____

Number of hours available to work on task _____

Figure 3-12. Project Assignment for Kickoff Meeting

How do you do QA/QC?

A QA/QC program is a process to attain quality products in an efficient and cost-effective manner. At Parametrix, QA/QC is an important part of project management. It is also an important part of the duties assigned to each team member in your project. Each employee manages and completes the tasks and projects assigned. That way, the proper reviews and controls are implemented from the earliest scope of work for proposals to final verification that our finished products satisfy the highest professional standards and the client's needs.

Each type of project and task work has specific QA/QC requirements. However, on all projects and for all tasks QA/QC must be considered for:

- **Technical data** (use existing guidelines)
  - Laboratory data
  - Benthic data
  - Groundwater data
  - Geotechnical data
  - Drafted or computer-generated figures.

- **Document production**
  - Editorial reviews of text and graphics
    - Readability
    - Uniformity (Bellevue office see the *Parametrix Style Guide*)
    - Proofreading
  - Technical adequacy
    - Data interpretation
    - Conclusions
    - Recommendations
    - Peer review
    - Political issues

- **Coordination with drafting**
  - Drafting and review of projects
  - Initial assignments

- **Project Management.** A project manager should arrange for a peer review of key management issues on the project including:
  - The work plan
  - Budget
    - Completeness
    - Adequacy for the scope
  - Schedule
  - Allocation of time

- Approach.

Because QA/QC is so critical to the success of projects and to the long-term success of the firm, Parametrix is developing a stand-alone QA/QC document. The details of the QA/QC process will be described there.

3.9 DIRECT, GUIDE, AND CONTROL THE PROJECT

Why is directing, guiding, and controlling the project important?

Even though a detailed scope, budget, and schedule are developed for each job, your project can't run itself. You must direct, guide, and control the project so that the work is done according to plan. However, you also need the flexibility to respond to changes of circumstances. It is not necessary to feel constrained by plans developed in the early phases of the project. Go ahead and make the changes necessary to your project. Just be certain those deviations from the plan are deliberate, well considered, and promptly communicated to the client and the team.

When does it need to be done?

You must guide your project to its closure.

How do you direct, guide, and control a project?

As project manager, you are ultimately responsible for all work that occurs on the project. You need to manage the project by delegating work to the project team. When doing so, give others the responsibility, authority, resources, and mentoring necessary to complete an assignment. Then hold them accountable for completing it.

Technical Task Managers. On large projects, especially ones with multiple disciplines, it is most effective to delegate work to technical task managers. Technical task managers report to the project manager on all delegated project task work. They delegate work to technical staff and run their tasks much the same way the project manager runs the overall project.

Technical task managers typically help in the following ways:

- Receive technical assignments from the project manager
- Fulfill or delegate technical assignments to the technical staff
- Are kept up to date on all changes in the project by the project manager

- Provide input to how proposed project changes will influence task schedule, budget, and deliverables
- Provide input for MIS (see Section 4.8, Management Information System [MIS])
- Provide input for progress letter to go out with billing (see Figures 5-5 and 5-6, Billing Transmittal Letter).

Technical Issues. In addition to delegating work to technical task managers, you must address some major issues that almost always occur throughout the life of the project. These include:

- Obtain written client agreement on changes to the work plan
- Address new issues and changes in technical direction as they arise
- Identify changes in the scope of work when they occur
- Work with the client to obtain additional money if there is a change in scope
- Work with the client and subconsultants to get approval for changes in schedule
- Work with group leaders (including support services) to keep the project staffed at the required level
- Resolve conflicts in resources and between team members.

Communicating with Your Team. Throughout the life of a project, most important to its technical success is communication. While communication with the client is extremely important (see Chapter 2, Client Relations), communication within the project team is equally important. Ongoing team overview meetings are critical to the success of the project. *No project ever failed from too much communication.*

When holding team meetings, you should consider using these tools:

- Developing and using agendas
- Updating assignments/objectives/schedules with task managers
- Identifying and resolving problems
- Making milestone decisions
- Providing client briefing
- Providing a status report
- Preparing for the next step
- Keeping a written record of project development
- Providing group feedback and receiving input
- Team building.

The mechanics for keeping the project keyed into the management systems at Parametrix are described in detail in Chapter 4, Administrative Project Management.

3.10 GIVE FEEDBACK

Feedback is the information project managers give and receive from technical group managers and other team members regarding their performance on the project technical tasks.

Why is giving feedback important?

Feedback is part of communication. By reviewing work with the team during team meetings and with individuals behind closed doors, performance can be adjusted and improved. Such feedback often helps to open dialogue with team members and can lead to additional productive discussions when you hear what the team has to say on the same issues. As project manager, you should also brief the technical group manager on the performance of the team members in their group. This information allows the group manager to guide and mentor the staff member so that person can grow professionally. It also forms part of the basis for performance evaluation and salary review.

When does it need to be done?

Because feedback is so vital, it must occur throughout the project. It becomes a habit for good project managers. Feedback is especially useful when a phase of work ends, a person's involvement in the project changes, or the project ends.

How do you do give feedback?

How you provide feedback is critical. One of the most important things to remember is that negative feedback should be face-to-face, one-to-one, and private. Don't make the mistake of only giving feedback when things go wrong. The team also needs to hear that they are doing good work when things go well. In general, feedback should always be:

- Direct
- Constructive
- Courteous
- Timely
- Specific
- Balanced.

3.11 UPDATING THE MARKETING DATABASE

The marketing database is a system of information, predominantly project descriptions and résumés, available to and used by many people in all our offices. You'll need to supply marketing with at least the minimum materials (project description and résumé updates) for the database kept for future marketing efforts.

Why is updating the marketing database important?

Because marketing supports the overall workload of the firm, it can only be effective if we maintain an accurate database. Even if you do not have any immediate marketing needs, do your part to keep the database updated because someone else may need the information concerning the services of your group. Also, given short turn-around times on proposals and SOQ's, we must be prepared at all times with an up-to-date database.

When does the marketing database need to be updated?

The database must be updated when we are awarded new projects, when new people join the firm, when a scope of work or contract amount significantly changes, and when client status changes (for example, from a positive reference to a negative one).

After a proposal or SOQ has had project descriptions modified, those new descriptions need to be permanently replaced on the database. Sometimes a different emphasis that did not exist before is added to the project description. The project manager on the SOQ or proposal needs to coordinate with marketing to have it permanently added.

How do you update the marketing database?

Give a marketing coordinator a project description when Parametrix receives the Notice to Proceed. This project description can be from one to several paragraphs long, but no longer than a page. It should be revised if the scope of the project changes. You can get an example of a project description from the marketing coordinator for your division.

When the project begins, you should update your personal Parametrix résumé and ask others on the team to do the same. Updated résumés better describe roles and responsibilities on a project and help us win jobs. The marketing database contains more than one résumé for most individuals, each with a different technical focus. Each team member is responsible for working with a

marketing coordinator concerning the appropriate résumé(s) to be updated with new project information.

As project manager, you should also keep the marketing coordinator up to date on the client status. Marketing needs to know when to use and when not to use a client as a reference in order to control confidentiality and the quality of our referrals when references are checked. Team members write what they think is appropriate on individual résumés. Many pieces of that information, however, may be confidential including:

- Client name
- Client goal
- Property location.
- Contract amount
- Type of contaminant

You are responsible for advising the marketing coordinator of any special circumstances concerning project technical information that may or may not be used freely from the marketing database.

3.12 TECHNICAL PROJECT MANAGEMENT EXTRAS

While carefully controlling the technical elements of your project ensures its success, top project managers go one step futher. They take care of the extras, the informal duties, that mark excellence in project management. Some of these duties are:

- Hold extra brainstorming sessions on project elements
- Conduct a literature review on relevant project topics
- Present in-house seminars on project technical issues
- Coordinate with marketing to improve the marketing materials we have in particular technical areas. For example, a project manager might develop and share special graphics during the project that could be used in later marketing efforts.
- Send thank-you notes to key people who help get the team through crunches
- Upon approval, hold an appropriate special recognition event.

Chapter 4
Administrative

Chapter 4 Objectives

This chapter will describe administrative techniques used at Parametrix. It will provide you with the "nuts and bolts" of the following administrative tasks:

1. Developing a contract between the client and Parametrix or between Parametrix and another consulting firm.

2. Filling out New Project Information Sheets for the in-house tracking of your project.

3. Setting up files to provide a complete record of your project.

4. Estimating project staff time through the Management Information System (MIS).

5. Closing a project correctly.

Administrative Project Management

4.1 INTRODUCTION

Administrative project management responsibilities encompass recordkeeping and setting up an in-house system for tracking the project. While the category is called "administrative," it should not be considered a nonbillable function. On the contrary, except for contract negotiation with the client, administrative aspects of project management *are billable* and should be considered in budgeting the time for working on the project.

Why is administrative project management important?

Every new project must be integrated into the Parametrix administrative system. Once we receive a signed contract from the client, the process begins by obtaining signed contracts from any subconsultants on the team. Other steps include setting up the project for accounting and billing, establishing a filing system for record-keeping, and making sure project team members are available to work on a project.

Administrative responsibilities fulfill several important functions. First, it is important legally that contracts accurately reflect the expectations and understandings of the parties concerned. It is also important legally that a complete paper-trail be maintained for the record.

Second, the administrative responsibilities of the project manager enable the efficient and useful transfer of information within Parametrix. Administrative tasks alert the Sumner General and Administration (G&A) staff and technical group leaders to the existence of the project, specific billing needs, and staff requirements. This information is entered into various computer programs that generate billings and a series of reports used to track project progress.

Examples of such reports include the Project Effort Details Report (see Section 5.3, Project Effort Details Report Review) and the management information system (MIS). The Project Effort Details Report provides a biweekly accounting of charges made to the project. MIS allows project managers to establish and then make monthly adjustments to the hours allocated to each project team member. On a regular basis, all ongoing project information is combined into special reports used by Parametrix management to evaluate the performance of the company. Thus, carrying out the administrative responsibilities of project management leads to the success of individual projects as well as improving the overall performance of the firm.

4.2 ELEMENTS OF ADMINISTRATIVE PROJECT MANAGEMENT

Your administrative project management includes several duties. These duties involve:

- Client contracts
- Subconsultant contracts
- New Project Information forms
- Task schedule sheets
- Project files
- Project notebook
- MIS
- Project status and billing reports.
- Project closure.

4.3 CONTRACTS

As project manager, it's your responsibility to obtain a signed contract between the client and Parametrix. Contracts authorize Parametrix to work on a project. Without contracts, we have no business. If Parametrix has included subconsultants on its team, you must also coordinate and obtain signed agreements with them. In those instances where Parametrix is a subconsultant, you must help develop an agreement with the prime consultant. In all cases, you should be familiar with the terms of the contracts that involve your project. The discussion that follows details the procedures to follow in each of these three contract situations.

First, some basic definitions:

Prime Contract: Agreement between Parametrix and our client.

Prime Consultant ("Prime"): The consulting firm awarded the project by the client. The prime consultant is the firm that has put the project team together and that is ultimately responsible for the successful completion of the project.

Subconsultant ("Sub"): A consulting firm or individual that has agreed to be part of a project team. Generally, the subconsultant brings special expertise to the project team and enters into an agreement with the prime consultant to provide that expertise.

Subconsultant Agreement: The contract between the prime consultant and another consulting firm or individual.

4.3.1 Prime Contract

Why is the prime contract important?

The prime contract gives a "green light" to a project. In general, work should not proceed on a project without a signed contract or other written authorization. The contract is also important because it provides both the client and Parametrix with an understanding of what will be done, when tasks will be completed, and how much each task will cost. Because it defines the terms of the agreement, the contract is a binding legal arrangement between Parametrix and our clients.

When does the prime contract need to be completed?

The prime contract should be completed as soon as possible after the job has been awarded to Parametrix. As mentioned, work should not proceed without a signed contract. *If for any reason work must begin before a contract can be developed, you should discuss the situation with the principal assigned to your project.* In most instances, a written *Notice to Proceed* from the client is acceptable.* The Notice to Proceed should define which tasks to begin, the billing rates and fees, and the project schedules. The assigned principal, however, must approve any precontract arrangements.

What is the prime contract process?

The process of obtaining a signed contract from the client is illustrated in Figure 4-1. The major steps include:

- Determining the type of contract to use (see Appendix C)
- Negotiating contract language
- Developing a scope of work, schedule, and budget
- Obtaining all required signatures.

In addition, the project manager is responsible for ensuring that the client receives a signed original, that G&A receives a signed original, and that the office administrator receives a copy for the project files. All signed original contracts and amendments are in a central G&A file in the Sumner Parametrix office.

* To begin work before contract is signed

Determine the Type of Contract to Use

- Client contracts can be provided by the client or developed by Parametrix
- Subconsultant agreements where Parametrix is the "prime" are usually provided by Parametrix
- Subconsultant agreements where Parametrix is the "sub" are usually provided by the "prime"

Negotiate Contract Language

- Agree on contract language
- Contract Manager should be involved

Develop Contract Exhibits

- Scope of work
- Budget
- Schedule
- Other

Obtain all Required Signatures

- Send two originals of contract to client or subconsultants for signature *
- Ask client or subconsultant to sign and return originals to Parametrix
- Upon receipt of signed originals return to assigned principal for signature
- Attach a note signed by contract manager, verifying approval of contract language
- Send one signed original to client or subconsultant
- Send other signed original with a photocopy to office administrator
- Office administrator will forward original to G&A and place photocopy in project file

Contract Amendments

- Develop contract amendment
- Negotiate language, if necessary
- Follow same signature process described above

* Approval process may vary with client

Figure 4-1.
Parametrix Contracts Process

Preparing the Prime Contract

The major steps in the client contract process when Parametrix is a prime consultant are:

1. **Determining the type of contract to be used.** Since either a client or Parametrix can provide a contract, it is important to determine early on if Parametrix will develop the contract. If the client provides a contract, you should obtain a copy as soon as the job is awarded. The contract should be routed to the Parametrix contract manager for review.

   If Parametrix has worked with the client in the past, it is likely that acceptable contract terms have already been worked out. If Parametrix has not worked with the client, the terms of the agreement may need more negotiation. In either case, our contract manager must review all contracts for their acceptability.

   When the client prefers that we develop a contract, you should request a contract from our contract manager. A copy of our standard contract form is included in Appendix C. You need to fill in the blanks with the appropriate client and project information. The contract manager will assist you, if necessary. As with contracts provided by the client, the terms of the agreement may need negotiation.

2. **Negotiating contract language.** Negotiating the terms of an agreement can involve almost any aspect of a project. Typically, issues can arise regarding insurance, indemnity, and liability clauses. Other issues can involve special client requirements, such as custom billing procedures, progress reports, and who will have custody of the files. Since clients and job requirements differ, it is often necessary to tailor a contract to the specifics of individual projects. The contract manager must be involved in any negotiations of contract language.

3. **Developing a scope of work, schedule, and budget.** In addition to assisting the contract officer in negotiating the terms of the agreement, you are also responsible for developing exhibits to the client contract. *Exhibit* is a term for an attachment to the contract. Exhibits to Parametrix contracts always include a scope of work, a schedule, and a budget.

   In many cases a scope of work, schedule, and budget have been prepared at the proposal stage. If appropriate, these can be used as exhibits.

   - **Scope of Work.** Depending on the job, the scope of work can vary from a brief statement of what will be done to a detailed description

of each task. The important thing is that the scope states clearly what services Parametrix will provide and, if appropriate, what services we will not provide.

Because the scope of work can vary so greatly, an example is not provided in this handbook. However, separate technical groups at Parametrix have developed standard scope-of-work formats for specific types of jobs. In some cases, the work plan described in Section 3.4, Develop Work Plan, can be used. In other cases, an abbreviated version is appropriate. If you are not sure how to prepare a scope of work for a particular job, discuss it with your supervisor. The contract manager also has several examples.

Although there is no one standard for a scope of work, the content should include any important assumptions used in estimating time and costs. This is particularly important if we will be paid on a lump sum basis (see Section 4.4 below). Some examples of assumptions that should be included in the scope of work (if relevant) are listed below. However, this list is by no means exhaustive.

- *If a document is to be produced, specify the number of review drafts that will be provided, the number of copies of each, and their estimated page length.* Also specify how many final copies will be provided, along with the estimated page length. If Parametrix *is not* responsible for the printing, make sure this is stated in the scope of work. If Parametrix *is* responsible, then it may be appropriate to specify the form of reproduction, such as photocopying or offset printing. Any client requests, such as using recycled paper, should be stated in the scope of work and included in your budget (see discussion of budget below).

- *If the job will require frequent meetings with the client or with other specific groups, state the number of meetings anticipated under the scope of work.* These meetings could be with groups such as planning commissions or solid waste advisory committees. If Parametrix is being asked to make presentations at public meetings or hearings, these too should be itemized in the scope of work.

- *If regulatory guidelines apply to the project or will be used for its development, identify the specific requirements.* To do so, assures compliance and documents any methods that will be followed.

- *If samples are to be taken, specify what types, the number, and what the samples will be analyzed for.* In some cases, it may be appropriate to state who will take the samples, particularly if this work is to be subcontracted to other firms.

- *If there is uncertainty about what could be required, then contingency language should be built into the scope of work.* For example, if the extent of the work depends on the outcome of sampling results, then the scope should be very clear on this uncertainty. It may even be appropriate to state that the scope would be amended when the extent of the project becomes known.

- **Schedule.** Developing a schedule has been described in Chapter 3, Technical Project Management (see Section 3.5, Develop Project Schedule). As with the budget, the amount of detail contained in the schedule attached to the client contract depends on the project and the client's expectations.

- **Budget.** Developing a budget has been described in Chapter 3, Technical Project Management (see Section 3.6, Develop Project Budget). If appropriate, the detailed Budget Master sheets can be used as an exhibit to the contract. However, in some cases it is more appropriate to use an abbreviated version of the Budget Master sheets.

The client may request other exhibits to the contract. You should make sure these exhibits are appended to the contract. An example of an additional exhibit that may be requested is proof of equal employment opportunity (EEO) compliance. You must arrange for these exhibits. For example, EEO forms can be requested from the marketing coordinator in the Parametrix Sumner office.

4. **Obtaining all required signatures**: The contract is ready for signature when the language and exhibits are acceptable to both parties. Although the signature process can vary depending upon client preferences, the typical procedure is as follows:

   - If the client is providing the contract, two originals are sent to the project manager with a request that the contracts be returned with the authorized Parametrix signatures. Sometimes clients will send us the contracts with their authorized signatures already attached.

   - The project manager gives the two originals to the assigned principal with a note from the contract manager acknowledging the contract manager's review and approval of contract language.

   - The assigned principal signs and returns the contracts to the project manager.

   - If the client has not signed the contracts yet, the project manager returns them to the client for the client's signature. The client will return one signed original to the project manager. If the client has

signed the contracts, the project manager returns one original to the client and retains one original for the Parametrix files.

- The project manager gives an original and one photocopy to G&A. One photocopy should be put into the project file (see Section 4.5, Project Files). If you have obtained a project number, write the number in the upper righthand corner of the contract.

Once a contract has been signed, you can begin work according to schedule. In some cases, however, we need a written Notice to Proceed from the client. You should determine if a written Notice to Proceed is necessary.

Handling any Amendments to the Prime Contract

One final aspect to client contracts is the potential for contract amendments. Amendments may be necessary when the scope of work, schedule, or budget changes. As with the original contract, you should have the contract manager review any contract changes. Parametrix has standard amendment forms normally used if the client does not provide the amendment language. All parties must agree to the terms of the amendment, and in some cases negotiation may be necessary. Once an agreement is reached, you must repeat the signature process described above.

4.3.2 Subconsultant Agreements when Parametrix is the "Prime"

When Parametrix is the prime consultant, you must obtain a signed agreement between Parametrix and any subconsultants on the project team (see Appendix D). It is also your responsibility to distribute the signed originals and copies to the subconsultant and the Parametrix G&A staff.

Why is the subconsultant agreement important?

The subconsultant agreement establishes a working relationship between Parametrix and another firm or individual not employed by Parametrix. This agreement defines the contractual duties of both parties. It defines the scope of work for the subconsultant, the schedule for the performance of subconsultant work, the basis of payment for the work, and authorizes the subconsultant to begin work on a project. It is important to have a subconsultant agreement, because it is legally binding and assures both parties that work will proceed on terms acceptable to both.

When does the subconsultant agreement need to be completed?

The subconsultant agreement can be prepared before receiving a fully executed (all signatures affixed) prime contract. However, the subcontract agreement may

not be signed until the prime agreement is formalized. The reason for this sequence of events is that subconsultant agreements may be altered according to conditions of the client contract. Also, in most cases the client contract is appended to the subconsultant agreement as an exhibit.

What is the subconsultant agreement process?

The subconsultant agreement process is similar to the prime contract process (see Figure 4-1). However, there are some notable differences:

1. **Determining the type of contract to be used.** One major difference is that Parametrix almost always provides the subconsultant agreement. There are two different agreement forms: (1) a *master subconsultant agreement* and (2) a *letter agreement*. A copy of the master subconsultant agreement is provided in Appendix D and copies can be requested from Word Processing or the Parametrix contract manager.

   The first type is the Parametrix Standard Subconsultant Contract Form (see Appendix D). This subconsultant agreement form can be requested from Word Processing. The second type is an alternate, preprinted version of the subconsultant form (see Appendix E). It is called the Standard Subconsultant Agreement for Professional Services. That form is currently in its draft version and may be requested from the contract manager.

   A *letter agreement* is usually used in those instances when the contract amount is small (under $2,000). However, a standard agreement is used for some small contracts. As with client contracts, you should inform the contract manager of the need for a subconsultant agreement. The contract manager will recommend the form of agreement to use and will advise you on contract language.

2. **Negotiating contract language.** The subconsultant may not agree with particular aspects of the agreement. In such cases, the language of the agreement must be negotiated with the Parametrix contract manager. To avoid unexpected problems in this regard, you could send a copy of the standard agreement to the subconsultants, after they have agreed to be on the project team. This step is especially recommended if the subconsultant has not worked with Parametrix in the past. Sending the agreement to subconsultants early in the process allows them to preview the language. Then they can notify you if they have problems with any requirements, such as the need for errors and omissions insurance, types and levels of coverage, or the fact that subconsultants are not generally paid until Parametrix receives payment from the client.

Parametrix prefers to do business with firms that are not only technically competent and experienced but that also have adequate insurance. While assembling a project team, it is appropriate to consider whether a subconsultant has adequate insurance. The contract manager can assist you.

One additional item to note is that Word Processing has instructions not to delete any of the wording on the master subconsultant agreement for any specific contract. If as a result of negotiations contract language is deleted, Word Processing will use the ~~strikeout~~ function to indicate the change.

3. **Filling out the master subconsultant agreement.** Using a blank master subconsultant agreement, fill in the following information (see Appendix D):

- **Page 1** Insert subconsultant's name and address in the upper righthand corner. Insert project name as appropriate. Insert subconsultant's name in the first paragraph.

- **Page 3** Section 1.1 - Insert name of the client (agency, firm, or individual of prime agreement).

  Section 2.1 - Insert dollar amount of total subcontract budget.

- **Page 5** Section 3.3 - In the first blank, insert the specific article/provision/section numbers we want to pass on directly to the subconsultants. Use the appropriate nomenclature taken directly from the prime contract, such as "sections 1, 3, 4, and 8" or "articles 1.0, 3.0, and 8.0." The prime agreement must be read carefully to determine any differences from our master subcontract and to identify the specific provisions or articles that apply directly to the subconsultant. The contract manager will read the prime contract and determine if any language is more stringent than the subconsultant agreement language. Any language deleted from the subconsultant agreement should be ~~struckout~~ not deleted.

  In the second blank, insert the name of the client. In the third blank, insert the name of the subconsultant.

- **Page 7** Section 3.8 - The contract manager will carefully review the prime agreement to determine the types and level of insurance required. The contract manager then determines how this clause will be structured.

The types of insurance the subconsultant must carry will be identified in the subconsultant agreement. Certificates of insurance will be requested of the subconsultant to verify that they carry adequate insurance to cover the work to be performed. Typically, Parametrix requires comprehensive general liability insurance and automobile insurance for any vehicles used to perform project tasks. Depending on the nature of the services to be provided by the subconsultants, professional liability insurance may be necessary. You should request such certificates and give them to the contract manager, who will check that insurance coverage is adequate.

- **Page 9** Insert the subconsultant's name under the line provided for their signature.

Clearly, these instructions are for filling out the form in Appendix D. For help in filling out the subconsultant agreement in Appendix E, see the contract manager.

Word Processing will type up the changes to the subconsultant agreement and keep it on file. Make sure you tell them it is a new subcontract and give them a name and project number for storage purposes.

4. **Preparing exhibits to the subconsultant agreement.** A scope of work, budget, and schedule need to be prepared as exhibits to the master subconsultant agreement. These are prepared in much the same way as similar exhibits to the prime contract. However, the scope, budget, and schedule reflect only the specific work, costs, and timing of the subconsultant's involvement. The prime agreement is also attached as an exhibit if prime contract language is incorporated by reference.

5. **Obtaining all required signatures.** A subconsultant agreement can be prepared for signature once it is acceptable to both parties. You are responsible for getting the signatures and routing signed originals and copies to the appropriate individuals. The signature process for subconsultant agreements is similar to that described above for prime contracts. However, you should prepare *two copies* of the contract and send them to the subconsultant. Request that the subconsultant review and sign both copies, and return them to you. Then you submit the subconsultant agreement to the assigned principal for signature. The agreement should be accompanied by a note signed by the contract manager, verifying the contract manager's review. Once the principal signs the agreement, send one executed copy to the subconsultant and one copy to G&A. A photocopy should also go in the project file. Remember to put the project number in the upper righthand corner of the contract, if a number has been assigned.

Keep one complete, unsigned copy of the subconsultant agreement in your files when the copies are mailed. This copy should be put in the project file along with the transmittal letter. It will be your backup in case the other gets lost in the mail or befalls some catastrophe before reaching the subconsultant.

When the two signed contracts are returned, attach one original signed copy to the New Project Information Form, which is submitted to the office administrator. The office administrator forwards that material to G&A (see Section 4.4, below). The other signed copy should be placed in your project file (see Section 4.5, below). If the subcontract agreements are returned after the New Project Information Form has been submitted, they are submitted to the same personnel but with a note that the subcontract is to be attached to the previously filed form.

4.3.3 Subconsultant Agreements when Parametrix is the "Sub"

When Parametrix is a subconsultant, the prime consultant usually provides the subconsultant agreement. As project manager for the Parametrix element of the job, you should ask the prime for a copy of their subconsultant agreement. Ask the contract manager to review the agreement to determine if it contains terms that should be negotiated. If there are problems, you immediately notify the project manager for the prime consultant. Ideally, contractual language can be worked out before the contract is awarded.

When the prime consultant provides the subconsultant agreement, the signature process is straightforward. You should normally receive *two copies* of the contract from the prime consultant. If the copies have not been signed by the prime consultant, ask the assigned principal to sign them and return both to the prime consultant. A signed original will be sent back to us for our files. You should make a copy of the contract and attach it and the original contract to the New Project Information Form, which you then give to the office administrator. (See Section 4.4, New Project Information.) If the copies have been signed by the prime consultant, ask the assigned principal to sign them and return one to the prime.

Once you have obtained a signed original, attach it to the New Project Information Form (see Section 4.4, below) and make a copy for filing. If a project number has been assigned, put this number on the upper righthand corner of the contract. These materials should be submitted to the office administrator, who will then forward the information to G&A and make sure a file is set up for your project.

In some cases, Parametrix may be asked to begin work before a subconsultant agreement has been signed. If this is the case, make sure you obtain a written

Notice to Proceed, complete with a description of the work to be performed, issues to be addressed, and budget. *As with the prime contract, all work performed before a formal contract is executed must be approved by the assigned principal.*

4.4 NEW PROJECT INFORMATION FORMS

As project manager, you must fill out a New Project Information Form at the onset of a project and deliver it to the office administrator who in turn will forward it to the G&A department in Sumner.

Why are New Project Information Forms important?

New Project Information Forms provide data that is entered into the computer for billing and job reporting purposes (Figure 4-2). Once the information is entered into the computer, your project is given a number and a system is set up so that team members can bill to the project number, and project status reports can be generated. However, as discussed earlier, with written authorization by the client (Notice to Proceed) and approval from the assigned principal, work can proceed without a signed contract. In such instances, the project manager should submit the Notice to Proceed with the New Project Information Form to G&A staff.

When does the New Project Information Form need to be completed?

New Project Information Forms should be completed as soon as a client contract is signed. As noted, work cannot be charged to a project until these forms have been submitted and a project number issued.

How do you fill out New Project Information Forms.

The New Project Information Form has many blanks you must complete. Ask the contract manager to answer any questions you may have (see Figure 4-2). Make sure the contract manager reviews and signs the completed forms before you submit them to G&A in Sumner.

The following guidelines will help you complete the New Project Information Form:

Job

- Indicate the name of the project, project manager, and assigned principal. The assigned principal is generally the principal in charge of the division responsible for the job.

- Include the proposal number used for this project, if any.

New Project Information

Approved by _____

Job

Name _____ Number _____

Manager _____ Principal _____

Proposal Number _____

Job Type (1-11) _____

1 Natural Resources	5 Solid Waste	9 Water
2 Environmental	6 Land Development/Surveying	10 Sewage Treatment
3 Planning/Economics	7 Transportation	11 Sewage Collection
4 Hazardous Waste	8 Storm Drainage	

Client

		Contact	Phone
Name	_____	_____	_____
Address	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Contract (Attach)

Amount _____

Client Retention?	Yes _____	No _____	% _____
Subcontractors	Yes _____	No _____	% _____
EEO Forms?	Yes _____	No _____	

Billing

Frequency Monthly _____ Phase Completion _____ Job End _____

Format By Task Yes _____ No _____

Time & Materials Labor + 1.63 _____ Other _____

Fee 15% _____ Other _____

Std. Multiplier (3.0) _____ Other _____

Lump Sum Total _____ Itemized Yes _____ No _____

Cost + Fixed Fee Fee _____

Labor + 1.63 Other _____

Expenses Outside Services 15% _____ Other _____

Subcontractors 10% _____ Other _____

Instructions _____

_____

_____

Budget Reporting

By Task Yes _____ No _____

(If Yes) PMX Labor Task _____

Expenses Task _____

Subconsultants Task _____

Note: Budget sheets MUST be attached for each level of budget reporting indicated above.

Figure 4-2.
New Project Information Form

- Leave the project number blank. This number will be provided by the G&A staff.

- Indicate the Job Type (choose 1 only).

Client

- Complete all client information—name, address, contact persons(s) and phone number. Make a special effort to understand each client's billable process. This would involve knowing:

  - Who specifically to submit the billings to for prompt payment
  - What date to submit in order to best fit with the client's approval and payment schedule
  - Who to contact to verify that billing is in order.

Contract

- Indicate the total contract amount.

- Indicate *yes* or *no* to all three questions in this category. If portions of the contract allow the client to retain a percentage of the budget until the job is complete, indicate the percentage withheld. When the client holds a retention from Parametrix payments, the same percent retention is withheld from subconsultant payments. If subconsultants are involved, indicate the percentage of the budget allocated for their services.

- Attach the original signed contract.

Billing

- Indicate billing frequency (choose only one–by the month, by phase, or by job end).

- Indicate (yes or no) whether billings should be set up by task.

- Choose a billing format. Billing formats are usually specified in the contract. You should direct any questions regarding billing format to the contract manager.

The following is a brief description of billing systems:

Time and Materials

Labor + 1.63. The 1.63 multiplier is Parametrix current overhead (163%). Charges to the client include the cost of labor (hourly rate) multiplied by 2.63. Direct costs and a fee are charged separately and must be indicated on the line directly below.

Fee 15%. This line is used to indicate the fee (profit) negotiated with the Labor + 1.63 format. Parametrix generally requests a 15% markup for labor and direct expenses. Since this percentage is negotiated, it varies from project to project. A space has been provided for "other" percentage arrangements.

Std Multiplier (3.0). This is the preferred Parametrix billing format. Labor charges are based on the employees' hourly rate multiplied by 3. The number 3 represents the 1.63 overhead rate plus a 14% fee. As with the Fee 15% arrangement (see below), the pass-through fees for direct expenses are negotiable. Parametrix generally requests a 15% markup on direct expenses.

Lump Sum

Lump sum. A lump sum billing arrangement is used when the client agrees to pay a fixed amount for services described in the scope of work. In lump sum situations, the client is usually billed for the percentage of work completed. Under this system, billings are independent of the amount of work charged to a project.

Cost + Fixed Fee

Cost + Fixed Fee. Under this billing system, the cost of labor is multiplied by the overhead figure (1.63) and is charged in addition to a negotiated fee. The fee represents profit and will not change unless the scope of work is revised.

- Expenses: Parametrix generally charges a 15% pass through fee for outside services and 10% for subconsultants. You must indicate if a different percentage has been negotiated with the client.

- Instructions: Indicate any specific billing requirements. For example, lump sum contracts may request that invoices show the "percent job complete" by task or that expenses be itemized and listed separately.

4.5 TASK SCHEDULE SHEETS

A task schedule sheet should be filled out for each task and attached to the New Project Information Form (Figure 4-3). Tasks are usually identified during the budget process described in Section 3.6, Develop Project Budget. Budget sheets from the contract can be used in place of the task schedule sheets.

Task Schedule

Task Name _____ No. _____

Phase Name _____ No. _____

Project Name _____ No. _____

PMX Labor Total Hours _____ Dollars _____

Direct Expenses	Task Amount

Subconsultants	Task Total

Figure 4-3.
Task Schedule Sheet

The original information provided on the task sheet must be accurate. It serves as the basis for budget tracking during the life of the project. Setting it up correctly means your project budget will be tracked properly.

As the project manager, you should fill out the task schedule sheet for each task, giving the name of the task, the phase name if appropriate, and the project name. Task numbers and project numbers are all assigned by G&A staff. The rest of the task schedule you can fill out by using the budget sheets.

4.6 PROJECT FILES

It is your job to set up an adequate project filing system and to maintain accurate project records.

Why are project files important?

Project files provide a record of the agreements, communications, and work performed. Accurate and organized records are important if challenged legally and if individuals unconnected with the project need to use the files.

When are project files set up?

Project files should be set up once the New Project Information Form has been submitted to the office manager and a project number has been assigned (see Figure 4-2).

How are project files set up and maintained?

Files are set up by office administrative staff. A standard filing system is used that organizes files into the following categories:

- **Contracts:** Client Contracts
  Subconsultant Agreements
- **Incoming Correspondence** (in chronological order)
- **Outgoing Correspondence** (in chronological order)
- **Reports and Completed Documents.**

For some projects, this task schedule filing system is adequate. For large and more complex projects, a more extensive system is needed. You are responsible for determining the filing needs of your project. Some filing methods you might find useful are to:

- **Organize the filing system by phase or task.** That way, discrete portions of the project can be filed together and identified.

- **Maintain a separate file folder for one or more of the following:**

  - *Each subconsultant*: The file would contain a copy of the signed subconsultant agreement, work submittals, and correspondence, including fax transmissions.

  - *Fax transmissions*: Normally, fax transmissions are filed as incoming or outgoing correspondence. This system could break up the flow of information that sometimes takes place over the fax machine. In such instances, grouping fax transmissions together is a good idea.

  - *Billings and progress reports*: Grouping these keeps billing information together and easily accessible, rather than integrated with outgoing correspondence.

  - Notes of important phone conversations.

  - In-house memos.

  - Project team handouts and meeting notes.

  - QA/QC review notes.

  - Important reference material used to substantiate critical parts of the project.

  - Technical data used in the project.

  - Field notes and field logs.

  - Design calculations.

  - Copies of work submittals that contain the client's written comments.

  - Copies of important draft submittals.

  - Camera-ready originals and graphics.

As stated, the project manager is responsible for designing the file system and seeing that all appropriate documentation is filed. It's also your job to inform the project staff of the project filing system at the kickoff meeting. Project staff then know how to label file materials correctly. (For example, all originals must be

placed in the project file.) To prepare materials for filing, the project number and the file name should be placed in the upper righthand corner of the first page. The file name is particularly important if a complex filing system has been set up. Materials ready for filing should be placed in the in-basket located in the filing room. Office administrative staff will do the filing.

Check your project files occasionally to make sure that your records are being accurately kept. At the end of a project, you are responsible for making sure a copy of the final document is placed in the project file and/or company library.

4.7 PROJECT MANAGEMENT NOTEBOOK (OPTIONAL)

Although not required, project notebooks can be a good management tool. These notebooks are developed to keep pertinent project information readily available. However, notebooks do not substitute for the complete and accurate record maintained in the project files.

Why is the project notebook important?

Project notebooks contain copies of information that the project manager may want readily available. Project notebooks can improve project tracking and provide a useful management tool. By selectively placing pertinent information, such as scope of work and schedules, into a notebook, you have this documentation at your fingertips. There is no need to go to the project files to get the information or to set up a separate filing system in the project manager's office.

When is the project notebook prepared?

The project notebook is established at the beginning of a project.

How is a project notebook prepared?

Because project notebooks are optional, there are no prescribed methods for their preparation. However, a loose-leaf binder with several dividers is useful. Some recommended divisions to the notebook include:

- Client Contract
- Subconsultant Contract(s)
- Scope of Work
- Project Outline
- Schedules
  - In-house schedules
  - Client schedules

- Budget
- Job Cost Records
- Cost-to-complete analyses
- Invoices and Progress Reports
- Final MIS printouts for project
- Meetings and Phone Records
- Pertinent correspondence
  - Incoming
  - Outgoing.

For large projects, it may be necessary to prepare more than one notebook.

4.8 MANAGEMENT INFORMATION SYSTEM (MIS)

Management Information Systems (MIS) is a software program Parametrix uses to assign staff to projects. MIS is also used to estimate billing revenues. It is a computer program that uses project staffing information provided by project managers to generate workload estimates for each section of the firm and to forecast future income. MIS estimates are made each month and track work assignments for the next 12 months.

Why is MIS important?

MIS is an important tool for communication with Parametrix administration. It gives the project manager an opportunity to identify staff for the project team and to make sure these individuals will have time to work on the project. When all of the MIS input from all the project managers is compiled, section leaders can determine if staff are overbooked or underbooked. This ability helps ensure that staff assigned to one project are not overcommitted to other projects. It also helps determine how much work remains on a job and how much it will cost to complete. MIS information also helps office management make hiring decisions.

When does MIS need to be done?

MIS requirements (forms) need to be completed each month. There is an established process for gathering this information by the third Thursday of every month. This information leads to a preliminary final MIS report that presents the staff utilization and billing information. The preliminary report is reviewed by section leaders and returned for final MIS processing. The flow chart in Figure 4-4 describes the process for completing MIS.

How is MIS done?

MIS information is prepared for each new project. As shown in Figure 4-4, the project manager should request an MIS New Project Form from the MIS manager. You must provide information on the project name, number, type, and category. In addition, you need to estimate the hours each member of the project team will spend on their tasks. An example of the MIS New Project Form used for this purpose is shown in Figure 4-5. *In estimating project team hours, you should account for support as well as technical staff.*

In some cases, a new employee is brought onto a project team before the MIS has been amended. In such cases, the project manager should provide the MIS manager with the following information about the individual: *name, section, billing rate, and billability.*

The MIS New Project Form submitted to the MIS manager is entered into the computer. On the third Thursday of every month, you'll receive a printout showing the hours allocated to each project team member, who will then receive their copies of the MIS Staff Assignment Form (Figure 4-6). The MIS Staff Assignment Form shows the employee the month and the number of hours each project has requested of them. The process for amending these reports is discussed above and illustrated (see Figure 4-4). Typically, as a project progresses, the team member's hours need to be adjusted and the MIS changed to reflect those changes. MIS is used to generate a series of reports the Parametrix Executive Committee uses to evaluate the performance of the company. Examples of some of these reports are included in Appendix F.

MIS is an important management tool that serves all levels of management in Parametrix. However, its credibility and usability depends entirely on the accuracy of hourly estimates by project managers. *To maximize the potential of the system, it is absolutely essential that you accurately estimate the hourly staff demands of your projects.*

4.9 PROJECT STATUS

Some division managers within Parametrix require regular status reports of ongoing projects within their division. An example of such a status report is provided in Appendix G. These status reports are designed to update upper management on the progress of projects and any problems that may be developing.

Since project status reports are not a uniform requirement in Parametrix, you should find out if you need to complete one. If you do have to prepare status

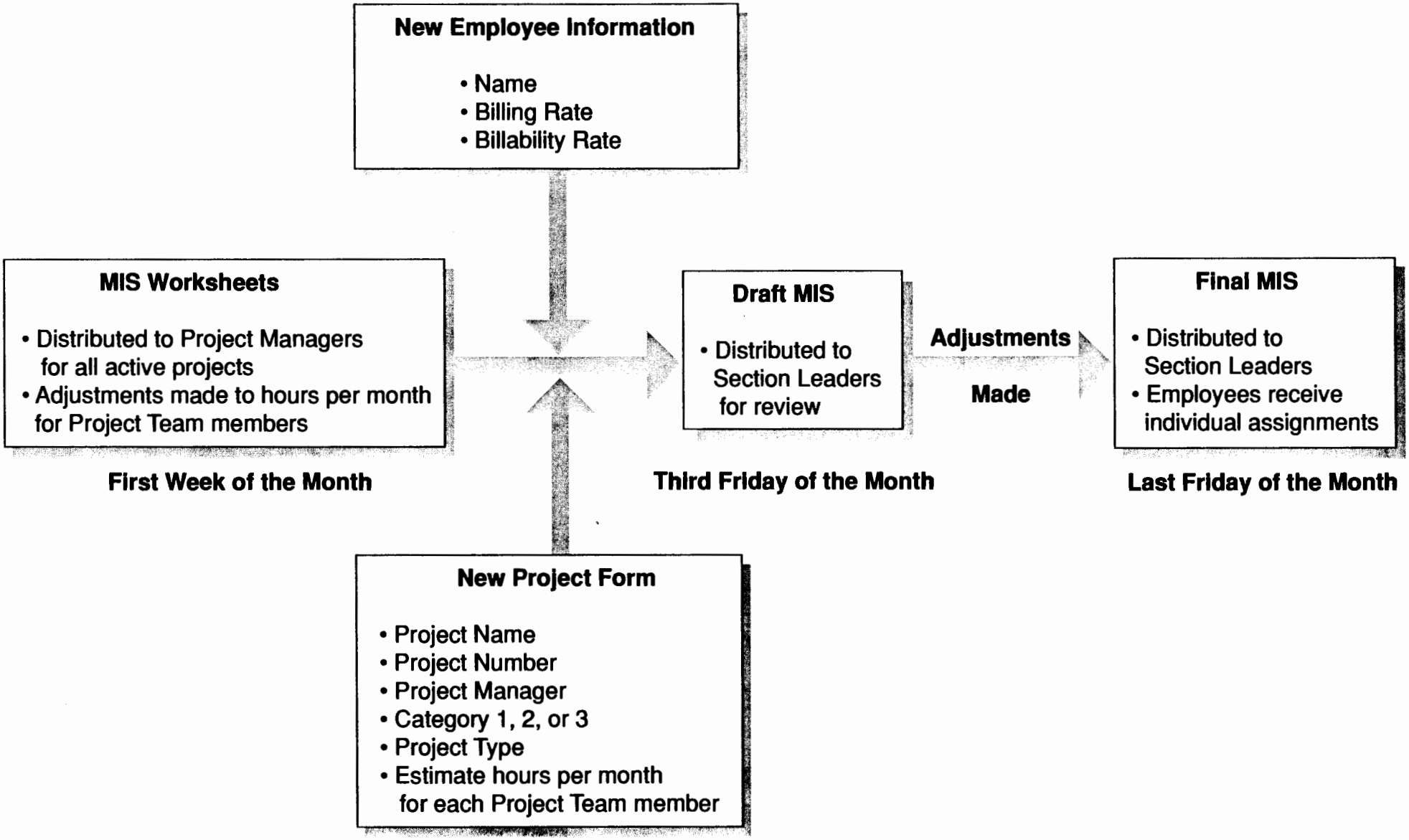


Figure 4-4.
Parametrix Management Information System - The MIS Process

BELLEVUE MANAGEMENT INFORMATION SYSTEM
New Project Form - Fill in information below

Page 1
04/10/90

Hours in month	May 176	Jun 176	Jul 176	Aug 168	Sep 168	Oct 176	Nov 176	Dec 160	Jan 184	Feb 160	Mar 168	Apr 176	May 176	Comments
100 Beluche														
101 Weithamp														
102 WORD PROC(2):														
103 CLERICAL (2):														
104 GRAPHICS (2):														
105 EDITING														
106 Storlie														
109 Schroeder														
110 Johnson														
111 Peters														
113 Boyce														
114 Shimek														
115 Whitman														
116 Sullivan														
117 Williams														
118 Thompson														
119 Galstad														
120 Hawes														
121 Karas														
122 Spink														
123 Shields														
124 Hagen														
125 Biologist														

BELLEVUE MANAGEMENT INFORMATION SYSTEM
New Project Form - Fill in information below

Page 2
04/10/90

Hours in month	May 176	Jun 176	Jul 176	Aug 168	Sep 168	Oct 176	Nov 176	Dec 160	Jan 184	Feb 160	Mar 168	Apr 176	May 176	Comments
130 Fagerness														
131 Siemler														
133 Sweeney														
134 Lakey														
135 Kelley														
136 Neiman														
137 Bruce														
138 Laboratory														
139 Ecklein														
141 Peterson														
142 Campbell														
144 Gallion														
145 Dold														
146 Ziesette														
147 Heilman														
148 Butler														
149 Wold														
150 Planner														
153 Georgianna														
154 Maynard														
155 Peterson														

BELLEVUE MANAGEMENT INFORMATION SYSTEM
New Project Form - Fill in information below

Page 3
04/10/90

Hours in month	May 176	Jun 176	Jul 176	Aug 168	Sep 168	Oct 176	Nov 176	Dec 160	Jan 184	Feb 160	Mar 168	Apr 176	May 176	Comments
161 Sullivan														
162 Neuner														
164 Emge														
165 Do														
166 Mullen														
167 Vieira														
169 Shields														
170 Mukelic														
171 Anderson														
172 Swan														
173 Hall														
174 Brown														
175 Baltzell														
176 Sr Hydrol														
177 Morley														
178 Kane														
179 Clark														
182 Drennen														
185 Campbell														
186 PROJECT MGR														
187 ENGINEER II														
188 ENGINEER I														
189 HW PLANNER														
202 Miller														
203 Massart														
204 Bourque														

BELLEVUE MANAGEMENT INFORMATION SYSTEM
New Project Form - Fill in information below

Page 4
04/10/90

Hours in month	May 176	Jun 176	Jul 176	Aug 168	Sep 168	Oct 176	Nov 176	Dec 160	Jan 184	Feb 160	Mar 168	Apr 176	May 176	Comments
205 Harrison														
206 McKay														
207 Richards														
208 Hill														
209 Sorenson														
210 Hamberg														
211 Martenez														
212 Hicker														
213 Churen														
214 Wilkins														
215 Ullman														
216 Ashton														
217 Sutton														
218 SW PROJ MNGR:														
219 SW ENG I														
220 SW ENG II														

Project Name: _____

Project Number: _____ Project Manager: _____

Category: (circle one) 1 - Under contract 2 - No contract yet

Job Type: (circle one)

01-Aquatic Resources
02-Environmental
03-Planning/Economics
04-Hazardous Waste
05-Solid Waste
06-Land Dev/Surveying
07-Transportation
08-Storm Drainage
09-Water
10-Sewage Treatment
11-Sewage Collection

Figure 4-5.
MIS New Project Form

BELLEVUE MANAGEMENT INFORMATION SYSTEM
STAFF ASSIGNMENTS

Page 1
04/30/90

Project		140 Dave Mattern May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Category 1										
35-1583-16	WDOE S-4	40	40							
55-1550-22	Midway FS Pt.2 Gr	8	4		8		8			
55-1656-49	Newhalem Creek FE	6						20		
85-2115-02	Sockeye Spawning	100	80	80	80	80				
Category 2										
99-9999-81	Lake Tapps Enviro		40	40	40	40				
Category 1 Hours		156	104	80	88	80	8	20	0	0
Category 2 Hours		0	40	40	40	40	0	0	0	0
Assigned Hours		156	144	120	128	120	8	20	0	0
Non-Billable Hours										
Bus Dev & Admin		39	39	39	37	37	39	39	35	40
Vacation										
Available Hours		137	137	137	131	131	137	137	125	144
Over/Under Booked										
Category 1		-19	33	57	43	51	129	117	125	144
Category 1&2		-19	-7	17	3	11	129	117	125	144

BELLEVUE MANAGEMENT INFORMATION SYSTEM
STAFF ASSIGNMENTS

Page 1
04/30/90

Project		171 Mark Anderson May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Category 1										
55-1550-22	Midway FS Pt.2 Gr	10	10	20	10					
55-1625-04	Cascade Center	20	15	15	20	20				
55-1823-01	Olivine Landfill	15								
55-1846-01	ODEQ - Nuway	40								
99-9999-74	Queen City Site 1	8								
99-9999-76	Anchorage Soil Tr	20	20							
99-9999-77	Puget Power Shuff	30								
Category 2										
31-1600-01	Olympic View Risk	15	15	20	20	20	20	40	40	40
55-1591-05	Rabanco - Grant C	10	20				40	30	30	30
99-9999-75	Weyerhaueser-Aber	20	10	40	40	40				
99-9999-85	ODEQ - Nuway		40				0	0	0	0
Category 1 Hours		143	45	35	30	20	0	70	70	70
Category 2 Hours		45	85	60	60	60	60	70	70	70
Assigned Hours		188	130	95	90	80	60			
Non-Billable Hours										
Bus Dev & Admin		35	35	35	34	34	35	35	32	37
Vacation										
Available Hours		141	141	141	134	134	141	141	128	147
Over/Under Booked										
Category 1		-2	96	106	104	114	141	141	128	147
Category 1&2		-47	11	46	44	54	81	71	58	77

BELLEVUE MANAGEMENT INFORMATION SYSTEM
STAFF ASSIGNMENTS

Page 1
04/30/90

Project		103 CLERICAL (2) May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Category 1										
11-1600-11	Olympic View Spec	2	2	2	2	2	2	2	2	2
35-1542-21	Bypass Options	6	6							
35-1583-16	WDOE S-4	10	20							
55-1527-23	Sumner Wetland In	2								
55-1550-22	Midway FS Pt.2 Gr	10	10	10	10		10	10		
55-1550-25	Midway Leachate W	1	1							
55-1650-15	Simpson Cap Monit			2	2	2				
55-1846-02	ODEQ/HRS	2								
85-2115-02	Sockeye Spawning	4	4	4	4	4	4	4	4	
99-9999-74	Queen City Site I	5								
99-9999-76	Anchorage Soil Tr	5								
Category 2										
31-1600-01	Olympic View Risk	3	3							
35-1542-19	FERC Proceedings	24	16							
35-1795-01	DNR-USTs REMOVAL	1	1	1	1	1	1	1	1	
99-9999-75	Weyerhaueser-Aber	5	5							
99-9999-87	Jackson County SW	2								
99-9999-90	Simpson Outfall			2	2	2	2			
99-9999-99	Cathcart Energy R		4	4	4	4				
Category 1 Hours		47	43	18	18	8	16	16	6	2
Category 2 Hours		35	29	7	7	7	3	1	1	0
Assigned Hours		82	72	25	25	15	19	17	7	2
Non-Billable Hours										
Bus Dev & Admin		0	0	0	0	0	0	0	0	0
Vacation										
Available Hours		352	352	352	336	336	352	352	320	368
Over/Under Booked										
Category 1		305	309	334	318	328	336	336	314	366
Category 1&2		270	280	327	311	321	333	335	313	366

Figure 4-6.
MIS Staff
Assignment Forms

reports, then you should find what format to use and when the submittals are due.

In addition to in-house status reports, you will need to provide a written client status report to accompany the billing. You'll need to see that the status report is complete and sent with the billing (see Figures 5-5 and 5-6, Billing Transmittal Letter).

4.10 CLOSING A PROJECT

Closing a project involves several key steps:

- Notify G&A that the project has ended
- Verify all project costs have been billed
- Close files
- Send appropriate reference material to the Parametrix librarian
- Write a final letter to the client.

The project manager is responsible for closing a project. This means G&A needs to be notified of the closure of a project in order to properly close the *job costing information files*. You must also make sure all necessary information is in the project files and that a completed copy of the document is placed in the files.

While it is important to place all necessary information in the files, it is also important to remove unnecessary information. All duplicates should be weeded out and only important drafts of the document should be saved. If a project is likely to be challenged, you may want to keep interim and previous drafts of the report. However, these materials should not be mixed into the files: *store them separately*.

In closing a project, gather any reference material collected over the course of the project. This material should be given to the Parametrix librarian for the benefit of others in the company.

As a final step in closing a project, you should write a final letter to the client. We hope the project has been completed on a positive note and the letter can express our appreciation for the client's business. The letter should be followed up with a telephone call. During the call, ask the client to evaluate our performance and give us their impressions and thoughts on the project. This feedback gives us valuable ideas on how we can improve and builds client goodwill. *Never close a project without it!*

Chapter 5
Financial Project Management

Chapter 5 Objectives

In this chapter you'll find the steps necessary to keep your project budget in line. These important actions are:

1. Completing the monthly billing cycle.
2. Understanding Project Effort Review Reports.
3. Accurately tracking the project budget.
4. Reviewing subconsultant budgets to see that "sub" costs are in line.
5. Processing project invoices.

Financial Project Management

5.1 INTRODUCTION

Financial project management encompasses the "dollars and cents" side of project management. It can be separated into the routine responsibilities such as invoices and billings handled monthly, and the more challenging planning/forecasting responsibilities such as budget tracking and cost overrun management.

Why is financial project management important?

Parametrix is in business to make a profit: without it, our solvency will be short lived. Therefore, financial project management is one of the most important aspects of successful project management. To succeed, careful budget planning at the start of the project is important, and thorough budget tracking during the life of the project is essential.

Another component of financial project management is the routine monthly processing of invoices posted against the project, and monthly billing to the client. This part of financial management is important because it provides a steady cash flow to cover the costs of business operation. Therefore, monthly billings follow a tight timeline you must plan on accommodating.

5.2 ELEMENTS OF FINANCIAL PROJECT MANAGEMENT

Managing your project budget means a clear understanding of all the elements of financial project management. These elements include:

- Project Effort Details Report review
- Percent-complete estimates
- Project invoices
- Project billings
- Subconsultant budget review
- Aging Report review
- Supervisor update on budget status
- Handling cost overruns.

Within each of these elements, are a number of responsibilities you must fulfill. These responsibilities are explained in detail in the following sections of this chapter.

Project Effort Details Reports are the formal administrative tool for tracking projects at Parametrix. Other budget tracking tools may also be used to keep track of the budget status. These tools include plotting budget available versus budget spent to get a quick accounting of how much budget remains versus how much work remains on the project.

5.3 PROJECT EFFORT DETAILS REPORT REVIEW

Project Effort Details Reports (effort reports) are computer-generated reports showing expenditures against a job (Figure 5-1). The expenditures are separated by labor (including staff names), direct expenses, and subconsultants. The expenditures are compiled by two categories: (1) *month-to-date* and (2) *project-to-date*. The bottom line of each effort report summarizes the amount budgeted, the amount spent to date, the percent of the budget used, and the percentage of the project completed. This last category, *percent complete*, is an estimate you make before the effort report is generated.

Effort reports are set up initially from the information provided on the New Project Information Form (see Figure 4-2). Therefore, it is essential that form be completed accurately.

Why are Project Effort Details Report reviews important?

Reviewing effort reports is the mechanism you'll use to track your budget. These reviews allow you to determine how much of the project budget has been spent, where it has been spent (on labor, subconsultants, or direct expenses), and who has spent it. Effort reports also indicate how much money was budgeted and calculate the percent of budget spent.

The percent-complete estimate you make should be based on your estimate of the work done and progress made towards meeting the deliverables. *The percent-complete estimate should not be based on the project budget.* When the effort report is available, the percent-complete estimate should be checked against the actual percentage of budget used. If the percentage of budget used is substantially greater than the percent-complete estimate, your project is headed toward a cost overrun.

In addition to providing this basic information on expenditures, reviewing your effort reports helps you determine if anyone has incorrectly charged to your project.

NONE :
NONE :
NONE :

PARAMETRIX
PROJECT EFFORT DETAIL
AS OF 03/31/90

RUN DATE/TIME 04/03/90 09:53
PERIOD ENDING 03/89
ALL OR SELECTED: SELE
PAGE 1

21-1578-31 MICKLEBERRY-RIDGETOP SIGNAL
CLIENT: KITS04 Kitsap County
ORG NM 111 Sumner Office

FEE TYPE CPM
FEE AVAILABLE 10,995.80
RGLM: 2.9982 BLM = 2.9982

PROJECT START DATE 12/24/89
EST. COMPLETION / /

---- BILLING ADDRESS ----

---- PROJECT COMMENTS ----

---- SCHEDULING REMARKS ----

EMPLOYEE / VENDOR	MTD HOURS	MTD DOLLARS	PTD HOURS	PTD DOLLARS	BUDGET HOURS	BUDGET DOLLARS	PERCENT USED HRS	PERCENT USED DOLLARS	PCT COMP
031210 Ettinger, Linda A.	.75	22.49	.75	22.49					
032018 Filosi, Robin M.	2.00	101.04	26.00	1313.52					
033836 Franklin, Robert P.	1.00	82.60	44.50	3675.73					
044946 Holtzclaw, Karen J.	2.50	78.70	6.00	188.88					
066560 Pilon, Ami E.	2.00	57.20	66.00	1887.78					
071004 Rowland, Clark G.	1.00	64.22	6.00	385.35					
071408 Rozanski, Janice C.	.25	9.29	.25	9.29					
PRIOR ACTIVITY			7.50	2052.18					
** TOTAL LABOR **	9.50	415.54	157.00	9535.22		9995.80		95.39	95.39
G/L 5131-PR Printing									
9KESO1 Kestrel Blueprint		115.19		143.73					
PRIOR ACTIVITY				19.12					
** TOTAL EXPENSE		115.19		162.85		1000.00		16.29	
*** PROJECT TOTAL									
** TOTAL LABOR	9.50	415.54	157.00	9535.22		9995.80		95.39	95.39
** TOTAL EXPENSE		115.19		162.85		1000.00		16.29	
** GRAND TOTAL	9.50	530.73	157.00	9698.07		10995.80		88.20	95.39

CONTRACT REF: CONTACT:	TOTAL BILLINGS TO DATE	TOTAL COLLECTIONS	OUTSTANDING A/R	PTD EARNED REV	WORK-IN PROCESS
	9167.34	.00	9167.34	9698.07	530.73

*** END OF PROJECT **********

Figure 5-1. Project Effort Details Report

When do effort report reviews occur?

Project managers typically review project effort reports twice a month—at the halfway point, and at the end of each month. More frequent effort reports can be generated at your request. The month-end effort report is provided in conjunction with a prebilling analysis report described in more detail in Section 5.4, Project Billings.

How are effort report reviews conducted?

Effort reports are generated by the G&A department in the Sumner Parametrix office. They are created from data presented on timesheets and expense reports. The Sumner office distributes them to all Parametrix project managers. Once you receive this report, it is your responsibility to:

- Review them promptly and direct any questions to G&A.
- Notify G&A of any incorrect charges or changes in your project by any of these methods:
  - By phone
  - By listing the changes on the Project Correction Form (Figure 5-2)
  - By faxing changes marked on the Monthly Prebilling Review Report form (see Section 5.5, Project Billings)
- Report any potential or immediate budget problems to your supervisor
- Notify the client of budget problems as appropriate (see Section 5.7, Handling Cost Overruns).
- It is also your responsibility to make a percent-complete estimate before the end of the month effort report is issued.

Once a project manager has reviewed an effort report, it should be initialed and ultimately routed to the office administrator for filing. However, you may want to route it to other project staff, especially task leaders, before it is filed. The project file will contain only the most recent effort report printout. Old printouts are purged from the file and discarded. If it is necessary to retain old effort reports for project records, it is your responsibility to maintain an effort report file in your own office.

Direct expenses and subconsultant costs should be carefully reviewed and distinguished from Parametrix labor costs. In reviewing the project's bottom line it is easy to be misled into thinking your project budget is in good shape because a large amount of money remains. In reality, the situation may be that because a major subconsultant has not sent us an invoice yet, most of the remaining budget is already earmarked for a use other than Parametrix labor. Therefore, very little budget may remain for Parametrix labor.

PROJECT CORRECTION FORM

Submitted by:	Date:
Project Name	Project #:

CHANGE SET-UP		**TRANSFER CHARGES**	
	Change PM		Same job/different task
	Increase fee budget		Different job/task
	Redistribute budget	**CHANGE STATUS**	
	Other		Active
MISCELLANEOUS			Inactive
	Other		Close (All A/R must be collected to close)

Explain in detail below and attach back-up if needed.

Figure 5-2.
Project Correction Form

During your effort report reviews, take this budgeting factor into account. *You are responsible for comparing Parametrix labor spent against labor budgeted to determine the correct financial status of your project budget.*

5.4 PROJECT INVOICES

Invoices are defined as bills we receive from subconsultants, vendors, and other direct expenses posted against a project. They differ from "billings," which are defined as the bill we send to a client (see Section 5.5, Project Billings)

Why are invoices important?

All project invoices received by Parametrix must be tracked to a project, posted against that project, and paid. Parametrix payment policy, especially with subconsultants, is to pay the invoice *after* we have been paid by the client. Therefore, it is important that you promptly process and post invoices to your project.

When are invoices processed?

Incoming invoices are handled on a continuum. As they arrive in the office, they are sent to project managers and dealt with immediately.

How are invoices processed?

Receptionists intercept invoices in the incoming mail and route them to the office administrator. The office administrator logs them in as received, and directs them to project managers. You can recognize invoices in your incoming mail because they are routed in colored folders. You must approve the invoices (initial them) and note the job, and task number on the invoice. Once you've approved them, invoices should be returned to the office administrator. After approval by the Division Manager, the office administrator will forward them to G&A in Sumner where invoices are processed for payment and posted to project accounts.

5.5 PROJECT BILLINGS

Project billings are the invoices *that we send to the client*. Unless a project has some special provisions for a different billing scheme, project billings are typically sent monthly. The billings identify the labor charges, subconsultant charges, and direct expenses.

Why are project billings important?

Project billings must be tended to promptly each month because they provide the steady cash flow necessary to operate the business.

When do project billings occur?

The billing process takes place during the first 10 working days of each month. You must be available to review project billings between the third and fifth working day of every month. If you know that you'll be out of the office on those days, appoint someone who can complete the review in your absence.

How do project billings occur?

Project billings are generated by the G&A Department in Sumner. You must approve them and have them signed by a principal. The timing and sequencing of this process is shown in Figure 5-3.

Monthly Prebilling Review Report

The project billing process is initiated when the project manager receives a *Monthly Prebilling Review Report* (Figure 5-4). These reports are accompanied by a memo from G&A that outlines the schedule after turning around each month's billings. Monthly Prebilling Review Reports are typically delivered on the third working day of each month and arrive in a blue folder. The report identifies all of the current charges on your project.

These basic definitions should help you interpret the Monthly Prebilling Review Report:

Billings: The actual dollar amount(s) billed to the client on the project.

Effort: The billable value of staff hours expended on a project and project expenses incurred.

Monthly Cycle

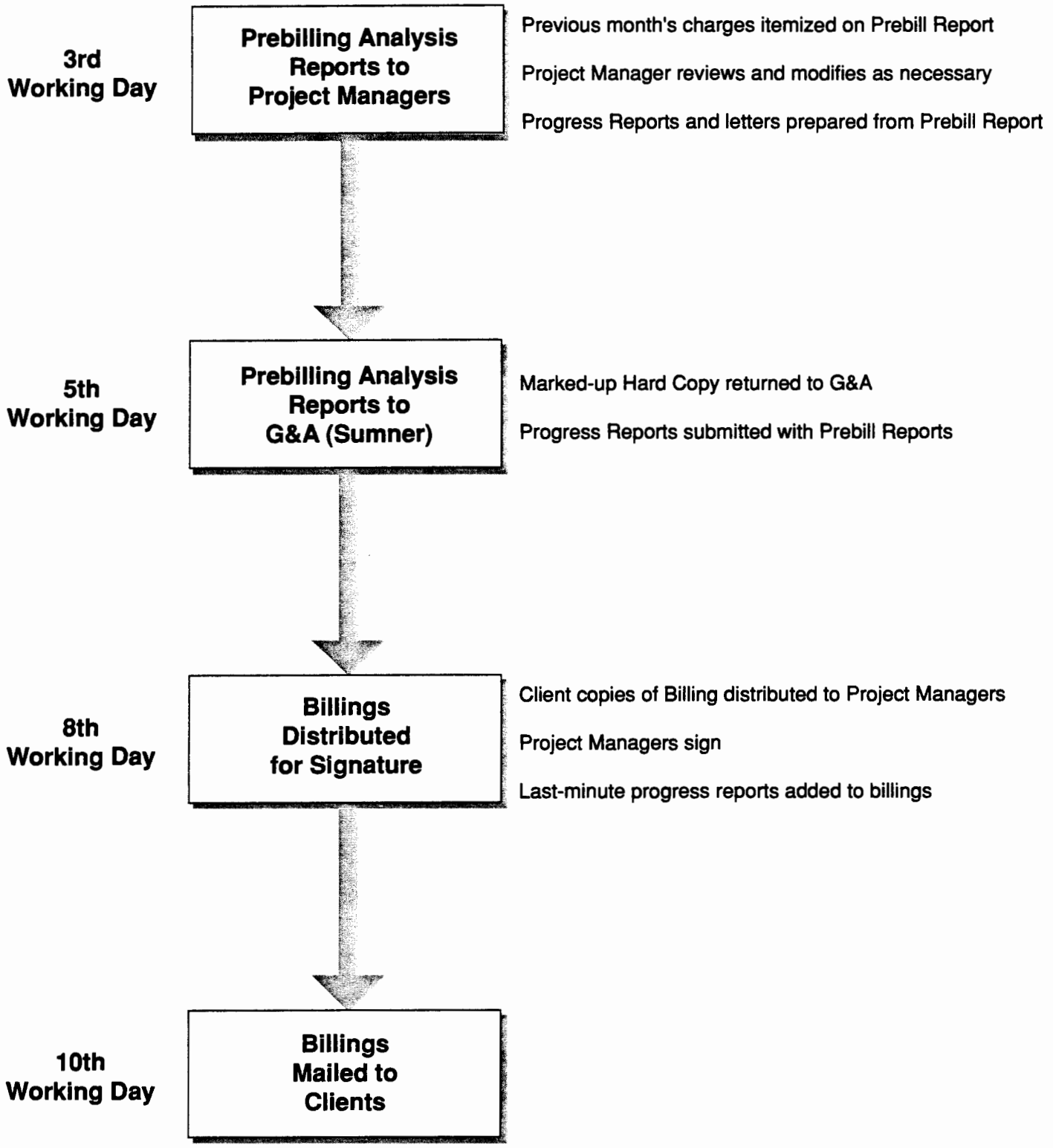


Figure 5-3.
Project Billing Process

PARAMETRIX
PREBILLING ANALYSIS
FROM 03/01/90 THRU 03/31/90

RUN DATE 04/03/90
PAGE 1

21-1578-31 MICKLEBERRY-RIDGETOP SIGNAL
CLIENT: KITS04 Kitsap County
O/T BILLING: Y FRING LOADED: NO, .00

PRI: Dunlap, Richard A. BILL CYCLE: 1
P/M: McIntyre, John S. BILL MULTP: 2.9982
P/E: Franklin, Robert P. BILL ORG: 112
BLR: Franklin, Robert P. COVER MASK: CPMOHFEE

FEE: 10,995.80
FEE TYPE: CPM
RATE SCHEDUE: 19
BACKUP: BOHFEENT

SALARY & EXPENSE DETAIL

DIRECT LABOR

	TASK	DEPT	CLS	ATVY	DATE	P.E. DATE	HOURS	RATE	COST	BILLABLE	*** KEY ***
Ettinger, Linda A.	0	0000	?	00	03/30/90	03/30/90	.75	10.0000	7.50	22.48	0389-09S-187
Filosi, Robin M.	0	0000	?	00	03/09/90	03/09/90	2.00	16.8500	33.70	101.03	0389-01K-388
Franklin, Robert P.	0	0000	?	00	03/30/90	03/30/90	1.00	27.5500	27.55	82.60	0389-09J-356
Holtzclaw, Karen J.	0	0000	?	00	03/09/90	03/09/90	2.50	10.5000	26.25	78.70	0389-01W-320
Pilon, Ami E.	0	0000	?	00	03/30/90	03/30/90	.50				0389-09P-009
Pilon, Ami E.	0	0000	?	00	03/30/90	03/30/90	1.50				0389-09P-011
						***	2.00	9.5400	19.08	57.20	
Rowland, Clark G.	0	0000	?	00	03/23/90	03/23/90	1.00	21.4200	21.42	64.22	0389-07W-118
Rozanski, Janice C.	0	0000	?	00	03/15/90	03/15/90	.25	12.4000	3.10	9.29	0389-04M-534
					** TOTAL MLT		9.50		138.60	415.52	

DIRECT EXPENSES

	TASK	DEPT	DOC #	UNIT	DATE	P.E. DATE	QTY/COST/SIZE	RATE/MULT	BILLABLE	**** KEY ****
G/L ACCT: 5131-PR										
Printing Kestral Blueprint	0	0000	001877		03/14/90	03/31/90	115.19			0389-02H-071
						***	115.19	1.0000	115.19	
									115.19	
						CURRENT TOTAL AVAILABLE BILLABLE ***			530.71	

	AVAILABLE BILLING			EFFORT ON-HOLD			EFFORT WRITTEN OFF		
	HOURS	LABOR	EXPENSE	HOURS	LABOR	EXPENSE	HOURS	LABOR	EXPENSE
CURRENT	9.50	415.52	115.19						
PREVIOUS	147.50	7,389.14	47.66						
TOTAL	157.00	7,804.66	162.85						

AVAILABLE EFFORT FROM 03/01/90 TO 03/31/90			AVAILABLE EFFORT PRIOR TO 03/01/90		
HOURS	LABOR	EXPENSE	HOURS	LABOR	EXPENSE
9.50	415.54	115.19	.00	.00	.00

MAIN CONTRACT BILLING			MAIN CONTRACT + R/X TASKS				
CURRENT	PREVIOUS	TOTAL	REVENUE	BILLINGS	WIP	COLLECTED	A/R
530.71	9,167.34	9,698.05	9,698.07	9,167.34	530.73		9,167.34

Figure 5-3. Monthly Prebilling Review Report

Revenue: The same as effort, unless your budget multiplied by percent complete limits your project revenue as a result of cost overruns.

The following equations are designed by the manufacturer of our accounting software. You can use them to help you determine what *revenue* means on your Monthly Prebilling Review Report (see Figure 5-4):

Revenue = Effort
If % Complete x Budgets > Effort

Revenue = % Complete x Budgets
If % Complete x Budget < Effort

Exceptions:

If Lump Sums, then

Revenue = % Complete x Budgets

If Cost Plus, then

Revenue = Effort

WIP: WIP stands for work in process. Work in process is revenue minus the amount billed. At the month end, WIP is the entire month's billings. After billing, WIP is the amount withheld.

If you need to review the Monthly Prebilling Review Report, indicate any revisions in red on the report, and return it to Sumner. You must return these reports to Sumner by the fifth working day of the month. Progress reports or letters should accompany each billing and should be returned along with the Monthly Billing Review Report.

Monthly Billing Transmittal Letters

It is also the project manager's responsibility to send a *monthly billing transmittal letter* to the client to update the status of the project. This update letter should accompany our bill and should address both technical and budget issues. The organization and an example of such a letter are shown in Figures 5-5 and 5-6. The letter should be attached to the Monthly Billing Review Report that is returned to G&A. G&A will forward the letter to the client along with our bill.

By the eighth working day of each month, the G&A department then creates our billings to the clients and distributes them to office administrators for signatures by the principal. Although last-minute progress reports can be incorporated with

Billing Transmittal Letter

Address billing to appropriate person

- Person whom client agrees can best process the billing

Subject: List billing #, date of billing, project name/reference

Begin directly with overview of billing

- Mention project name
- Give amount of billing
- Give period or month of billing

List project tasks and discuss work initiated and/or completed under each task

- If no work is done on a specific task, list "No work done this period"
- If the project is a single task, list the completed activities

Give $ spent

Give percent complete vs. percent of budget spent

- Task by task *or* total project basis
- Use a table, if appropriate

Give information on project work

- Significant project work done, if any, since billing end date and the time of mailing this letter with billing
- Work scheduled for the coming month(s)

Discuss new scope of work, if any

- Say that an amendment to the contract scope is being processed under separate cover
- Give overall implications to the project budget and percent complete
- Note any adjustments to the schedule

List or discuss other special factors

- Subconsultant billings
- Reimbursable expenses

Follow-up

- *Verify that billing was received and is being processed*
- *Check status of payment (accounts receivable)*

Figure 5-5.
General Outline for Writing Billing Transmittal Letter

December 22, 1989
PMX #11-1101-01

Ms. Jones
ABC Consultants, Inc.
1000 Tech Center Drive, #100
Hometown, USA 12345-6789

Subject: PMX Billing #12345 dated 12/08/89
Anytown Site Drainage Study

Dear Ms. Jones:

Enclosed is Parametrix' first, second, etc. bill for professional, engineering, etc. services completed on the Anytown project. The amount of the bill is $amount and covers the period from project start-up; month of through period of/month of.

Services initiated and/or completed during this period include the following:

1. Met with ABC staff on October 30 and November 6 & 9, 1989 to discuss the project.

2. Met with ABC and Anytown staff on November 1 at the Port of Anytown to view the lumber mill and site drainage.

3. Prepared four graphics representing: site plan, drainage area, drainage flows, and drainage schematics.

4. Met with ABC and Washington DOE staff on November 9 in Olympia to discuss the project.

5. Reviewed and commented on correspondence prepared by ABC for submittal to Anytown and DOE.

As of end date for billing period, Parametrix has spent $ amount to date of the $ budget budget for assistance on the initial study phase. Based upon our current understanding of the project's status, we are about n% completed with the work, and have spent n% of the budget.

Since end date for billing period, we have assisted with review and comment on some additional correspondence by ABC. We will keep you informed as to the status of our budget as the project proceeds.

Let me know if you have questions or need further information.

Sincerely,
PARAMETRIX, INC.

P. Polly Smith
Project Manager

encl.

Figure 5-6.
Billing Transmittal Letter

the billing at this time, they must be coordinated with the office administrator. Signed billings must be returned to G&A and mailed to clients by the tenth working day of the month.

5.6 SUBCONSULTANT BUDGET REVIEW

As project manager, you are also responsible for seeing to it that your project's subconsultants work within budget. Our subcontract agreement will specify their scope of work and budget. (See Section 4.3, Subconsultant Contracts and Appendices D and E). It is your job to review how well the subconsultant meets the scope of work, and how they are progressing on their share of the budget.

Why is subconsultant budget review important?

Just as our own labor charges need to remain within budget, so do our subconsultants' charges. As prime contractor, it is our responsibility to deliver a product to the client, and see to it that the product is completed within the initial budget. If a subconsultant runs over budget, you need to be in a position to deny additional budget requests by subconsultants, or to argue on their behalf to the client that more funding is justified. If the client is unhappy with cost overruns, it reflects just as poorly on your project management as it does on the subconsultant for exceeding their budget.

When are subconsultant budget reviews completed?

Subconsultant budgets need to be reviewed throughout the life of the project. They should occur any time an invoice is received from the subconsultant, an effort report is reviewed, and when monthly billing reports are reviewed.

How are subconsultant budget reviews completed?

During the review, you need to ask: Are the subconsultants' expenditures in line with the amount of work they have done? Can they complete their assignment within their remaining budget? If the answer to either of these questions is no, then it is your responsibility to notify the subconsultant and discuss your concerns. One of the best ways to assure that your subconsultant is providing you with useful information is to require them to send you a monthly update letter. This letter should be similar to the type you send to the client each month (see Figures 5-5 and 5-6, Billing Transmittal Letter). You need to get a clear answer from the subconsultant that they will complete their assignment within budget, or that they will be requesting additional funds. If they do request additional funds, subconsultants must justify it in writing. Client approval of the budget increase must also occur before you can notify subconsultants that their budget increase is approved.

must also occur before you can notify subconsultants that their budget increase is approved.

5.7 SUPERVISOR UPDATE ON BUDGET STATUS

It is your responsibility to regularly update your supervisor on the status of the project's budget.

Why is supervisor awareness important?

There are several reasons why supervisor awareness is necessary. These reasons include:

- Your performance review is based in part on how well you manage budgets.
- Supervisors can give helpful insights and suggestions.
- Supervisors occasionally meet with the client and thus need to be aware of the project budget.

When do supervisors need to be made aware of your project budget status?

Constantly. Throughout the life of the project you should be communicating with your supervisor on the budget's status.

How can awareness come about?

Communication. Several forms of communication are available. Perhaps best is to provide your supervisor with a copy of the update letter that is sent to the client (see Figures 5-5 and 5-6, Billing Transmittal Letter).

5.8 COST OVERRUNS

While everything in this handbook is intended to prevent you from being in a situation where cost overruns occur, the reality of project management is that sometimes projects do go over budget. Thus, you need to know how to deal with cost overruns. Before reviewing some advice on how to deal with cost overruns, you should memorize the following tips on how to prevent them:

Resist client add-ons. Frequently clients will ask "small" favors that mean additional work. Often with a new client we are eager to please, and so the favors are accommodated without consideration to the budget. As much as you may want to accommodate the client, please resist. The resistance does

not mean rejecting the client's request. Instead, the request can be accepted as conditional on more funding being available if the original budget falls short. The client should be sent a letter documenting your willingness to fulfill the request. That letter needs to tell the client it will take "x" amount of hours to complete the add-on request.

Carefully plan the budget. Spend the time it takes to carefully and thoughtfully develop the project budget. It is difficult and awkward to approach a client midway through a project and say: "By the way, I forgot to consider this factor and it's going to cost another $5,000." What if the client is unwilling to provide more money, but is going to hold you to the deliverables and scope of work? Use the budget checklist provided in this handbook and talk with your supervisor and people in your section (see Figure 3-9, Budget Checklist). Ask them if they can think of anything else that may have been overlooked.

Review your project frequently. Often times a month or two will go by before you'll take the time to review the budget and discover a task is over budget. Budget reviews need not take long, and can save a lot of pain and agony in the long run. Also, during busy periods on a project, ask G&A to provide you *weekly* effort reports. During document production and other intense periods it is easy to consume a budget without realizing all of the people who must be involved and who are charging to the project.

Why are cost overruns an important issue?

Obviously cost overruns cost us money and make us less profitable. Worse yet, in the long term they can damage our reputation with a client and cost us potential repeat business if not handled properly. Remember how much time and effort went into getting the job and client in the first place? The last thing we want to do is exclude ourselves from potential repeat business.

When do cost overruns need to be handled?

Immediately. Never put off informing a client that the budget is going to be exceeded. Chances are the sooner they are notified of the problem, the greater the probability the client will be able to successfully deal with the situation and make the necessary adjustments.

How should cost overruns be handled?

Stay in close communication with your supervisor. Requests to clients for more funding should be initiated with a phone call and followed up with a letter. An unexpected letter may offend the client. When a letter is eventually sent, it should thoroughly document why the overrun occurred, what will be done to

prevent it from happening in the future, and how much additional money is necessary. If possible, you'll need to identify where in the budget we may be able to save money and recoup the losses. Potential areas include reduction in the number of draft reports and document turnarounds, shifting report reproduction responsibilities to the client, and identifying tasks that can withstand a reduction in their scope of work.

If requests for funding are denied, then a decision needs to be made regarding whether or not to cancel the remaining existing charges, and how to deal with future charges (for example, charge them to administration). *These decisions are not up to the project manager's discretion.* You should consult your supervisor and group leaders. Cancellations of any amount on any project require the approval of a principal.

5.9 ACCOUNTS RECEIVABLE

The status of accounts receivable for a project is shown at the bottom of the effort report (see Figure 5-1). If an account should reach 90 days, it will require research as to the reason.

G&A sends a monthly aging report to each division highlighting the problem accounts. The division principals request an explanation for each problem account and notify G&A as to what is being done or if G&A should follow-up.

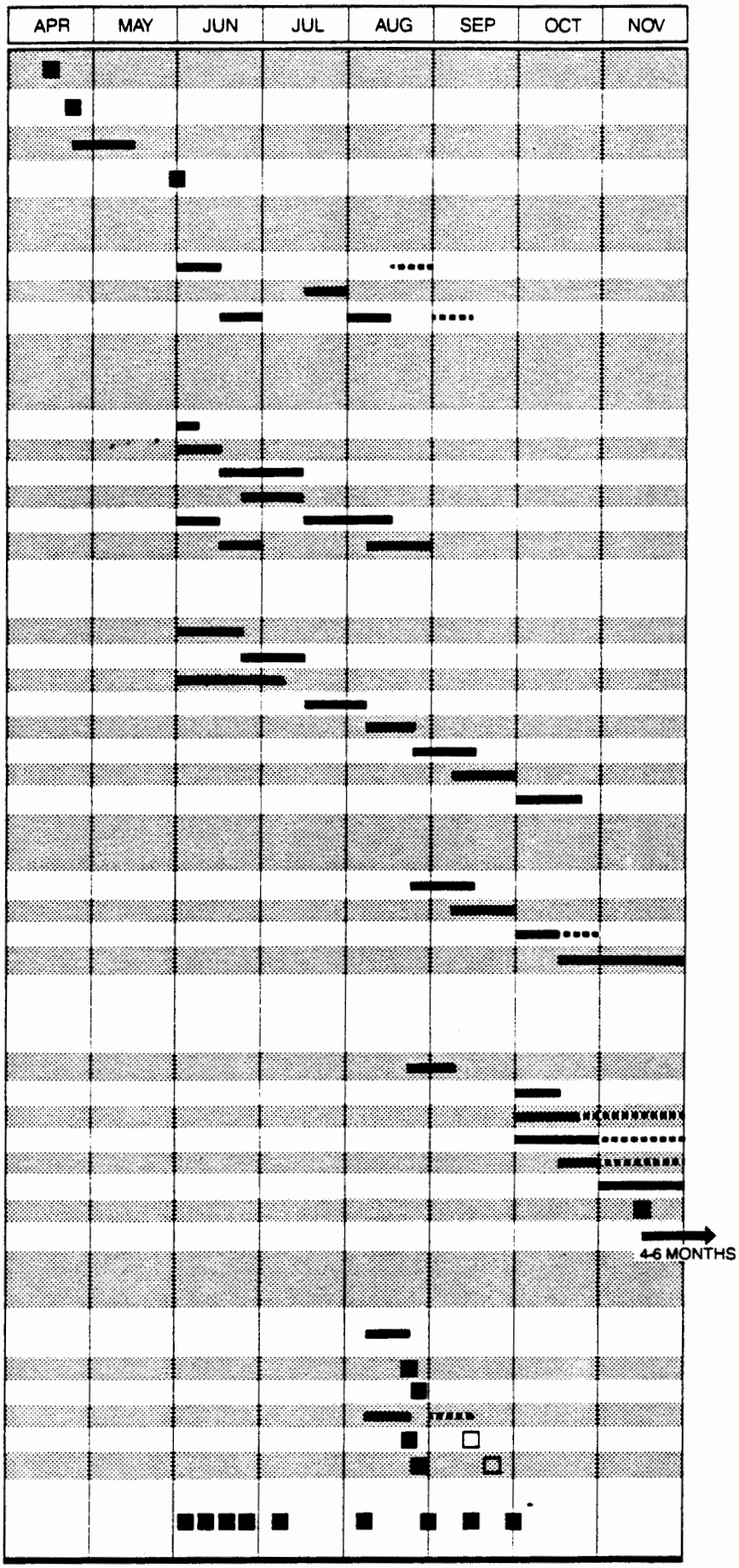
It is important as project manager that you be aware we cannot continue to work for a client who does not pay bills on time.

APPENDIX A

SOFTWARE EXAMPLES FOR PROJECT SCHEDULING

Project Schedule Done on Macintosh

Project Timeline for Cathcart Landfill Gas Management Plan



Submit Proposal and Interview

Consultant Selection By Solid Waste Division

Negotiate Contract

Notice to Proceed

Task 1.
Odor Study

- Survey Before Drilling and Gas Extraction
- Survey Gas Extraction
- Report Preparation

Task 2.
Install/Operate Test Wells, Trench; Analyze Data Including Air Quality

- Interview County Personnel, Assemble Data
- Design Wells, Trench and Probes
- Drill, Install Wells, Trench, Probes
- Install Manifold, Well Connections and Blower
- Operate and Perform Tests
- Analyze Data and Establish Design Criteria

Task 3.
Energy Recovery Feasibility Study

- Identify Energy Users On and Near Site
- Evaluate Data-Rank Candidate Users
- County Provides Finance Information
- Determine Feasibility of Onsite of Nearby Users
- County Evaluation of Users/Concepts
- Prepare Conceptual Facility Design
- Identify/Compare Alternative Systems
- County Evaluation of Alternative Systems

Task 4.
Prepare Gas Collection and Control Plan

- Final Determination of Design Parameters
- Prepare Conceptual Design
- County and Regulatory Agency Review
- Prepare Detailed Plans and Specifications

Task 5.
Prepare Plans and Specifications for Energy Recovery Project

- Final Determination of Gas Quantity, Quality and Impacts
- Verify Possible Users
- Obtain Letters of Commitment
- Obtain Regulatory Agency Approval
- Obtain Permits
- Negotiate Contract
- County Stop/Proceed Decision
- Prepare Plans and Specifications for Selected Alternatives

Task 6.
Supply Necessary Monitoring Equipment and Training

- Prepare Gas Monitoring System Operations and Maintenance Manual
- Train County Personnel in Gas System Theory
- Provide Gas Monitoring Equipment and "Hands-On" Training
- Prepare Odor Survey Manual
- Train County Personnel in Odor Theory
- Provide Odor Equipment and "Hands-On" Training

Task 7.
Conduct Meetings with Public Works Department and Regulatory Agencies

Parametrix, Inc. Team Organization for the Toxic Sediment Hot Spot Elimination Master Program Plan

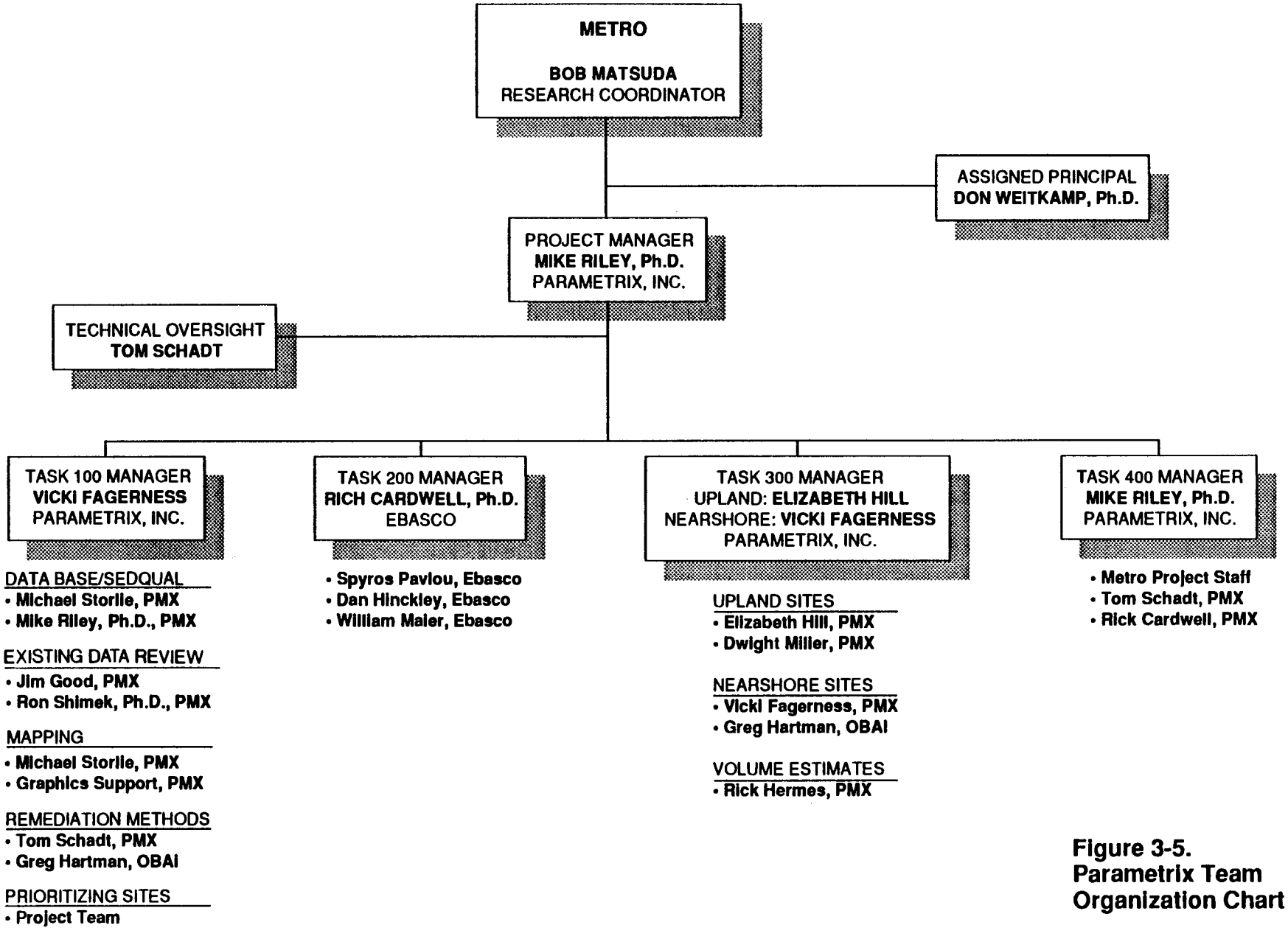


Figure 3-5. Parametrix Team Organization Chart

3.4 DEVELOP THE WORK PLAN

The project manager must develop a written plan that outlines how the team will complete the work we have agreed to do for the client. As you write your work plan, use the checklist shown in Figure 3-6. This written work plan includes the scope of work, a discussion of key technical issues, a project schedule, key milestone dates, a project budget, and a discussion of project quality assurance/quality control (QA/QC). The scope of work in the work plan is typically broken into tasks with each task linked to a detailed budget. Because scopes of work often become part of the contract, they must be clearly defined.

The work plan is a tool that helps you lay out the details of how the work will be done to meet the project goals and satisfy the client. In addition to being an essential in-house "recipe" for a successful project, the project work plan is often submitted to clients, agencies, and other parties for approval. For example, when we work on Superfund sites in Washington, we typically submit an extremely detailed work plan to the client and to the Department of Ecology for their review and approval. In such a case, the work plan is often structured so that the material intended only for in-house use can easily be detached from the submitted work plan. *Always consider the needs of all potential readers when developing the work plan for your project.*

Why is developing the work plan important?

The work plan serves several important needs. It is a tool that forces a project manager to plan a project in detail. When preparing the work plan, the project team identifies the challenges of the many key technical issues of the job. When the work plan is complete, it informs team members, the client, agencies, and other interested parties of how the project will be done.

When does the work plan need to be done?

The work plan must be completed before the project begins or as the first element of work. This is particularly true for projects that require field activities. Often a work plan is developed as part of the proposal. Before the job starts, you should review your work plan to see that it contains adequate detail.

WORK PLAN CHECKLIST

☐ **Introduction**

- ▫ Briefly discuss the project background information
- ▫ Briefly discuss the client's concern or problem
- ▫ Present an understanding of why the consultant team has been requested to provide assistance
- ▫ Present an understanding of regulatory guidelines
- ▫ Present an understanding of legislative or political mandates and developments

☐ **Task descriptions**

- ▫ Describe tasks. Tasks will be designed to address technical and regulatory issues. A well-defined task objective should be included under each task.Where regulatory guidelines apply, the specific requirements for each task must be addressed in detail. That way, work can be completed according to the work plan **and** existing regulations.

☐ **Name key staff and subconsultants**

☐ **Budget**

- ▫ Summarize task budgets and total project costs
- ▫ Give a detailed budget for each task
- ▫ Give a detailed list of cost assumptions
- ▫ Discuss how scheduling may influence the budget
- ▫ Give a detailed budget for each subconsultant

☐ **Project schedule -- Milestones and deliverables**

☐ **Health and safety plan (if required)**

☐ **Description of work to be subcontracted**

☐ **Deliverables**

- ▫ Describe the type and quantity
- ▫ Describe progress reports, preliminary draft, draft, final

☐ **Work not to be provided**

- ▫ Identify any work not provided in the project. To clarify and limit the scope of the project, the work plan should identify what services Parametrix and the subcontractors will not provide during the project. These limitations can be based on information obtained from the client. Parametrix can assume these limitations as unnecessary or infeasible due to client restraints on the project scope or budget.

Figure 3-6.
Work Plan Checklist

How do you develop a work plan?

The work plan is a step-by-step approach for reaching the project goal. When preparing a work plan, it is often useful to use as a model an existing work plan from a similar job. However, don't allow an existing work plan to make you overlook the unique characteristics and requirements of your project. Make certain you work with the client early on to make your work plan fit their specific needs. Until you are a seasoned project manager, always use the work plan checklist (see Figure 3-6) to identify all the elements necessary to work out the technical details of the project.

3.5 DEVELOP PROJECT SCHEDULE

Why is developing the project schedule important?

Setting up a project schedule is important: it is the track upon which your project will run. When well-developed, a project schedule helps you meet the commitments Parametrix has made to the client. Project schedules allow you to:

- Obtain required staff
- Shape task work
  - Identify when to start tasks
  - Identify how long tasks will take to complete
  - Clarify task relationships
- Identify and resolve potential bottlenecks
- Monitor project progress
- Communicate with client and project staff regarding progress and needs
- Identify data you will later submit to the client.

When does it need to be done?

Scheduling is a key activity at several points in the life of a project. The first project schedule is done during the initial planning process. It is an integral part of the work plan and budget preparation.

The first schedule is always presented to the client before work begins. It forms the basis for negotiating the *master* project schedule that features firmly agreed-upon milestones and deliverables. Typically, the master project schedule is a general listing of the milestones and our deliverables.

For pulling together the many pieces of most Parametrix projects, you must draw up a highly detailed *in-house* project schedule. That schedule is your working schedule for getting the project done on the timeline you identified in your master schedule. It deserves your careful attention.

Although many smaller projects do not need an in-house schedule, it is wise to create and follow one. Experienced project managers know the importance of internal coordination. Relying solely on the master schedule can cost you time and money when it comes to final production of project deliverables.

Even if a master schedule was developed during the proposal phase, you must revisit the project schedule before the kickoff meeting. That way, you can make any required changes and communicate those changes to the staff. Ideally, you'll present your team with a clearly detailed in-house project schedule based on the master schedule. Check and adjust the schedule periodically throughout the project. Let the client, project team, and support services manager know of any changes in your project schedule.

How do you develop a project schedule?

As project manager, you will develop the master and in-house project schedules. To build involvement and project ownership by team members, have task managers develop or comment on individual task schedules. Project and task schedules have the same basic elements. The schedules can be developed in many ways, depending on the size and complexity of the job and your preference. There are several software packages available to help in the scheduling process. Among them are (1) Quick Schedule, (2) Super Project Manager Expert, (3) Insta Plan, and (4) Timeline (Appendix A). Samples of Quick Schedule and Timeline are shown in Figures 3-7 and 3-8, respectively.

The schedule given to the client must be complete. However, it usually does not have to be as detailed as the working project schedule you use as project manager. The project schedule should include:

- Start date, typically a specified number of days after Notice to Proceed
- Critical path for tasks and subtasks
- Key milestones and dates
- Meetings (team, public, coordination, etc.)
- Field work
- Outside services turnaround time (for example, lab turnaround time)
- Subconsultant deliverable dates
- Routine administrative functions (MIS or billing)
- QA/QC review
- Document production schedule (Bellevue office see *Document Production Guide*)
- Deliverable dates.

UW BRANCH CAMPUSES - EIS DRAFT SCHEDULE - 10/19/89

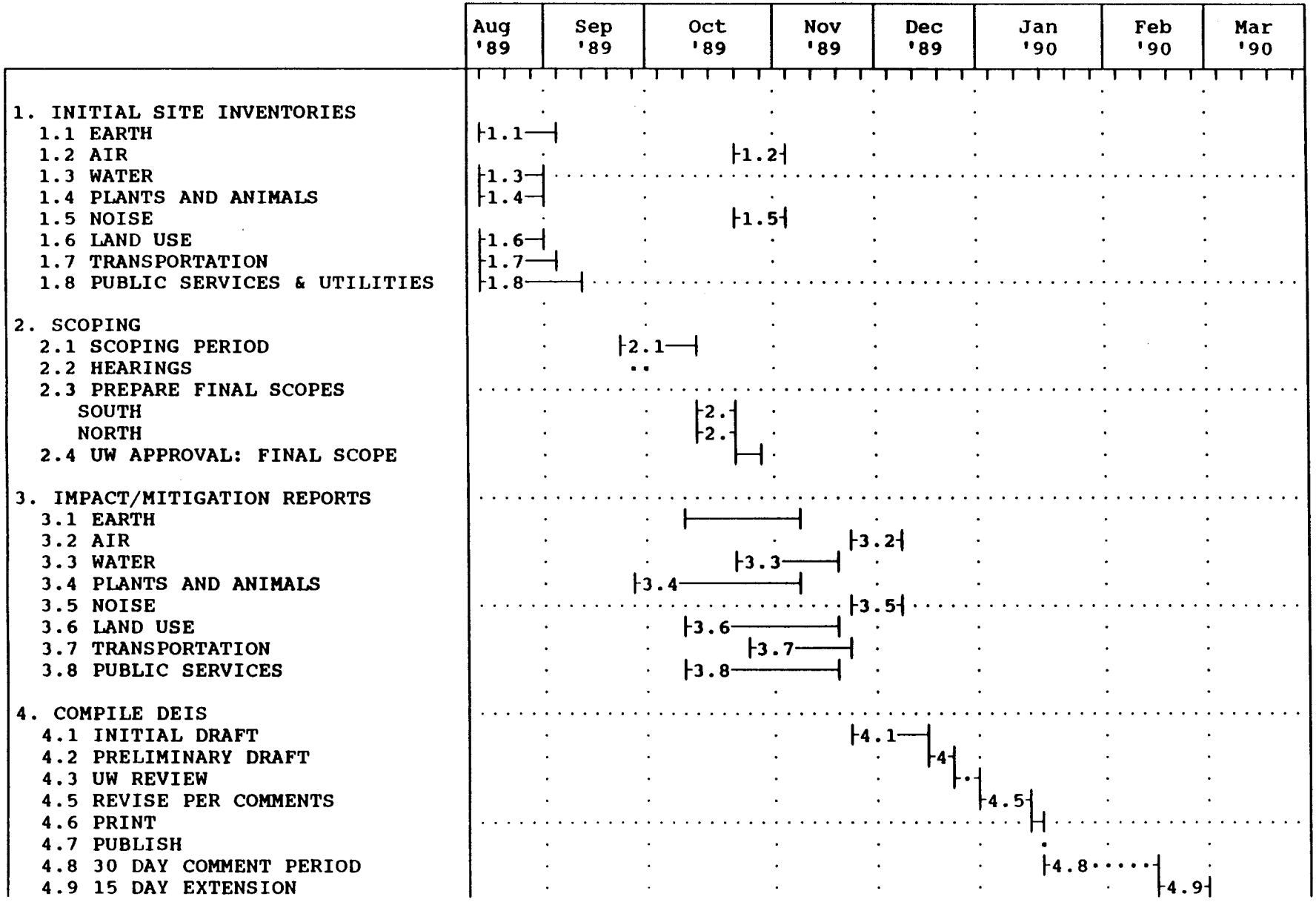
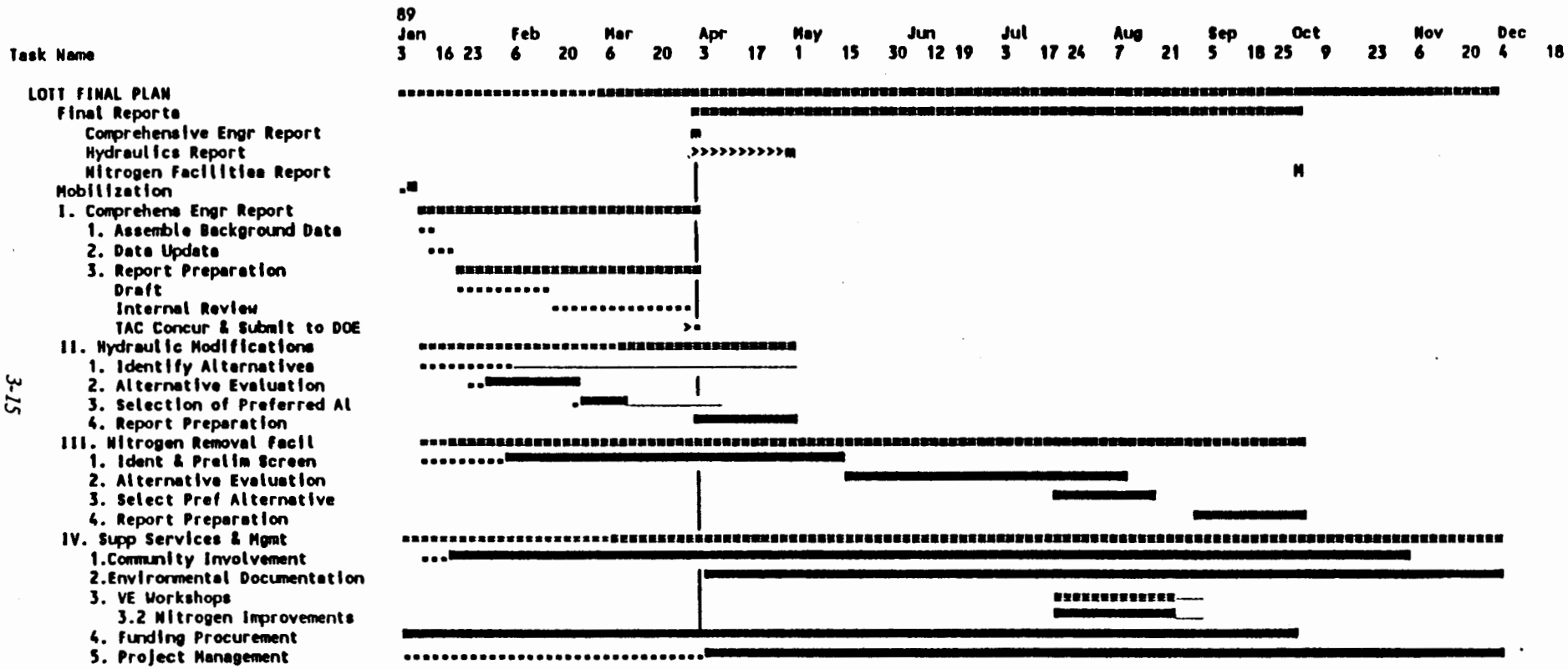


Figure 3-7.
Project Schedule Done on
Quick Schedule Software Program

Schedule Name : LOTT Hydraulic Modifications and Nitrogen Removal
Responsible : Parametrix, Inc.
As-of Date : 31-Mar-89 Schedule File : A:\LOTTREV1



Detail Task (Started) (Slack)
Summary Task (Started) (Slack)
M Milestone
>>> Conflict
Resource delay
Scale: 2 days per character

TIME LINE Gantt Chart Report, Strip 1, Page 1

Figure 3-8.
Project Schedule Done on Timeline Software Program

3.6 DEVELOP PROJECT BUDGET

The project budget is a detailed estimate of how much a proposed set of services will cost. It includes all of the items for which a client will be billed over the life of the project.

Why is developing the project budget important?

The project budget is developed to communicate to the client how much the proposed set of services will cost and to determine our level of involvement. The budget should directly relate to the scope of work and should be developed by task (Figure 3-9). A list of assumptions must be developed during the budgeting process and included in the scope of work, so that it is very clear what the estimate covers and what it does not.

If project conditions or requirements change, this budget documentation may later be used to request client authorization for additional work and a corresponding budget increase. Get the appropriate team members involved so they "own" the budget and will therefore be more able and committed to completing each task within the project budget. Each task manager and the support services representative should be given a final task budget at the kickoff meeting.

When does a project budget need to be done?

Depending on the client and the type of project, the first budget may have been prepared during the proposal stage of the project. However, costs are not often considered in the selection process. In any case, budgets cannot be done until the scope of work and the key project personnel have been identified. Like the scope of work and the schedule, the budget should be reviewed just before work actually begins on the project. Throughout the life of your project, you must monitor and revise the budget when necessary. The process for reviewing project budgets is discussed in Section 5.3, Project Effort Details Report Review. *As project manager, you must always consider any budget constraints when you make decisions.*

How do you do develop a project budget?

Budgets can be prepared several ways. They should be as detailed as possible and should be structured by task. Because many things must be considered when preparing a budget, these items are listed in the budget checklist (see Figure 3-9). Always use this list when preparing your project budget.

BUDGET CHECKLIST

In preparing a budget, consider all the following items:

- ☐ **Labor (including overhead markup) for the following:**
  - ☐ Technical work
  - ☐ Fieldwork
  - ☐ Status reports
  - ☐ Budget reviews
  - ☐ Staffing coordination
  - ☐ Management
  - ☐ Principal overview
  - ☐ Editing
  - ☐ Graphics preparation
  - ☐ Computer support
  - ☐ Health and safety
  - ☐ QA/QC
  - ☐ Technical and final reviews (Peer review)
  - ☐ Word processing
  - ☐ Proofreading
  - ☐ Admin/clerical
  - ☐ Travel time
  - ☐ Meeting time (client, presentations, public, team)
  - ☐ Anticipated salary increases
- ☐ **Direct costs of the following:**
  - ☐ Couriers
  - ☐ Graphic supplies and outside services
  - ☐ Mailing/postage
  - ☐ Shipping
  - ☐ Analytical labs
  - ☐ Travel, per diem
  - ☐ Printing (internal and external)
    - – Special items
    - – Number of drafts
    - – Number of copies
    - – Number of pages or sheets
  - ☐ Oversized exhibits
  - ☐ Parametrix equipment lease
  - ☐ Outside equipment lease or rental
  - ☐ Equipment purchase (if part of budget, it belongs to the client)
  - ☐ Subcontractor(s)
  - ☐ Outside services
  - ☐ Reference literature/maps
  - ☐ Film processing
- ☐ **Markup on subconsultants**
- ☐ **Markup on analytical lab**
- ☐ **Markup on other outside services**
- ☐ **Recovery of proposal labor and direct costs**
- ☐ **Project schedule**
- ☐ **Degree of customizing required for routine client communication**
- ☐ **Contingencies**
- ☐ **Profit (Fee)**

Figure 3-9. Budget Checklist

It is typical to have a target budget that may be imposed by the client or your own sense of the market. Usually, it works best to prepare individual task budgets, sum them, compare the total to the overall target, and then make the necessary revisions task by task. Because budgets typically require several revisions, it is useful to use computerized spreadsheets to prepare them.

To help you prepare your budgets, several software programs are available. One program, Budget Master, contains all the necessary budget elements such as staff names and billing rates (Figure 3-10).

Budget Master is a Lotus 1-2-3 based program customized for Parametrix. As shown in Figure 3-10, Budget Master will give you a total job cost summary compiled from individual task budgets. It lets you do cost estimates for staff time, direct costs (things like travel, materials and printing and reproduction), subconsultant fees, and equipment.

Because it allows you to set overhead and profit fees you can easily adjust as contract or client needs dictate, Budget Master is a flexible management tool. You can also use Budget Master to fillout the staff hour estimates for MIS. (See Section 4.7, MIS.)

Some individuals choose to create their own budget spreadsheets with Lotus 1-2-3 or Excel. An example of a customized spreadsheet may be found in Appendix B. Regardless of the software or tool you use to produce the budget, use the budget checklist to be certain all elements are considered (see Figure 3-9).

3.7 HOLD KICKOFF MEETING

The kickoff meeting is the first meeting the project manager holds with the full project staff, including subconsultants.

Why is the kickoff meeting important?

The kickoff meeting is critical to the success of your project. It is your opportunity to get the entire project team together, provide them with the big picture, direct them toward the overall goal, and present them a detailed outline and document schedule. Kickoff meetings get all projects off to strong, well-organized starts. Without the background and perspective you build at the kickoff meeting, your team can spend frustrating and costly hours chasing down information you can freely give.

Total Job Cost

JOB COST SUMMARY

Landfill Design — Project #: 55-1660-07

Task Number	Task Name	Total Labor Costs	Direct Costs	Task Total
1	Hydrogeo. & Wetlands Assessment	$8,508.72	$163,959.72	$172,468.44
2	Solid Waste Permit Appl.	$17,289.68	$7,525.00	$24,814.68
3	Access Rd & Permit Assistance	$14,178.18	$23,699.00	$37,877.18
4	Design Report	$47,967.42	$31,905.00	$79,872.42
5	Plans & Specifications	$149,250.56	$16,180.00	$165,430.56
6	CQA Plan Preparation	$16,584.40	$2,230.00	$18,814.40
7	Project Mgmt. & Admin.	$17,593.62	$12,604.00	$30,197.62
TOTAL		271,372.58	258,102.72	529,475.30

Project Name: Lndf Dsgn — Project Number: 55-1660-07
Task Name: Design Report — Task Number: 4
Date: 04-Jan-90 — Total Cost: $79,872.42

STAFF	HOURS	BILLING RATE	TOTAL LABOR
Principal	4	107.54	430.14
Project Manager	48	85.74	4,115.48
Project Eng.	140	61.73	8,641.96
Design Eng.	200	51.71	10,342.62
Engineer 1	100	44.94	4,494.00
Senior Eng.	100	68.02	6,801.99
Wastewater Eng.	48	84.52	4,056.93
Traffic Eng.	8	82.66	661.26
Drafter	80	45.61	3,649.13
Graphics	40	36.02	1,440.65
Wordprocessing	80	30.50	2,439.60
Clerical	24	37.24	893.66

TOTALS
Hours 872 — Labor Cost $47,967.42

DIRECT COSTS		
Travel (no direct cost fee)		0.00
Materials		500.00
Printing and Reproduction		1,000.00
WORD PROCESSOR	hours @ $6/hour	480.00
SUBCONTRACTORS		
George Maddox and Associates		1,000.00
Traffic Engineer & Surveyor		1,000.00
Land Application Consultant		15,000.00
Geotech. Analysis (Contingency)		10,000.00

Subtotal	$28,980.00
Direct Cost Fee	2925.00
Total Direct Costs	$31,905.00
TOTAL COSTS	$79,872.42

Figure 3-10. Budget Master Job Cost Summary and Task Breakdown of Design Report Costs

When does a kickoff meeting need to be done?

The kickoff meeting should be held after the scope of work, budget, and schedule are final, and Parametrix has received Notice to Proceed. All team members, including subconsultants, should be required to attend the kickoff meeting. Be certain to clear your team assignments with the technical group leaders before finalizing the project team. The technical group manager will be aware of any scheduling conflicts between projects. (See Section 4.7 for a description of the MIS process and further details on how to select your team.)

How do you conduct a kickoff meeting?

Be well prepared for the kickoff meeting—it sets the tone for the entire project. Begin by using the kickoff meeting checklist to make certain you discuss all the points that will keep your project within budget and on time (Figure 3-11). Successful projects all begin with a well-organized start.

You should notify all task managers and key members of support services as to where and when the meeting will be held. It may take some coordination to find a time when all key members can attend, but the time is well spent. To keep your team on target from the start, complete and distribute a Project Assignment Form to each member (Figure 3-12). *Never let a team member guess at what their role might be. Spell it out.*

3.8 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) RESPONSIBILITY

Why is QA/QC important?

QA/QC is important because we need to provide complete and accurate deliverables to our clients. Our work is often used in court cases and therefore must be legally defensible.

When does QA/QC need to be done?

QA/QC is an ongoing process and must occur throughout the life of the project. it is part of the planning, implementation, analysis, and reporting process.

KICKOFF MEETING CHECKLIST

- ☐ Project overview (the big picture: the client, the regulatory setting, the driving force of the project)
- ☐ Project goals
- ☐ Scope of work
- ☐ Project structure (structure of team/task managers)
- ☐ Individual responsibilities (see Figure 3-12)
- ☐ Team coordination/communications (including multi-office coordination)
- ☐ Client coordination requirements
- ☐ Availability and location of reference materials
- ☐ Schedule of milestones and deliverables (includes critical path and internal deadlines)
- ☐ Project and task budgets
- ☐ Products or deliverables:
  - ☐ Use mock-ups and refer back to the big picture
  - ☐ Identify deadlines for first draft, second draft, editorial reviews, and printing (Bellevue office see *Parametrix Document Production Guide)*
- ☐ Project job and task number(s)
- ☐ Ground rules for project file
- ☐ Document production coordination
- ☐ Special project challenges
- ☐ Unique requirements set by the project manager
- ☐ Schedule for future project meetings
- ☐ Task managers, first assignment: to conduct detailed planning of their task including:
  - ☐ Task staffing needs -- people hours and schedule
  - ☐ Task schedule
  - ☐ Task technical requirements
  - ☐ Products/deliverables.

Figure 3-11.
Kickoff Meeting Checklist

Project Title _____

Job Number _____

Team Member's Name _____

Primary Task and Number _____

Role on Project _____

_____

_____

_____

Relationship to other tasks _____

_____

_____

_____

Type of Product expected _____

_____

_____

_____

Schedule of when input is due _____

_____

_____

_____

Number of hours available to work on task _____

Figure 3-12. Project Assignment for Kickoff Meeting

How do you do QA/QC?

A QA/QC program is a process to attain quality products in an efficient and cost-effective manner. At Parametrix, QA/QC is an important part of project management. It is also an important part of the duties assigned to each team member in your project. Each employee manages and completes the tasks and projects assigned. That way, the proper reviews and controls are implemented from the earliest scope of work for proposals to final verification that our finished products satisfy the highest professional standards and the client's needs.

Each type of project and task work has specific QA/QC requirements. However, on all projects and for all tasks QA/QC must be considered for:

- **Technical data** (use existing guidelines)
  - Laboratory data
  - Benthic data
  - Groundwater data
  - Geotechnical data
  - Drafted or computer-generated figures.

- **Document production**
  - Editorial reviews of text and graphics
    - Readability
    - Uniformity (Bellevue office see the *Parametrix Style Guide*)
    - Proofreading
  - Technical adequacy
    - Data interpretation
    - Conclusions
    - Recommendations
    - Peer review
    - Political issues

- **Coordination with drafting**
  - Drafting and review of projects
  - Initial assignments

- **Project Management.** A project manager should arrange for a peer review of key management issues on the project including:
  - The work plan
  - Budget
    - Completeness
    - Adequacy for the scope
  - Schedule
  - Allocation of time

- Approach.

Because QA/QC is so critical to the success of projects and to the long-term success of the firm, Parametrix is developing a stand-alone QA/QC document. The details of the QA/QC process will be described there.

3.9 DIRECT, GUIDE, AND CONTROL THE PROJECT

Why is directing, guiding, and controlling the project important?

Even though a detailed scope, budget, and schedule are developed for each job, your project can't run itself. You must direct, guide, and control the project so that the work is done according to plan. However, you also need the flexibility to respond to changes of circumstances. It is not necessary to feel constrained by plans developed in the early phases of the project. Go ahead and make the changes necessary to your project. Just be certain those deviations from the plan are deliberate, well considered, and promptly communicated to the client and the team.

When does it need to be done?

You must guide your project to its closure.

How do you direct, guide, and control a project?

As project manager, you are ultimately responsible for all work that occurs on the project. You need to manage the project by delegating work to the project team. When doing so, give others the responsibility, authority, resources, and mentoring necessary to complete an assignment. Then hold them accountable for completing it.

Technical Task Managers. On large projects, especially ones with multiple disciplines, it is most effective to delegate work to technical task managers. Technical task managers report to the project manager on all delegated project task work. They delegate work to technical staff and run their tasks much the same way the project manager runs the overall project.

Technical task managers typically help in the following ways:

- Receive technical assignments from the project manager
- Fulfill or delegate technical assignments to the technical staff
- Are kept up to date on all changes in the project by the project manager

- Provide input to how proposed project changes will influence task schedule, budget, and deliverables
- Provide input for MIS (see Section 4.8, Management Information System [MIS])
- Provide input for progress letter to go out with billing (see Figures 5-5 and 5-6, Billing Transmittal Letter).

Technical Issues. In addition to delegating work to technical task managers, you must address some major issues that almost always occur throughout the life of the project. These include:

- Obtain written client agreement on changes to the work plan
- Address new issues and changes in technical direction as they arise
- Identify changes in the scope of work when they occur
- Work with the client to obtain additional money if there is a change in scope
- Work with the client and subconsultants to get approval for changes in schedule
- Work with group leaders (including support services) to keep the project staffed at the required level
- Resolve conflicts in resources and between team members.

Communicating with Your Team. Throughout the life of a project, most important to its technical success is communication. While communication with the client is extremely important (see Chapter 2, Client Relations), communication within the project team is equally important. Ongoing team overview meetings are critical to the success of the project. *No project ever failed from too much communication.*

When holding team meetings, you should consider using these tools:

- Developing and using agendas
- Updating assignments/objectives/schedules with task managers
- Identifying and resolving problems
- Making milestone decisions
- Providing client briefing
- Providing a status report
- Preparing for the next step
- Keeping a written record of project development
- Providing group feedback and receiving input
- Team building.

The mechanics for keeping the project keyed into the management systems at Parametrix are described in detail in Chapter 4, Administrative Project Management.

3.10 GIVE FEEDBACK

Feedback is the information project managers give and receive from technical group managers and other team members regarding their performance on the project technical tasks.

Why is giving feedback important?

Feedback is part of communication. By reviewing work with the team during team meetings and with individuals behind closed doors, performance can be adjusted and improved. Such feedback often helps to open dialogue with team members and can lead to additional productive discussions when you hear what the team has to say on the same issues. As project manager, you should also brief the technical group manager on the performance of the team members in their group. This information allows the group manager to guide and mentor the staff member so that person can grow professionally. It also forms part of the basis for performance evaluation and salary review.

When does it need to be done?

Because feedback is so vital, it must occur throughout the project. It becomes a habit for good project managers. Feedback is especially useful when a phase of work ends, a person's involvement in the project changes, or the project ends.

How do you do give feedback?

How you provide feedback is critical. One of the most important things to remember is that negative feedback should be face-to-face, one-to-one, and private. Don't make the mistake of only giving feedback when things go wrong. The team also needs to hear that they are doing good work when things go well. In general, feedback should always be:

- Direct
- Constructive
- Courteous
- Timely
- Specific
- Balanced.

3.11 UPDATING THE MARKETING DATABASE

The marketing database is a system of information, predominantly project descriptions and résumés, available to and used by many people in all our offices. You'll need to supply marketing with at least the minimum materials (project description and résumé updates) for the database kept for future marketing efforts.

Why is updating the marketing database important?

Because marketing supports the overall workload of the firm, it can only be effective if we maintain an accurate database. Even if you do not have any immediate marketing needs, do your part to keep the database updated because someone else may need the information concerning the services of your group. Also, given short turn-around times on proposals and SOQ's, we must be prepared at all times with an up-to-date database.

When does the marketing database need to be updated?

The database must be updated when we are awarded new projects, when new people join the firm, when a scope of work or contract amount significantly changes, and when client status changes (for example, from a positive reference to a negative one).

After a proposal or SOQ has had project descriptions modified, those new descriptions need to be permanently replaced on the database. Sometimes a different emphasis that did not exist before is added to the project description. The project manager on the SOQ or proposal needs to coordinate with marketing to have it permanently added.

How do you update the marketing database?

Give a marketing coordinator a project description when Parametrix receives the Notice to Proceed. This project description can be from one to several paragraphs long, but no longer than a page. It should be revised if the scope of the project changes. You can get an example of a project description from the marketing coordinator for your division.

When the project begins, you should update your personal Parametrix résumé and ask others on the team to do the same. Updated résumés better describe roles and responsibilities on a project and help us win jobs. The marketing database contains more than one résumé for most individuals, each with a different technical focus. Each team member is responsible for working with a

marketing coordinator concerning the appropriate résumé(s) to be updated with new project information.

As project manager, you should also keep the marketing coordinator up to date on the client status. Marketing needs to know when to use and when not to use a client as a reference in order to control confidentiality and the quality of our referrals when references are checked. Team members write what they think is appropriate on individual résumés. Many pieces of that information, however, may be confidential including:

- Client name
- Client goal
- Property location.
- Contract amount
- Type of contaminant

You are responsible for advising the marketing coordinator of any special circumstances concerning project technical information that may or may not be used freely from the marketing database.

3.12 TECHNICAL PROJECT MANAGEMENT EXTRAS

While carefully controlling the technical elements of your project ensures its success, top project managers go one step futher. They take care of the extras, the informal duties, that mark excellence in project management. Some of these duties are:

- Hold extra brainstorming sessions on project elements
- Conduct a literature review on relevant project topics
- Present in-house seminars on project technical issues
- Coordinate with marketing to improve the marketing materials we have in particular technical areas. For example, a project manager might develop and share special graphics during the project that could be used in later marketing efforts.
- Send thank-you notes to key people who help get the team through crunches
- Upon approval, hold an appropriate special recognition event.

Chapter 4
Administrative

Chapter 4 Objectives

This chapter will describe administrative techniques used at Parametrix. It will provide you with the "nuts and bolts" of the following administrative tasks:

1. Developing a contract between the client and Parametrix or between Parametrix and another consulting firm.

2. Filling out New Project Information Sheets for the in-house tracking of your project.

3. Setting up files to provide a complete record of your project.

4. Estimating project staff time through the Management Information System (MIS).

5. Closing a project correctly.

Administrative Project Management

4.1 INTRODUCTION

Administrative project management responsibilities encompass recordkeeping and setting up an in-house system for tracking the project. While the category is called "administrative," it should not be considered a nonbillable function. On the contrary, except for contract negotiation with the client, administrative aspects of project management *are billable* and should be considered in budgeting the time for working on the project.

Why is administrative project management important?

Every new project must be integrated into the Parametrix administrative system. Once we receive a signed contract from the client, the process begins by obtaining signed contracts from any subconsultants on the team. Other steps include setting up the project for accounting and billing, establishing a filing system for record-keeping, and making sure project team members are available to work on a project.

Administrative responsibilities fulfill several important functions. First, it is important legally that contracts accurately reflect the expectations and understandings of the parties concerned. It is also important legally that a complete paper-trail be maintained for the record.

Second, the administrative responsibilities of the project manager enable the efficient and useful transfer of information within Parametrix. Administrative tasks alert the Sumner General and Administration (G&A) staff and technical group leaders to the existence of the project, specific billing needs, and staff requirements. This information is entered into various computer programs that generate billings and a series of reports used to track project progress.

Examples of such reports include the Project Effort Details Report (see Section 5.3, Project Effort Details Report Review) and the management information system (MIS). The Project Effort Details Report provides a biweekly accounting of charges made to the project. MIS allows project managers to establish and then make monthly adjustments to the hours allocated to each project team member. On a regular basis, all ongoing project information is combined into special reports used by Parametrix management to evaluate the performance of the company. Thus, carrying out the administrative responsibilities of project management leads to the success of individual projects as well as improving the overall performance of the firm.

4.2 ELEMENTS OF ADMINISTRATIVE PROJECT MANAGEMENT

Your administrative project management includes several duties. These duties involve:

- Client contracts
- Subconsultant contracts
- New Project Information forms
- Task schedule sheets
- Project files
- Project notebook
- MIS
- Project status and billing reports.
- Project closure.

4.3 CONTRACTS

As project manager, it's your responsibility to obtain a signed contract between the client and Parametrix. Contracts authorize Parametrix to work on a project. Without contracts, we have no business. If Parametrix has included subconsultants on its team, you must also coordinate and obtain signed agreements with them. In those instances where Parametrix is a subconsultant, you must help develop an agreement with the prime consultant. In all cases, you should be familiar with the terms of the contracts that involve your project. The discussion that follows details the procedures to follow in each of these three contract situations.

First, some basic definitions:

Prime Contract: Agreement between Parametrix and our client.

Prime Consultant ("Prime"): The consulting firm awarded the project by the client. The prime consultant is the firm that has put the project team together and that is ultimately responsible for the successful completion of the project.

Subconsultant ("Sub"): A consulting firm or individual that has agreed to be part of a project team. Generally, the subconsultant brings special expertise to the project team and enters into an agreement with the prime consultant to provide that expertise.

Subconsultant Agreement: The contract between the prime consultant and another consulting firm or individual.

4.3.1 Prime Contract

Why is the prime contract important?

The prime contract gives a "green light" to a project. In general, work should not proceed on a project without a signed contract or other written authorization. The contract is also important because it provides both the client and Parametrix with an understanding of what will be done, when tasks will be completed, and how much each task will cost. Because it defines the terms of the agreement, the contract is a binding legal arrangement between Parametrix and our clients.

When does the prime contract need to be completed?

The prime contract should be completed as soon as possible after the job has been awarded to Parametrix. As mentioned, work should not proceed without a signed contract. *If for any reason work must begin before a contract can be developed, you should discuss the situation with the principal assigned to your project.* In most instances, a written *Notice to Proceed* from the client is acceptable.* The Notice to Proceed should define which tasks to begin, the billing rates and fees, and the project schedules. The assigned principal, however, must approve any precontract arrangements.

What is the prime contract process?

The process of obtaining a signed contract from the client is illustrated in Figure 4-1. The major steps include:

- Determining the type of contract to use (see Appendix C)
- Negotiating contract language
- Developing a scope of work, schedule, and budget
- Obtaining all required signatures.

In addition, the project manager is responsible for ensuring that the client receives a signed original, that G&A receives a signed original, and that the office administrator receives a copy for the project files. All signed original contracts and amendments are in a central G&A file in the Sumner Parametrix office.

* To begin work before contract is signed

Determine the Type of Contract to Use

- Client contracts can be provided by the client or developed by Parametrix
- Subconsultant agreements where Parametrix is the "prime" are usually provided by Parametrix
- Subconsultant agreements where Parametrix is the "sub" are usually provided by the "prime"

Negotiate Contract Language

- Agree on contract language
- Contract Manager should be involved

Develop Contract Exhibits

- Scope of work
- Budget
- Schedule
- Other

Obtain all Required Signatures

- Send two originals of contract to client or subconsultants for signature *
- Ask client or subconsultant to sign and return originals to Parametrix
- Upon receipt of signed originals return to assigned principal for signature
- Attach a note signed by contract manager, verifying approval of contract language
- Send one signed original to client or subconsultant
- Send other signed original with a photocopy to office administrator
- Office administrator will forward original to G&A and place photocopy in project file

Contract Amendments

- Develop contract amendment
- Negotiate language, if necessary
- Follow same signature process described above

* Approval process may vary with client

Figure 4-1.
Parametrix Contracts Process

Preparing the Prime Contract

The major steps in the client contract process when Parametrix is a prime consultant are:

1. **Determining the type of contract to be used.** Since either a client or Parametrix can provide a contract, it is important to determine early on if Parametrix will develop the contract. If the client provides a contract, you should obtain a copy as soon as the job is awarded. The contract should be routed to the Parametrix contract manager for review.

   If Parametrix has worked with the client in the past, it is likely that acceptable contract terms have already been worked out. If Parametrix has not worked with the client, the terms of the agreement may need more negotiation. In either case, our contract manager must review all contracts for their acceptability.

   When the client prefers that we develop a contract, you should request a contract from our contract manager. A copy of our standard contract form is included in Appendix C. You need to fill in the blanks with the appropriate client and project information. The contract manager will assist you, if necessary. As with contracts provided by the client, the terms of the agreement may need negotiation.

2. **Negotiating contract language.** Negotiating the terms of an agreement can involve almost any aspect of a project. Typically, issues can arise regarding insurance, indemnity, and liability clauses. Other issues can involve special client requirements, such as custom billing procedures, progress reports, and who will have custody of the files. Since clients and job requirements differ, it is often necessary to tailor a contract to the specifics of individual projects. The contract manager must be involved in any negotiations of contract language.

3. **Developing a scope of work, schedule, and budget.** In addition to assisting the contract officer in negotiating the terms of the agreement, you are also responsible for developing exhibits to the client contract. *Exhibit* is a term for an attachment to the contract. Exhibits to Parametrix contracts always include a scope of work, a schedule, and a budget.

   In many cases a scope of work, schedule, and budget have been prepared at the proposal stage. If appropriate, these can be used as exhibits.

   - **Scope of Work.** Depending on the job, the scope of work can vary from a brief statement of what will be done to a detailed description

of each task. The important thing is that the scope states clearly what services Parametrix will provide and, if appropriate, what services we will not provide.

Because the scope of work can vary so greatly, an example is not provided in this handbook. However, separate technical groups at Parametrix have developed standard scope-of-work formats for specific types of jobs. In some cases, the work plan described in Section 3.4, Develop Work Plan, can be used. In other cases, an abbreviated version is appropriate. If you are not sure how to prepare a scope of work for a particular job, discuss it with your supervisor. The contract manager also has several examples.

Although there is no one standard for a scope of work, the content should include any important assumptions used in estimating time and costs. This is particularly important if we will be paid on a lump sum basis (see Section 4.4 below). Some examples of assumptions that should be included in the scope of work (if relevant) are listed below. However, this list is by no means exhaustive.

- *If a document is to be produced, specify the number of review drafts that will be provided, the number of copies of each, and their estimated page length.* Also specify how many final copies will be provided, along with the estimated page length. If Parametrix *is not* responsible for the printing, make sure this is stated in the scope of work. If Parametrix *is* responsible, then it may be appropriate to specify the form of reproduction, such as photocopying or offset printing. Any client requests, such as using recycled paper, should be stated in the scope of work and included in your budget (see discussion of budget below).

- *If the job will require frequent meetings with the client or with other specific groups, state the number of meetings anticipated under the scope of work.* These meetings could be with groups such as planning commissions or solid waste advisory committees. If Parametrix is being asked to make presentations at public meetings or hearings, these too should be itemized in the scope of work.

- *If regulatory guidelines apply to the project or will be used for its development, identify the specific requirements.* To do so, assures compliance and documents any methods that will be followed.

- *If samples are to be taken, specify what types, the number, and what the samples will be analyzed for.* In some cases, it may be appropriate to state who will take the samples, particularly if this work is to be subcontracted to other firms.

- *If there is uncertainty about what could be required, then contingency language should be built into the scope of work.* For example, if the extent of the work depends on the outcome of sampling results, then the scope should be very clear on this uncertainty. It may even be appropriate to state that the scope would be amended when the extent of the project becomes known.

- **Schedule.** Developing a schedule has been described in Chapter 3, Technical Project Management (see Section 3.5, Develop Project Schedule). As with the budget, the amount of detail contained in the schedule attached to the client contract depends on the project and the client's expectations.

- **Budget.** Developing a budget has been described in Chapter 3, Technical Project Management (see Section 3.6, Develop Project Budget). If appropriate, the detailed Budget Master sheets can be used as an exhibit to the contract. However, in some cases it is more appropriate to use an abbreviated version of the Budget Master sheets.

The client may request other exhibits to the contract. You should make sure these exhibits are appended to the contract. An example of an additional exhibit that may be requested is proof of equal employment opportunity (EEO) compliance. You must arrange for these exhibits. For example, EEO forms can be requested from the marketing coordinator in the Parametrix Sumner office.

4. **Obtaining all required signatures**: The contract is ready for signature when the language and exhibits are acceptable to both parties. Although the signature process can vary depending upon client preferences, the typical procedure is as follows:

   - If the client is providing the contract, two originals are sent to the project manager with a request that the contracts be returned with the authorized Parametrix signatures. Sometimes clients will send us the contracts with their authorized signatures already attached.

   - The project manager gives the two originals to the assigned principal with a note from the contract manager acknowledging the contract manager's review and approval of contract language.

   - The assigned principal signs and returns the contracts to the project manager.

   - If the client has not signed the contracts yet, the project manager returns them to the client for the client's signature. The client will return one signed original to the project manager. If the client has

signed the contracts, the project manager returns one original to the client and retains one original for the Parametrix files.

- The project manager gives an original and one photocopy to G&A. One photocopy should be put into the project file (see Section 4.5, Project Files). If you have obtained a project number, write the number in the upper righthand corner of the contract.

Once a contract has been signed, you can begin work according to schedule. In some cases, however, we need a written Notice to Proceed from the client. You should determine if a written Notice to Proceed is necessary.

Handling any Amendments to the Prime Contract

One final aspect to client contracts is the potential for contract amendments. Amendments may be necessary when the scope of work, schedule, or budget changes. As with the original contract, you should have the contract manager review any contract changes. Parametrix has standard amendment forms normally used if the client does not provide the amendment language. All parties must agree to the terms of the amendment, and in some cases negotiation may be necessary. Once an agreement is reached, you must repeat the signature process described above.

4.3.2 Subconsultant Agreements when Parametrix is the "Prime"

When Parametrix is the prime consultant, you must obtain a signed agreement between Parametrix and any subconsultants on the project team (see Appendix D). It is also your responsibility to distribute the signed originals and copies to the subconsultant and the Parametrix G&A staff.

Why is the subconsultant agreement important?

The subconsultant agreement establishes a working relationship between Parametrix and another firm or individual not employed by Parametrix. This agreement defines the contractual duties of both parties. It defines the scope of work for the subconsultant, the schedule for the performance of subconsultant work, the basis of payment for the work, and authorizes the subconsultant to begin work on a project. It is important to have a subconsultant agreement, because it is legally binding and assures both parties that work will proceed on terms acceptable to both.

When does the subconsultant agreement need to be completed?

The subconsultant agreement can be prepared before receiving a fully executed (all signatures affixed) prime contract. However, the subcontract agreement may

not be signed until the prime agreement is formalized. The reason for this sequence of events is that subconsultant agreements may be altered according to conditions of the client contract. Also, in most cases the client contract is appended to the subconsultant agreement as an exhibit.

What is the subconsultant agreement process?

The subconsultant agreement process is similar to the prime contract process (see Figure 4-1). However, there are some notable differences:

1. **Determining the type of contract to be used.** One major difference is that Parametrix almost always provides the subconsultant agreement. There are two different agreement forms: (1) a *master subconsultant agreement* and (2) a *letter agreement*. A copy of the master subconsultant agreement is provided in Appendix D and copies can be requested from Word Processing or the Parametrix contract manager.

   The first type is the Parametrix Standard Subconsultant Contract Form (see Appendix D). This subconsultant agreement form can be requested from Word Processing. The second type is an alternate, preprinted version of the subconsultant form (see Appendix E). It is called the Standard Subconsultant Agreement for Professional Services. That form is currently in its draft version and may be requested from the contract manager.

   A *letter agreement* is usually used in those instances when the contract amount is small (under $2,000). However, a standard agreement is used for some small contracts. As with client contracts, you should inform the contract manager of the need for a subconsultant agreement. The contract manager will recommend the form of agreement to use and will advise you on contract language.

2. **Negotiating contract language.** The subconsultant may not agree with particular aspects of the agreement. In such cases, the language of the agreement must be negotiated with the Parametrix contract manager. To avoid unexpected problems in this regard, you could send a copy of the standard agreement to the subconsultants, after they have agreed to be on the project team. This step is especially recommended if the subconsultant has not worked with Parametrix in the past. Sending the agreement to subconsultants early in the process allows them to preview the language. Then they can notify you if they have problems with any requirements, such as the need for errors and omissions insurance, types and levels of coverage, or the fact that subconsultants are not generally paid until Parametrix receives payment from the client.

Parametrix prefers to do business with firms that are not only technically competent and experienced but that also have adequate insurance. While assembling a project team, it is appropriate to consider whether a subconsultant has adequate insurance. The contract manager can assist you.

One additional item to note is that Word Processing has instructions not to delete any of the wording on the master subconsultant agreement for any specific contract. If as a result of negotiations contract language is deleted, Word Processing will use the ~~strikeout~~ function to indicate the change.

3. **Filling out the master subconsultant agreement.** Using a blank master subconsultant agreement, fill in the following information (see Appendix D):

- **Page 1** Insert subconsultant's name and address in the upper righthand corner. Insert project name as appropriate. Insert subconsultant's name in the first paragraph.

- **Page 3** Section 1.1 - Insert name of the client (agency, firm, or individual of prime agreement).

  Section 2.1 - Insert dollar amount of total subcontract budget.

- **Page 5** Section 3.3 - In the first blank, insert the specific article/provision/section numbers we want to pass on directly to the subconsultants. Use the appropriate nomenclature taken directly from the prime contract, such as "sections 1, 3, 4, and 8" or "articles 1.0, 3.0, and 8.0." The prime agreement must be read carefully to determine any differences from our master subcontract and to identify the specific provisions or articles that apply directly to the subconsultant. The contract manager will read the prime contract and determine if any language is more stringent than the subconsultant agreement language. Any language deleted from the subconsultant agreement should be ~~struckout~~ not deleted.

  In the second blank, insert the name of the client. In the third blank, insert the name of the subconsultant.

- **Page 7** Section 3.8 - The contract manager will carefully review the prime agreement to determine the types and level of insurance required. The contract manager then determines how this clause will be structured.

The types of insurance the subconsultant must carry will be identified in the subconsultant agreement. Certificates of insurance will be requested of the subconsultant to verify that they carry adequate insurance to cover the work to be performed. Typically, Parametrix requires comprehensive general liability insurance and automobile insurance for any vehicles used to perform project tasks. Depending on the nature of the services to be provided by the subconsultants, professional liability insurance may be necessary. You should request such certificates and give them to the contract manager, who will check that insurance coverage is adequate.

- **Page 9** Insert the subconsultant's name under the line provided for their signature.

Clearly, these instructions are for filling out the form in Appendix D. For help in filling out the subconsultant agreement in Appendix E, see the contract manager.

Word Processing will type up the changes to the subconsultant agreement and keep it on file. Make sure you tell them it is a new subcontract and give them a name and project number for storage purposes.

4. **Preparing exhibits to the subconsultant agreement.** A scope of work, budget, and schedule need to be prepared as exhibits to the master subconsultant agreement. These are prepared in much the same way as similar exhibits to the prime contract. However, the scope, budget, and schedule reflect only the specific work, costs, and timing of the subconsultant's involvement. The prime agreement is also attached as an exhibit if prime contract language is incorporated by reference.

5. **Obtaining all required signatures.** A subconsultant agreement can be prepared for signature once it is acceptable to both parties. You are responsible for getting the signatures and routing signed originals and copies to the appropriate individuals. The signature process for subconsultant agreements is similar to that described above for prime contracts. However, you should prepare *two copies* of the contract and send them to the subconsultant. Request that the subconsultant review and sign both copies, and return them to you. Then you submit the subconsultant agreement to the assigned principal for signature. The agreement should be accompanied by a note signed by the contract manager, verifying the contract manager's review. Once the principal signs the agreement, send one executed copy to the subconsultant and one copy to G&A. A photocopy should also go in the project file. Remember to put the project number in the upper righthand corner of the contract, if a number has been assigned.

Keep one complete, unsigned copy of the subconsultant agreement in your files when the copies are mailed. This copy should be put in the project file along with the transmittal letter. It will be your backup in case the other gets lost in the mail or befalls some catastrophe before reaching the subconsultant.

When the two signed contracts are returned, attach one original signed copy to the New Project Information Form, which is submitted to the office administrator. The office administrator forwards that material to G&A (see Section 4.4, below). The other signed copy should be placed in your project file (see Section 4.5, below). If the subcontract agreements are returned after the New Project Information Form has been submitted, they are submitted to the same personnel but with a note that the subcontract is to be attached to the previously filed form.

4.3.3 Subconsultant Agreements when Parametrix is the "Sub"

When Parametrix is a subconsultant, the prime consultant usually provides the subconsultant agreement. As project manager for the Parametrix element of the job, you should ask the prime for a copy of their subconsultant agreement. Ask the contract manager to review the agreement to determine if it contains terms that should be negotiated. If there are problems, you immediately notify the project manager for the prime consultant. Ideally, contractual language can be worked out before the contract is awarded.

When the prime consultant provides the subconsultant agreement, the signature process is straightforward. You should normally receive *two copies* of the contract from the prime consultant. If the copies have not been signed by the prime consultant, ask the assigned principal to sign them and return both to the prime consultant. A signed original will be sent back to us for our files. You should make a copy of the contract and attach it and the original contract to the New Project Information Form, which you then give to the office administrator. (See Section 4.4, New Project Information.) If the copies have been signed by the prime consultant, ask the assigned principal to sign them and return one to the prime.

Once you have obtained a signed original, attach it to the New Project Information Form (see Section 4.4, below) and make a copy for filing. If a project number has been assigned, put this number on the upper righthand corner of the contract. These materials should be submitted to the office administrator, who will then forward the information to G&A and make sure a file is set up for your project.

In some cases, Parametrix may be asked to begin work before a subconsultant agreement has been signed. If this is the case, make sure you obtain a written

Notice to Proceed, complete with a description of the work to be performed, issues to be addressed, and budget. *As with the prime contract, all work performed before a formal contract is executed must be approved by the assigned principal.*

4.4 NEW PROJECT INFORMATION FORMS

As project manager, you must fill out a New Project Information Form at the onset of a project and deliver it to the office administrator who in turn will forward it to the G&A department in Sumner.

Why are New Project Information Forms important?

New Project Information Forms provide data that is entered into the computer for billing and job reporting purposes (Figure 4-2). Once the information is entered into the computer, your project is given a number and a system is set up so that team members can bill to the project number, and project status reports can be generated. However, as discussed earlier, with written authorization by the client (Notice to Proceed) and approval from the assigned principal, work can proceed without a signed contract. In such instances, the project manager should submit the Notice to Proceed with the New Project Information Form to G&A staff.

When does the New Project Information Form need to be completed?

New Project Information Forms should be completed as soon as a client contract is signed. As noted, work cannot be charged to a project until these forms have been submitted and a project number issued.

How do you fill out New Project Information Forms.

The New Project Information Form has many blanks you must complete. Ask the contract manager to answer any questions you may have (see Figure 4-2). Make sure the contract manager reviews and signs the completed forms before you submit them to G&A in Sumner.

The following guidelines will help you complete the New Project Information Form:

Job

- Indicate the name of the project, project manager, and assigned principal. The assigned principal is generally the principal in charge of the division responsible for the job.

- Include the proposal number used for this project, if any.

New Project Information

Approved by _____

Job

Name _____ Number _____

Manager _____ Principal _____

Proposal Number _____

Job Type (1-11) _____

1 Natural Resources	5 Solid Waste	9 Water
2 Environmental	6 Land Development/Surveying	10 Sewage Treatment
3 Planning/Economics	7 Transportation	11 Sewage Collection
4 Hazardous Waste	8 Storm Drainage	

Client

		Contact	Phone
Name	_____	_____	_____
Address	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Contract (Attach)

Amount _____

Client Retention?	Yes _____	No _____	% _____
Subcontractors	Yes _____	No _____	% _____
EEO Forms?	Yes _____	No _____	

Billing

Frequency Monthly _____ Phase Completion _____ Job End _____

Format By Task Yes _____ No _____

Time & Materials Labor + 1.63 _____ Other _____

Fee 15% _____ Other _____

Std. Multiplier (3.0) _____ Other _____

Lump Sum Total _____ Itemized Yes _____ No _____

Cost + Fixed Fee Fee _____

Labor + 1.63 Other _____

Expenses Outside Services 15% _____ Other _____

Subcontractors 10% _____ Other _____

Instructions _____

_____

_____

Budget Reporting

By Task Yes _____ No _____

(If Yes) PMX Labor Task _____

Expenses Task _____

Subconsultants Task _____

Note: Budget sheets MUST be attached for each level of budget reporting indicated above.

Figure 4-2.
New Project Information Form

- Leave the project number blank. This number will be provided by the G&A staff.

- Indicate the Job Type (choose 1 only).

Client

- Complete all client information—name, address, contact persons(s) and phone number. Make a special effort to understand each client's billable process. This would involve knowing:

  - Who specifically to submit the billings to for prompt payment
  - What date to submit in order to best fit with the client's approval and payment schedule
  - Who to contact to verify that billing is in order.

Contract

- Indicate the total contract amount.

- Indicate *yes* or *no* to all three questions in this category. If portions of the contract allow the client to retain a percentage of the budget until the job is complete, indicate the percentage withheld. When the client holds a retention from Parametrix payments, the same percent retention is withheld from subconsultant payments. If subconsultants are involved, indicate the percentage of the budget allocated for their services.

- Attach the original signed contract.

Billing

- Indicate billing frequency (choose only one–by the month, by phase, or by job end).

- Indicate (yes or no) whether billings should be set up by task.

- Choose a billing format. Billing formats are usually specified in the contract. You should direct any questions regarding billing format to the contract manager.

The following is a brief description of billing systems:

Time and Materials

Labor + 1.63. The 1.63 multiplier is Parametrix current overhead (163%). Charges to the client include the cost of labor (hourly rate) multiplied by 2.63. Direct costs and a fee are charged separately and must be indicated on the line directly below.

Fee 15%. This line is used to indicate the fee (profit) negotiated with the Labor + 1.63 format. Parametrix generally requests a 15% markup for labor and direct expenses. Since this percentage is negotiated, it varies from project to project. A space has been provided for "other" percentage arrangements.

Std Multiplier (3.0). This is the preferred Parametrix billing format. Labor charges are based on the employees' hourly rate multiplied by 3. The number 3 represents the 1.63 overhead rate plus a 14% fee. As with the Fee 15% arrangement (see below), the pass-through fees for direct expenses are negotiable. Parametrix generally requests a 15% markup on direct expenses.

Lump Sum

Lump sum. A lump sum billing arrangement is used when the client agrees to pay a fixed amount for services described in the scope of work. In lump sum situations, the client is usually billed for the percentage of work completed. Under this system, billings are independent of the amount of work charged to a project.

Cost + Fixed Fee

Cost + Fixed Fee. Under this billing system, the cost of labor is multiplied by the overhead figure (1.63) and is charged in addition to a negotiated fee. The fee represents profit and will not change unless the scope of work is revised.

- Expenses: Parametrix generally charges a 15% pass through fee for outside services and 10% for subconsultants. You must indicate if a different percentage has been negotiated with the client.

- Instructions: Indicate any specific billing requirements. For example, lump sum contracts may request that invoices show the "percent job complete" by task or that expenses be itemized and listed separately.

4.5 TASK SCHEDULE SHEETS

A task schedule sheet should be filled out for each task and attached to the New Project Information Form (Figure 4-3). Tasks are usually identified during the budget process described in Section 3.6, Develop Project Budget. Budget sheets from the contract can be used in place of the task schedule sheets.

Task Schedule

Task Name _____ No. _____

Phase Name _____ No. _____

Project Name _____ No. _____

PMX Labor Total Hours _____ Dollars _____

Direct Expenses	Task Amount

Subconsultants	Task Total

Figure 4-3.
Task Schedule Sheet

The original information provided on the task sheet must be accurate. It serves as the basis for budget tracking during the life of the project. Setting it up correctly means your project budget will be tracked properly.

As the project manager, you should fill out the task schedule sheet for each task, giving the name of the task, the phase name if appropriate, and the project name. Task numbers and project numbers are all assigned by G&A staff. The rest of the task schedule you can fill out by using the budget sheets.

4.6 PROJECT FILES

It is your job to set up an adequate project filing system and to maintain accurate project records.

Why are project files important?

Project files provide a record of the agreements, communications, and work performed. Accurate and organized records are important if challenged legally and if individuals unconnected with the project need to use the files.

When are project files set up?

Project files should be set up once the New Project Information Form has been submitted to the office manager and a project number has been assigned (see Figure 4-2).

How are project files set up and maintained?

Files are set up by office administrative staff. A standard filing system is used that organizes files into the following categories:

- **Contracts:** Client Contracts
  Subconsultant Agreements
- **Incoming Correspondence** (in chronological order)
- **Outgoing Correspondence** (in chronological order)
- **Reports and Completed Documents.**

For some projects, this task schedule filing system is adequate. For large and more complex projects, a more extensive system is needed. You are responsible for determining the filing needs of your project. Some filing methods you might find useful are to:

- **Organize the filing system by phase or task.** That way, discrete portions of the project can be filed together and identified.

- **Maintain a separate file folder for one or more of the following:**

  - *Each subconsultant*: The file would contain a copy of the signed subconsultant agreement, work submittals, and correspondence, including fax transmissions.

  - *Fax transmissions*: Normally, fax transmissions are filed as incoming or outgoing correspondence. This system could break up the flow of information that sometimes takes place over the fax machine. In such instances, grouping fax transmissions together is a good idea.

  - *Billings and progress reports*: Grouping these keeps billing information together and easily accessible, rather than integrated with outgoing correspondence.

  - Notes of important phone conversations.

  - In-house memos.

  - Project team handouts and meeting notes.

  - QA/QC review notes.

  - Important reference material used to substantiate critical parts of the project.

  - Technical data used in the project.

  - Field notes and field logs.

  - Design calculations.

  - Copies of work submittals that contain the client's written comments.

  - Copies of important draft submittals.

  - Camera-ready originals and graphics.

As stated, the project manager is responsible for designing the file system and seeing that all appropriate documentation is filed. It's also your job to inform the project staff of the project filing system at the kickoff meeting. Project staff then know how to label file materials correctly. (For example, all originals must be

placed in the project file.) To prepare materials for filing, the project number and the file name should be placed in the upper righthand corner of the first page. The file name is particularly important if a complex filing system has been set up. Materials ready for filing should be placed in the in-basket located in the filing room. Office administrative staff will do the filing.

Check your project files occasionally to make sure that your records are being accurately kept. At the end of a project, you are responsible for making sure a copy of the final document is placed in the project file and/or company library.

4.7 PROJECT MANAGEMENT NOTEBOOK (OPTIONAL)

Although not required, project notebooks can be a good management tool. These notebooks are developed to keep pertinent project information readily available. However, notebooks do not substitute for the complete and accurate record maintained in the project files.

Why is the project notebook important?

Project notebooks contain copies of information that the project manager may want readily available. Project notebooks can improve project tracking and provide a useful management tool. By selectively placing pertinent information, such as scope of work and schedules, into a notebook, you have this documentation at your fingertips. There is no need to go to the project files to get the information or to set up a separate filing system in the project manager's office.

When is the project notebook prepared?

The project notebook is established at the beginning of a project.

How is a project notebook prepared?

Because project notebooks are optional, there are no prescribed methods for their preparation. However, a loose-leaf binder with several dividers is useful. Some recommended divisions to the notebook include:

- Client Contract
- Subconsultant Contract(s)
- Scope of Work
- Project Outline
- Schedules
  - In-house schedules
  - Client schedules

- Budget
- Job Cost Records
- Cost-to-complete analyses
- Invoices and Progress Reports
- Final MIS printouts for project
- Meetings and Phone Records
- Pertinent correspondence
  - Incoming
  - Outgoing.

For large projects, it may be necessary to prepare more than one notebook.

4.8 MANAGEMENT INFORMATION SYSTEM (MIS)

Management Information Systems (MIS) is a software program Parametrix uses to assign staff to projects. MIS is also used to estimate billing revenues. It is a computer program that uses project staffing information provided by project managers to generate workload estimates for each section of the firm and to forecast future income. MIS estimates are made each month and track work assignments for the next 12 months.

Why is MIS important?

MIS is an important tool for communication with Parametrix administration. It gives the project manager an opportunity to identify staff for the project team and to make sure these individuals will have time to work on the project. When all of the MIS input from all the project managers is compiled, section leaders can determine if staff are overbooked or underbooked. This ability helps ensure that staff assigned to one project are not overcommitted to other projects. It also helps determine how much work remains on a job and how much it will cost to complete. MIS information also helps office management make hiring decisions.

When does MIS need to be done?

MIS requirements (forms) need to be completed each month. There is an established process for gathering this information by the third Thursday of every month. This information leads to a preliminary final MIS report that presents the staff utilization and billing information. The preliminary report is reviewed by section leaders and returned for final MIS processing. The flow chart in Figure 4-4 describes the process for completing MIS.

How is MIS done?

MIS information is prepared for each new project. As shown in Figure 4-4, the project manager should request an MIS New Project Form from the MIS manager. You must provide information on the project name, number, type, and category. In addition, you need to estimate the hours each member of the project team will spend on their tasks. An example of the MIS New Project Form used for this purpose is shown in Figure 4-5. *In estimating project team hours, you should account for support as well as technical staff.*

In some cases, a new employee is brought onto a project team before the MIS has been amended. In such cases, the project manager should provide the MIS manager with the following information about the individual: *name, section, billing rate, and billability.*

The MIS New Project Form submitted to the MIS manager is entered into the computer. On the third Thursday of every month, you'll receive a printout showing the hours allocated to each project team member, who will then receive their copies of the MIS Staff Assignment Form (Figure 4-6). The MIS Staff Assignment Form shows the employee the month and the number of hours each project has requested of them. The process for amending these reports is discussed above and illustrated (see Figure 4-4). Typically, as a project progresses, the team member's hours need to be adjusted and the MIS changed to reflect those changes. MIS is used to generate a series of reports the Parametrix Executive Committee uses to evaluate the performance of the company. Examples of some of these reports are included in Appendix F.

MIS is an important management tool that serves all levels of management in Parametrix. However, its credibility and usability depends entirely on the accuracy of hourly estimates by project managers. *To maximize the potential of the system, it is absolutely essential that you accurately estimate the hourly staff demands of your projects.*

4.9 PROJECT STATUS

Some division managers within Parametrix require regular status reports of ongoing projects within their division. An example of such a status report is provided in Appendix G. These status reports are designed to update upper management on the progress of projects and any problems that may be developing.

Since project status reports are not a uniform requirement in Parametrix, you should find out if you need to complete one. If you do have to prepare status

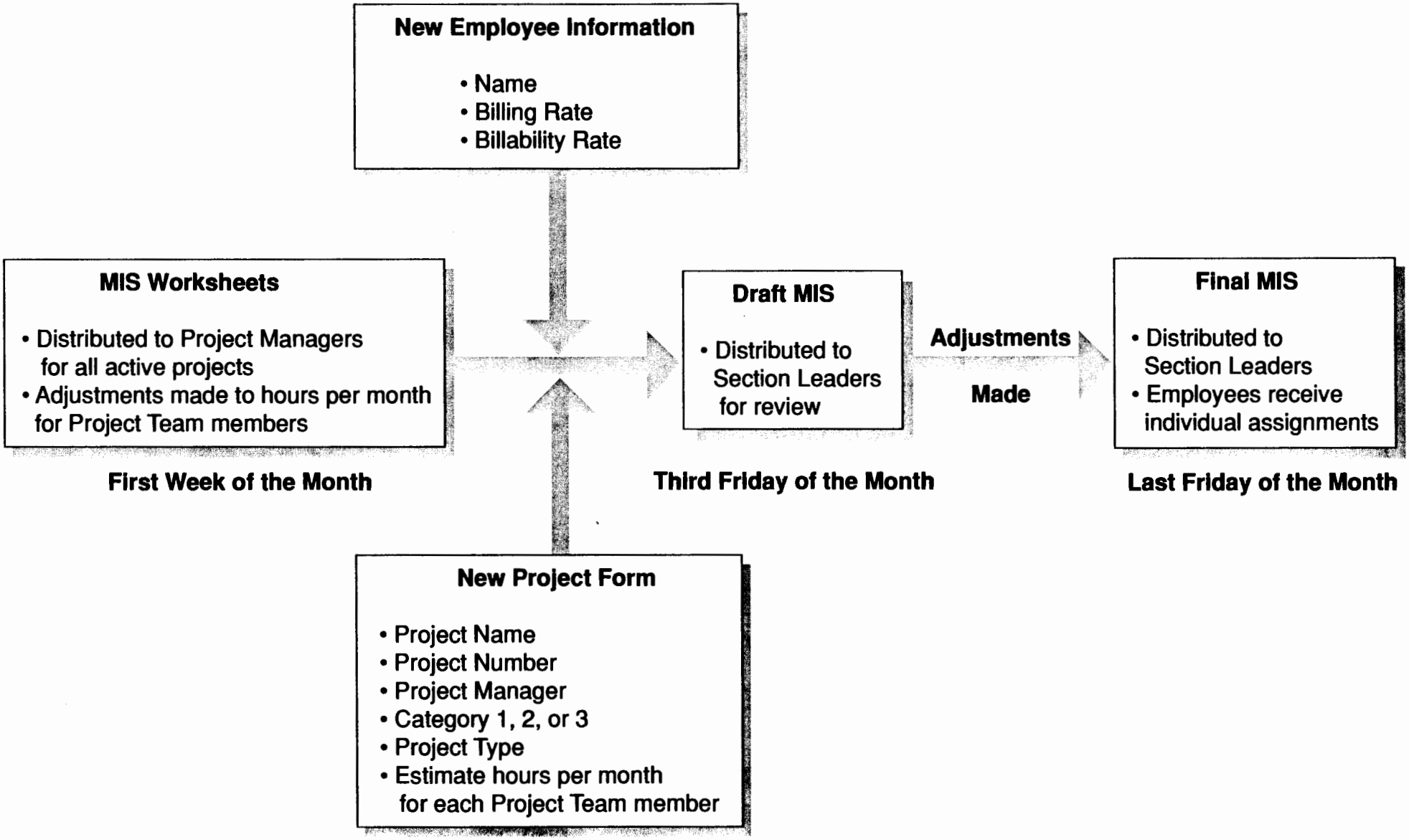


Figure 4-4.
Parametrix Management Information System - The MIS Process

BELLEVUE MANAGEMENT INFORMATION SYSTEM
New Project Form - Fill in information below

Page 1
04/10/90

Hours in month	May 176	Jun 176	Jul 176	Aug 168	Sep 168	Oct 176	Nov 176	Dec 160	Jan 184	Feb 160	Mar 168	Apr 176	May 176	Comments
100 Beluche														
101 Weithamp														
102 WORD PROC(2):														
103 CLERICAL (2):														
104 GRAPHICS (2):														
105 EDITING														
106 Storlie														
109 Schroeder														
110 Johnson														
111 Peters														
113 Boyce														
114 Shimek														
115 Whitman														
116 Sullivan														
117 Williams														
118 Thompson														
119 Galstad														
120 Hawes														
121 Karas														
122 Spink														
123 Shields														
124 Hagen														
125 Biologist														

BELLEVUE MANAGEMENT INFORMATION SYSTEM
New Project Form - Fill in information below

Page 2
04/10/90

Hours in month	May 176	Jun 176	Jul 176	Aug 168	Sep 168	Oct 176	Nov 176	Dec 160	Jan 184	Feb 160	Mar 168	Apr 176	May 176	Comments
130 Fagerness														
131 Siemler														
133 Sweeney														
134 Lakey														
135 Kelley														
136 Neiman														
137 Bruce														
138 Laboratory														
139 Ecklein														
141 Peterson														
142 Campbell														
144 Gallion														
145 Dold														
146 Ziesette														
147 Heilman														
148 Butler														
149 Wold														
150 Planner														
153 Georgianna														
154 Maynard														
155 Peterson														

BELLEVUE MANAGEMENT INFORMATION SYSTEM
New Project Form - Fill in information below

Page 3
04/10/90

Hours in month	May 176	Jun 176	Jul 176	Aug 168	Sep 168	Oct 176	Nov 176	Dec 160	Jan 184	Feb 160	Mar 168	Apr 176	May 176	Comments
161 Sullivan														
162 Neuner														
164 Emge														
165 Do														
166 Mullen														
167 Vieira														
169 Shields														
170 Mukelic														
171 Anderson														
172 Swan														
173 Hall														
174 Brown														
175 Baltzell														
176 Sr Hydrol														
177 Morley														
178 Kane														
179 Clark														
182 Drennen														
185 Campbell														
186 PROJECT MGR														
187 ENGINEER II														
188 ENGINEER I														
189 HW PLANNER														
202 Miller														
203 Massart														
204 Bourque														

BELLEVUE MANAGEMENT INFORMATION SYSTEM
New Project Form - Fill in information below

Page 4
04/10/90

Hours in month	May 176	Jun 176	Jul 176	Aug 168	Sep 168	Oct 176	Nov 176	Dec 160	Jan 184	Feb 160	Mar 168	Apr 176	May 176	Comments
205 Harrison														
206 McKay														
207 Richards														
208 Hill														
209 Sorenson														
210 Hamberg														
211 Martenez														
212 Hicker														
213 Churen														
214 Wilkins														
215 Ullman														
216 Ashton														
217 Sutton														
218 SW PROJ MNGR:														
219 SW ENG I														
220 SW ENG II														

Project Name: _____

Project Number: _____ Project Manager: _____

Category: (circle one) 1 - Under contract 2 - No contract yet

Job Type: (circle one)

01-Aquatic Resources
02-Environmental
03-Planning/Economics
04-Hazardous Waste
05-Solid Waste
06-Land Dev/Surveying
07-Transportation
08-Storm Drainage
09-Water
10-Sewage Treatment
11-Sewage Collection

Figure 4-5.
MIS New Project Form

BELLEVUE MANAGEMENT INFORMATION SYSTEM
STAFF ASSIGNMENTS

Page 1
04/30/90

Project		140 Dave Mattern May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Category 1										
35-1583-16	WDOE S-4	40	40							
55-1550-22	Midway FS Pt.2 Gr	8	4		8		8			
55-1656-49	Newhalem Creek FE	6						20		
85-2115-02	Sockeye Spawning	100	80	80	80	80				
Category 2										
99-9999-81	Lake Tapps Enviro		40	40	40	40				
Category 1 Hours		156	104	80	88	80	8	20	0	0
Category 2 Hours		0	40	40	40	40	0	0	0	0
Assigned Hours		156	144	120	128	120	8	20	0	0
Non-Billable Hours										
Bus Dev & Admin		39	39	39	37	37	39	39	35	40
Vacation										
Available Hours		137	137	137	131	131	137	137	125	144
Over/Under Booked										
Category 1		-19	33	57	43	51	129	117	125	144
Category 1&2		-19	-7	17	3	11	129	117	125	144

BELLEVUE MANAGEMENT INFORMATION SYSTEM
STAFF ASSIGNMENTS

Page 1
04/30/90

Project		171 Mark Anderson May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Category 1										
55-1550-22	Midway FS Pt.2 Gr	10	10	20	10					
55-1625-04	Cascade Center	20	15	15	20	20				
55-1823-01	Olivine Landfill	15								
55-1846-01	ODEQ - Nuway	40								
99-9999-74	Queen City Site 1	8								
99-9999-76	Anchorage Soil Tr	20	20							
99-9999-77	Puget Power Shuff	30								
Category 2										
31-1600-01	Olympic View Risk	15	15	20	20	20	20	40	40	40
55-1591-05	Rabanco - Grant C	10	20				40	30	30	30
99-9999-75	Weyerhaueser-Aber	20	10	40	40	40				
99-9999-85	ODEQ - Nuway		40				0	0	0	0
Category 1 Hours		143	45	35	30	20	0	70	70	70
Category 2 Hours		45	85	60	60	60	60	70	70	70
Assigned Hours		188	130	95	90	80	60			
Non-Billable Hours										
Bus Dev & Admin		35	35	35	34	34	35	35	32	37
Vacation										
Available Hours		141	141	141	134	134	141	141	128	147
Over/Under Booked										
Category 1		-2	96	106	104	114	141	141	128	147
Category 1&2		-47	11	46	44	54	81	71	58	77

BELLEVUE MANAGEMENT INFORMATION SYSTEM
STAFF ASSIGNMENTS

Page 1
04/30/90

Project		103 CLERICAL (2) May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Category 1										
11-1600-11	Olympic View Spec	2	2	2	2	2	2	2	2	2
35-1542-21	Bypass Options	6	6							
35-1583-16	WDOE S-4	10	20							
55-1527-23	Sumner Wetland In	2								
55-1550-22	Midway FS Pt.2 Gr	10	10	10	10		10	10		
55-1550-25	Midway Leachate W	1	1							
55-1650-15	Simpson Cap Monit			2	2	2				
55-1846-02	ODEQ/HRS	2								
85-2115-02	Sockeye Spawning	4	4	4	4	4	4	4	4	
99-9999-74	Queen City Site I	5								
99-9999-76	Anchorage Soil Tr	5								
Category 2										
31-1600-01	Olympic View Risk	3	3							
35-1542-19	FERC Proceedings	24	16							
35-1795-01	DNR-USTs REMOVAL	1	1	1	1	1	1	1	1	
99-9999-75	Weyerhaueser-Aber	5	5							
99-9999-87	Jackson County SW	2								
99-9999-90	Simpson Outfall			2	2	2	2			
99-9999-99	Cathcart Energy R		4	4	4	4				
Category 1 Hours		47	43	18	18	8	16	16	6	2
Category 2 Hours		35	29	7	7	7	3	1	1	0
Assigned Hours		82	72	25	25	15	19	17	7	2
Non-Billable Hours										
Bus Dev & Admin		0	0	0	0	0	0	0	0	0
Vacation										
Available Hours		352	352	352	336	336	352	352	320	368
Over/Under Booked										
Category 1		305	309	334	318	328	336	336	314	366
Category 1&2		270	280	327	311	321	333	335	313	366

Figure 4-6.
MIS Staff
Assignment Forms

reports, then you should find what format to use and when the submittals are due.

In addition to in-house status reports, you will need to provide a written client status report to accompany the billing. You'll need to see that the status report is complete and sent with the billing (see Figures 5-5 and 5-6, Billing Transmittal Letter).

4.10 CLOSING A PROJECT

Closing a project involves several key steps:

- Notify G&A that the project has ended
- Verify all project costs have been billed
- Close files
- Send appropriate reference material to the Parametrix librarian
- Write a final letter to the client.

The project manager is responsible for closing a project. This means G&A needs to be notified of the closure of a project in order to properly close the *job costing information files*. You must also make sure all necessary information is in the project files and that a completed copy of the document is placed in the files.

While it is important to place all necessary information in the files, it is also important to remove unnecessary information. All duplicates should be weeded out and only important drafts of the document should be saved. If a project is likely to be challenged, you may want to keep interim and previous drafts of the report. However, these materials should not be mixed into the files: *store them separately*.

In closing a project, gather any reference material collected over the course of the project. This material should be given to the Parametrix librarian for the benefit of others in the company.

As a final step in closing a project, you should write a final letter to the client. We hope the project has been completed on a positive note and the letter can express our appreciation for the client's business. The letter should be followed up with a telephone call. During the call, ask the client to evaluate our performance and give us their impressions and thoughts on the project. This feedback gives us valuable ideas on how we can improve and builds client goodwill. *Never close a project without it!*

Chapter 5
Financial Project Management

Chapter 5 Objectives

In this chapter you'll find the steps necessary to keep your project budget in line. These important actions are:

1. Completing the monthly billing cycle.
2. Understanding Project Effort Review Reports.
3. Accurately tracking the project budget.
4. Reviewing subconsultant budgets to see that "sub" costs are in line.
5. Processing project invoices.

Financial Project Management

5.1 INTRODUCTION

Financial project management encompasses the "dollars and cents" side of project management. It can be separated into the routine responsibilities such as invoices and billings handled monthly, and the more challenging planning/forecasting responsibilities such as budget tracking and cost overrun management.

Why is financial project management important?

Parametrix is in business to make a profit: without it, our solvency will be short lived. Therefore, financial project management is one of the most important aspects of successful project management. To succeed, careful budget planning at the start of the project is important, and thorough budget tracking during the life of the project is essential.

Another component of financial project management is the routine monthly processing of invoices posted against the project, and monthly billing to the client. This part of financial management is important because it provides a steady cash flow to cover the costs of business operation. Therefore, monthly billings follow a tight timeline you must plan on accommodating.

5.2 ELEMENTS OF FINANCIAL PROJECT MANAGEMENT

Managing your project budget means a clear understanding of all the elements of financial project management. These elements include:

- Project Effort Details Report review
- Percent-complete estimates
- Project invoices
- Project billings
- Subconsultant budget review
- Aging Report review
- Supervisor update on budget status
- Handling cost overruns.

Within each of these elements, are a number of responsibilities you must fulfill. These responsibilities are explained in detail in the following sections of this chapter.

Project Effort Details Reports are the formal administrative tool for tracking projects at Parametrix. Other budget tracking tools may also be used to keep track of the budget status. These tools include plotting budget available versus budget spent to get a quick accounting of how much budget remains versus how much work remains on the project.

5.3 PROJECT EFFORT DETAILS REPORT REVIEW

Project Effort Details Reports (effort reports) are computer-generated reports showing expenditures against a job (Figure 5-1). The expenditures are separated by labor (including staff names), direct expenses, and subconsultants. The expenditures are compiled by two categories: (1) *month-to-date* and (2) *project-to-date*. The bottom line of each effort report summarizes the amount budgeted, the amount spent to date, the percent of the budget used, and the percentage of the project completed. This last category, *percent complete*, is an estimate you make before the effort report is generated.

Effort reports are set up initially from the information provided on the New Project Information Form (see Figure 4-2). Therefore, it is essential that form be completed accurately.

Why are Project Effort Details Report reviews important?

Reviewing effort reports is the mechanism you'll use to track your budget. These reviews allow you to determine how much of the project budget has been spent, where it has been spent (on labor, subconsultants, or direct expenses), and who has spent it. Effort reports also indicate how much money was budgeted and calculate the percent of budget spent.

The percent-complete estimate you make should be based on your estimate of the work done and progress made towards meeting the deliverables. *The percent-complete estimate should not be based on the project budget.* When the effort report is available, the percent-complete estimate should be checked against the actual percentage of budget used. If the percentage of budget used is substantially greater than the percent-complete estimate, your project is headed toward a cost overrun.

In addition to providing this basic information on expenditures, reviewing your effort reports helps you determine if anyone has incorrectly charged to your project.

NONE :
NONE :
NONE :

PARAMETRIX
PROJECT EFFORT DETAIL
AS OF 03/31/90

RUN DATE/TIME 04/03/90 09:53
PERIOD ENDING 03/89
ALL OR SELECTED: SELE
PAGE 1

21-1578-31 MICKLEBERRY-RIDGETOP SIGNAL
CLIENT: KITS04 Kitsap County
ORG NM 111 Sumner Office

FEE TYPE CPM
FEE AVAILABLE 10,995.80
RGLM: 2.9982 BLM = 2.9982

PROJECT START DATE 12/24/89
EST. COMPLETION / /

---- BILLING ADDRESS ----

---- PROJECT COMMENTS ----

---- SCHEDULING REMARKS ----

EMPLOYEE / VENDOR	MTD HOURS	MTD DOLLARS	PTD HOURS	PTD DOLLARS	BUDGET HOURS	BUDGET DOLLARS	PERCENT USED HRS	PERCENT USED DOLLARS	PCT COMP
031210 Ettinger, Linda A.	.75	22.49	.75	22.49					
032018 Filosi, Robin M.	2.00	101.04	26.00	1313.52					
033836 Franklin, Robert P.	1.00	82.60	44.50	3675.73					
044946 Holtzclaw, Karen J.	2.50	78.70	6.00	188.88					
066560 Pilon, Ami E.	2.00	57.20	66.00	1887.78					
071004 Rowland, Clark G.	1.00	64.22	6.00	385.35					
071408 Rozanski, Janice C.	.25	9.29	.25	9.29					
PRIOR ACTIVITY			7.50	2052.18					
** TOTAL LABOR **	9.50	415.54	157.00	9535.22		9995.80		95.39	95.39
G/L 5131-PR Printing									
9KESO1 Kestrel Blueprint		115.19		143.73					
PRIOR ACTIVITY				19.12					
** TOTAL EXPENSE		115.19		162.85		1000.00		16.29	
*** PROJECT TOTAL									
** TOTAL LABOR	9.50	415.54	157.00	9535.22		9995.80		95.39	95.39
** TOTAL EXPENSE		115.19		162.85		1000.00		16.29	
** GRAND TOTAL	9.50	530.73	157.00	9698.07		10995.80		88.20	95.39

CONTRACT REF: CONTACT:	TOTAL BILLINGS TO DATE	TOTAL COLLECTIONS	OUTSTANDING A/R	PTD EARNED REV	WORK-IN PROCESS
	9167.34	.00	9167.34	9698.07	530.73

*** END OF PROJECT **********

Figure 5-1. Project Effort Details Report

When do effort report reviews occur?

Project managers typically review project effort reports twice a month—at the halfway point, and at the end of each month. More frequent effort reports can be generated at your request. The month-end effort report is provided in conjunction with a prebilling analysis report described in more detail in Section 5.4, Project Billings.

How are effort report reviews conducted?

Effort reports are generated by the G&A department in the Sumner Parametrix office. They are created from data presented on timesheets and expense reports. The Sumner office distributes them to all Parametrix project managers. Once you receive this report, it is your responsibility to:

- Review them promptly and direct any questions to G&A.
- Notify G&A of any incorrect charges or changes in your project by any of these methods:
  - By phone
  - By listing the changes on the Project Correction Form (Figure 5-2)
  - By faxing changes marked on the Monthly Prebilling Review Report form (see Section 5.5, Project Billings)
- Report any potential or immediate budget problems to your supervisor
- Notify the client of budget problems as appropriate (see Section 5.7, Handling Cost Overruns).
- It is also your responsibility to make a percent-complete estimate before the end of the month effort report is issued.

Once a project manager has reviewed an effort report, it should be initialed and ultimately routed to the office administrator for filing. However, you may want to route it to other project staff, especially task leaders, before it is filed. The project file will contain only the most recent effort report printout. Old printouts are purged from the file and discarded. If it is necessary to retain old effort reports for project records, it is your responsibility to maintain an effort report file in your own office.

Direct expenses and subconsultant costs should be carefully reviewed and distinguished from Parametrix labor costs. In reviewing the project's bottom line it is easy to be misled into thinking your project budget is in good shape because a large amount of money remains. In reality, the situation may be that because a major subconsultant has not sent us an invoice yet, most of the remaining budget is already earmarked for a use other than Parametrix labor. Therefore, very little budget may remain for Parametrix labor.

PROJECT CORRECTION FORM

Submitted by:	Date:
Project Name	Project #:

CHANGE SET-UP		**TRANSFER CHARGES**	
	Change PM		Same job/different task
	Increase fee budget		Different job/task
	Redistribute budget	**CHANGE STATUS**	
	Other		Active
MISCELLANEOUS			Inactive
	Other		Close (All A/R must be collected to close)

Explain in detail below and attach back-up if needed.

Figure 5-2.
Project Correction Form

During your effort report reviews, take this budgeting factor into account. *You are responsible for comparing Parametrix labor spent against labor budgeted to determine the correct financial status of your project budget.*

5.4 PROJECT INVOICES

Invoices are defined as bills we receive from subconsultants, vendors, and other direct expenses posted against a project. They differ from "billings," which are defined as the bill we send to a client (see Section 5.5, Project Billings)

Why are invoices important?

All project invoices received by Parametrix must be tracked to a project, posted against that project, and paid. Parametrix payment policy, especially with subconsultants, is to pay the invoice *after* we have been paid by the client. Therefore, it is important that you promptly process and post invoices to your project.

When are invoices processed?

Incoming invoices are handled on a continuum. As they arrive in the office, they are sent to project managers and dealt with immediately.

How are invoices processed?

Receptionists intercept invoices in the incoming mail and route them to the office administrator. The office administrator logs them in as received, and directs them to project managers. You can recognize invoices in your incoming mail because they are routed in colored folders. You must approve the invoices (initial them) and note the job, and task number on the invoice. Once you've approved them, invoices should be returned to the office administrator. After approval by the Division Manager, the office administrator will forward them to G&A in Sumner where invoices are processed for payment and posted to project accounts.

5.5 PROJECT BILLINGS

Project billings are the invoices *that we send to the client*. Unless a project has some special provisions for a different billing scheme, project billings are typically sent monthly. The billings identify the labor charges, subconsultant charges, and direct expenses.

Why are project billings important?

Project billings must be tended to promptly each month because they provide the steady cash flow necessary to operate the business.

When do project billings occur?

The billing process takes place during the first 10 working days of each month. You must be available to review project billings between the third and fifth working day of every month. If you know that you'll be out of the office on those days, appoint someone who can complete the review in your absence.

How do project billings occur?

Project billings are generated by the G&A Department in Sumner. You must approve them and have them signed by a principal. The timing and sequencing of this process is shown in Figure 5-3.

Monthly Prebilling Review Report

The project billing process is initiated when the project manager receives a *Monthly Prebilling Review Report* (Figure 5-4). These reports are accompanied by a memo from G&A that outlines the schedule after turning around each month's billings. Monthly Prebilling Review Reports are typically delivered on the third working day of each month and arrive in a blue folder. The report identifies all of the current charges on your project.

These basic definitions should help you interpret the Monthly Prebilling Review Report:

Billings: The actual dollar amount(s) billed to the client on the project.

Effort: The billable value of staff hours expended on a project and project expenses incurred.

Monthly Cycle

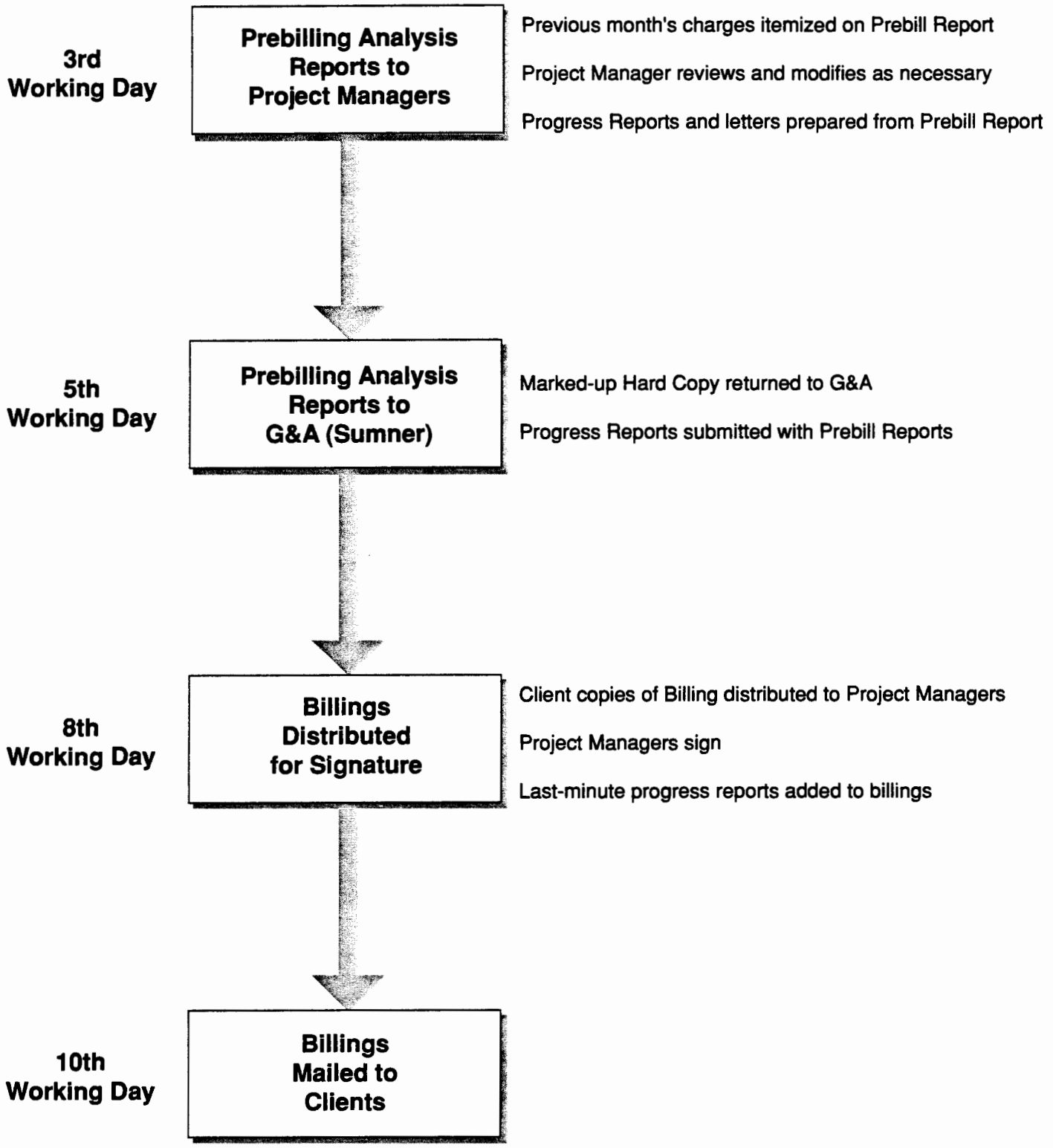


Figure 5-3.
Project Billing Process

PARAMETRIX
PREBILLING ANALYSIS
FROM 03/01/90 THRU 03/31/90

RUN DATE 04/03/90
PAGE 1

21-1578-31 MICKLEBERRY-RIDGETOP SIGNAL
CLIENT: KITS04 Kitsap County
O/T BILLING: Y FRING LOADED: NO, .00

PRI: Dunlap, Richard A. BILL CYCLE: 1
P/M: McIntyre, John S. BILL MULTP: 2.9982
P/E: Franklin, Robert P. BILL ORG: 112
BLR: Franklin, Robert P. COVER MASK: CPMOHFEE

FEE: 10,995.80
FEE TYPE: CPM
RATE SCHEDUE: 19
BACKUP: BOHFEENT

SALARY & EXPENSE DETAIL

DIRECT LABOR

	TASK	DEPT	CLS	ATVY	DATE	P.E. DATE	HOURS	RATE	COST	BILLABLE	*** KEY ***
Ettinger, Linda A.	0	0000	?	00	03/30/90	03/30/90	.75	10.0000	7.50	22.48	0389-09S-187
Filosi, Robin M.	0	0000	?	00	03/09/90	03/09/90	2.00	16.8500	33.70	101.03	0389-01K-388
Franklin, Robert P.	0	0000	?	00	03/30/90	03/30/90	1.00	27.5500	27.55	82.60	0389-09J-356
Holtzclaw, Karen J.	0	0000	?	00	03/09/90	03/09/90	2.50	10.5000	26.25	78.70	0389-01W-320
Pilon, Ami E.	0	0000	?	00	03/30/90	03/30/90	.50				0389-09P-009
Pilon, Ami E.	0	0000	?	00	03/30/90	03/30/90	1.50				0389-09P-011
						***	2.00	9.5400	19.08	57.20	
Rowland, Clark G.	0	0000	?	00	03/23/90	03/23/90	1.00	21.4200	21.42	64.22	0389-07W-118
Rozanski, Janice C.	0	0000	?	00	03/15/90	03/15/90	.25	12.4000	3.10	9.29	0389-04M-534
					** TOTAL MLT		9.50		138.60	415.52	

DIRECT EXPENSES

	TASK	DEPT	DOC #	UNIT	DATE	P.E. DATE	QTY/COST/SIZE	RATE/MULT	BILLABLE	**** KEY ****
G/L ACCT: 5131-PR										
Printing Kestral Blueprint	0	0000	001877		03/14/90	03/31/90	115.19			0389-02H-071
						***	115.19	1.0000	115.19	
									115.19	
						CURRENT TOTAL AVAILABLE BILLABLE ***			530.71	

	AVAILABLE BILLING			EFFORT ON-HOLD			EFFORT WRITTEN OFF		
	HOURS	LABOR	EXPENSE	HOURS	LABOR	EXPENSE	HOURS	LABOR	EXPENSE
CURRENT	9.50	415.52	115.19						
PREVIOUS	147.50	7,389.14	47.66						
TOTAL	157.00	7,804.66	162.85						

AVAILABLE EFFORT FROM 03/01/90 TO 03/31/90			AVAILABLE EFFORT PRIOR TO 03/01/90		
HOURS	LABOR	EXPENSE	HOURS	LABOR	EXPENSE
9.50	415.54	115.19	.00	.00	.00

MAIN CONTRACT BILLING			MAIN CONTRACT + R/X TASKS				
CURRENT	PREVIOUS	TOTAL	REVENUE	BILLINGS	WIP	COLLECTED	A/R
530.71	9,167.34	9,698.05	9,698.07	9,167.34	530.73		9,167.34

Figure 5-3. Monthly Prebilling Review Report

Revenue: The same as effort, unless your budget multiplied by percent complete limits your project revenue as a result of cost overruns.

The following equations are designed by the manufacturer of our accounting software. You can use them to help you determine what *revenue* means on your Monthly Prebilling Review Report (see Figure 5-4):

Revenue = Effort
If % Complete x Budgets > Effort

Revenue = % Complete x Budgets
If % Complete x Budget < Effort

Exceptions:

If Lump Sums, then

Revenue = % Complete x Budgets

If Cost Plus, then

Revenue = Effort

WIP: WIP stands for work in process. Work in process is revenue minus the amount billed. At the month end, WIP is the entire month's billings. After billing, WIP is the amount withheld.

If you need to review the Monthly Prebilling Review Report, indicate any revisions in red on the report, and return it to Sumner. You must return these reports to Sumner by the fifth working day of the month. Progress reports or letters should accompany each billing and should be returned along with the Monthly Billing Review Report.

Monthly Billing Transmittal Letters

It is also the project manager's responsibility to send a *monthly billing transmittal letter* to the client to update the status of the project. This update letter should accompany our bill and should address both technical and budget issues. The organization and an example of such a letter are shown in Figures 5-5 and 5-6. The letter should be attached to the Monthly Billing Review Report that is returned to G&A. G&A will forward the letter to the client along with our bill.

By the eighth working day of each month, the G&A department then creates our billings to the clients and distributes them to office administrators for signatures by the principal. Although last-minute progress reports can be incorporated with

Billing Transmittal Letter

Address billing to appropriate person

- Person whom client agrees can best process the billing

Subject: List billing #, date of billing, project name/reference

Begin directly with overview of billing

- Mention project name
- Give amount of billing
- Give period or month of billing

List project tasks and discuss work initiated and/or completed under each task

- If no work is done on a specific task, list "No work done this period"
- If the project is a single task, list the completed activities

Give $ spent

Give percent complete vs. percent of budget spent

- Task by task *or* total project basis
- Use a table, if appropriate

Give information on project work

- Significant project work done, if any, since billing end date and the time of mailing this letter with billing
- Work scheduled for the coming month(s)

Discuss new scope of work, if any

- Say that an amendment to the contract scope is being processed under separate cover
- Give overall implications to the project budget and percent complete
- Note any adjustments to the schedule

List or discuss other special factors

- Subconsultant billings
- Reimbursable expenses

Follow-up

- *Verify that billing was received and is being processed*
- *Check status of payment (accounts receivable)*

Figure 5-5.
General Outline for Writing Billing Transmittal Letter

December 22, 1989
PMX #11-1101-01

Ms. Jones
ABC Consultants, Inc.
1000 Tech Center Drive, #100
Hometown, USA 12345-6789

Subject: PMX Billing #12345 dated 12/08/89
Anytown Site Drainage Study

Dear Ms. Jones:

Enclosed is Parametrix' first, second, etc. bill for professional, engineering, etc. services completed on the Anytown project. The amount of the bill is $amount and covers the period from project start-up; month of through period of/month of.

Services initiated and/or completed during this period include the following:

1. Met with ABC staff on October 30 and November 6 & 9, 1989 to discuss the project.

2. Met with ABC and Anytown staff on November 1 at the Port of Anytown to view the lumber mill and site drainage.

3. Prepared four graphics representing: site plan, drainage area, drainage flows, and drainage schematics.

4. Met with ABC and Washington DOE staff on November 9 in Olympia to discuss the project.

5. Reviewed and commented on correspondence prepared by ABC for submittal to Anytown and DOE.

As of end date for billing period, Parametrix has spent $ amount to date of the $ budget budget for assistance on the initial study phase. Based upon our current understanding of the project's status, we are about n% completed with the work, and have spent n% of the budget.

Since end date for billing period, we have assisted with review and comment on some additional correspondence by ABC. We will keep you informed as to the status of our budget as the project proceeds.

Let me know if you have questions or need further information.

Sincerely,
PARAMETRIX, INC.

P. Polly Smith
Project Manager

encl.

Figure 5-6.
Billing Transmittal Letter

the billing at this time, they must be coordinated with the office administrator. Signed billings must be returned to G&A and mailed to clients by the tenth working day of the month.

5.6 SUBCONSULTANT BUDGET REVIEW

As project manager, you are also responsible for seeing to it that your project's subconsultants work within budget. Our subcontract agreement will specify their scope of work and budget. (See Section 4.3, Subconsultant Contracts and Appendices D and E). It is your job to review how well the subconsultant meets the scope of work, and how they are progressing on their share of the budget.

Why is subconsultant budget review important?

Just as our own labor charges need to remain within budget, so do our subconsultants' charges. As prime contractor, it is our responsibility to deliver a product to the client, and see to it that the product is completed within the initial budget. If a subconsultant runs over budget, you need to be in a position to deny additional budget requests by subconsultants, or to argue on their behalf to the client that more funding is justified. If the client is unhappy with cost overruns, it reflects just as poorly on your project management as it does on the subconsultant for exceeding their budget.

When are subconsultant budget reviews completed?

Subconsultant budgets need to be reviewed throughout the life of the project. They should occur any time an invoice is received from the subconsultant, an effort report is reviewed, and when monthly billing reports are reviewed.

How are subconsultant budget reviews completed?

During the review, you need to ask: Are the subconsultants' expenditures in line with the amount of work they have done? Can they complete their assignment within their remaining budget? If the answer to either of these questions is no, then it is your responsibility to notify the subconsultant and discuss your concerns. One of the best ways to assure that your subconsultant is providing you with useful information is to require them to send you a monthly update letter. This letter should be similar to the type you send to the client each month (see Figures 5-5 and 5-6, Billing Transmittal Letter). You need to get a clear answer from the subconsultant that they will complete their assignment within budget, or that they will be requesting additional funds. If they do request additional funds, subconsultants must justify it in writing. Client approval of the budget increase must also occur before you can notify subconsultants that their budget increase is approved.

must also occur before you can notify subconsultants that their budget increase is approved.

5.7 SUPERVISOR UPDATE ON BUDGET STATUS

It is your responsibility to regularly update your supervisor on the status of the project's budget.

Why is supervisor awareness important?

There are several reasons why supervisor awareness is necessary. These reasons include:

- Your performance review is based in part on how well you manage budgets.
- Supervisors can give helpful insights and suggestions.
- Supervisors occasionally meet with the client and thus need to be aware of the project budget.

When do supervisors need to be made aware of your project budget status?

Constantly. Throughout the life of the project you should be communicating with your supervisor on the budget's status.

How can awareness come about?

Communication. Several forms of communication are available. Perhaps best is to provide your supervisor with a copy of the update letter that is sent to the client (see Figures 5-5 and 5-6, Billing Transmittal Letter).

5.8 COST OVERRUNS

While everything in this handbook is intended to prevent you from being in a situation where cost overruns occur, the reality of project management is that sometimes projects do go over budget. Thus, you need to know how to deal with cost overruns. Before reviewing some advice on how to deal with cost overruns, you should memorize the following tips on how to prevent them:

Resist client add-ons. Frequently clients will ask "small" favors that mean additional work. Often with a new client we are eager to please, and so the favors are accommodated without consideration to the budget. As much as you may want to accommodate the client, please resist. The resistance does

not mean rejecting the client's request. Instead, the request can be accepted as conditional on more funding being available if the original budget falls short. The client should be sent a letter documenting your willingness to fulfill the request. That letter needs to tell the client it will take "x" amount of hours to complete the add-on request.

Carefully plan the budget. Spend the time it takes to carefully and thoughtfully develop the project budget. It is difficult and awkward to approach a client midway through a project and say: "By the way, I forgot to consider this factor and it's going to cost another $5,000." What if the client is unwilling to provide more money, but is going to hold you to the deliverables and scope of work? Use the budget checklist provided in this handbook and talk with your supervisor and people in your section (see Figure 3-9, Budget Checklist). Ask them if they can think of anything else that may have been overlooked.

Review your project frequently. Often times a month or two will go by before you'll take the time to review the budget and discover a task is over budget. Budget reviews need not take long, and can save a lot of pain and agony in the long run. Also, during busy periods on a project, ask G&A to provide you *weekly* effort reports. During document production and other intense periods it is easy to consume a budget without realizing all of the people who must be involved and who are charging to the project.

Why are cost overruns an important issue?

Obviously cost overruns cost us money and make us less profitable. Worse yet, in the long term they can damage our reputation with a client and cost us potential repeat business if not handled properly. Remember how much time and effort went into getting the job and client in the first place? The last thing we want to do is exclude ourselves from potential repeat business.

When do cost overruns need to be handled?

Immediately. Never put off informing a client that the budget is going to be exceeded. Chances are the sooner they are notified of the problem, the greater the probability the client will be able to successfully deal with the situation and make the necessary adjustments.

How should cost overruns be handled?

Stay in close communication with your supervisor. Requests to clients for more funding should be initiated with a phone call and followed up with a letter. An unexpected letter may offend the client. When a letter is eventually sent, it should thoroughly document why the overrun occurred, what will be done to

prevent it from happening in the future, and how much additional money is necessary. If possible, you'll need to identify where in the budget we may be able to save money and recoup the losses. Potential areas include reduction in the number of draft reports and document turnarounds, shifting report reproduction responsibilities to the client, and identifying tasks that can withstand a reduction in their scope of work.

If requests for funding are denied, then a decision needs to be made regarding whether or not to cancel the remaining existing charges, and how to deal with future charges (for example, charge them to administration). *These decisions are not up to the project manager's discretion.* You should consult your supervisor and group leaders. Cancellations of any amount on any project require the approval of a principal.

5.9 ACCOUNTS RECEIVABLE

The status of accounts receivable for a project is shown at the bottom of the effort report (see Figure 5-1). If an account should reach 90 days, it will require research as to the reason.

G&A sends a monthly aging report to each division highlighting the problem accounts. The division principals request an explanation for each problem account and notify G&A as to what is being done or if G&A should follow-up.

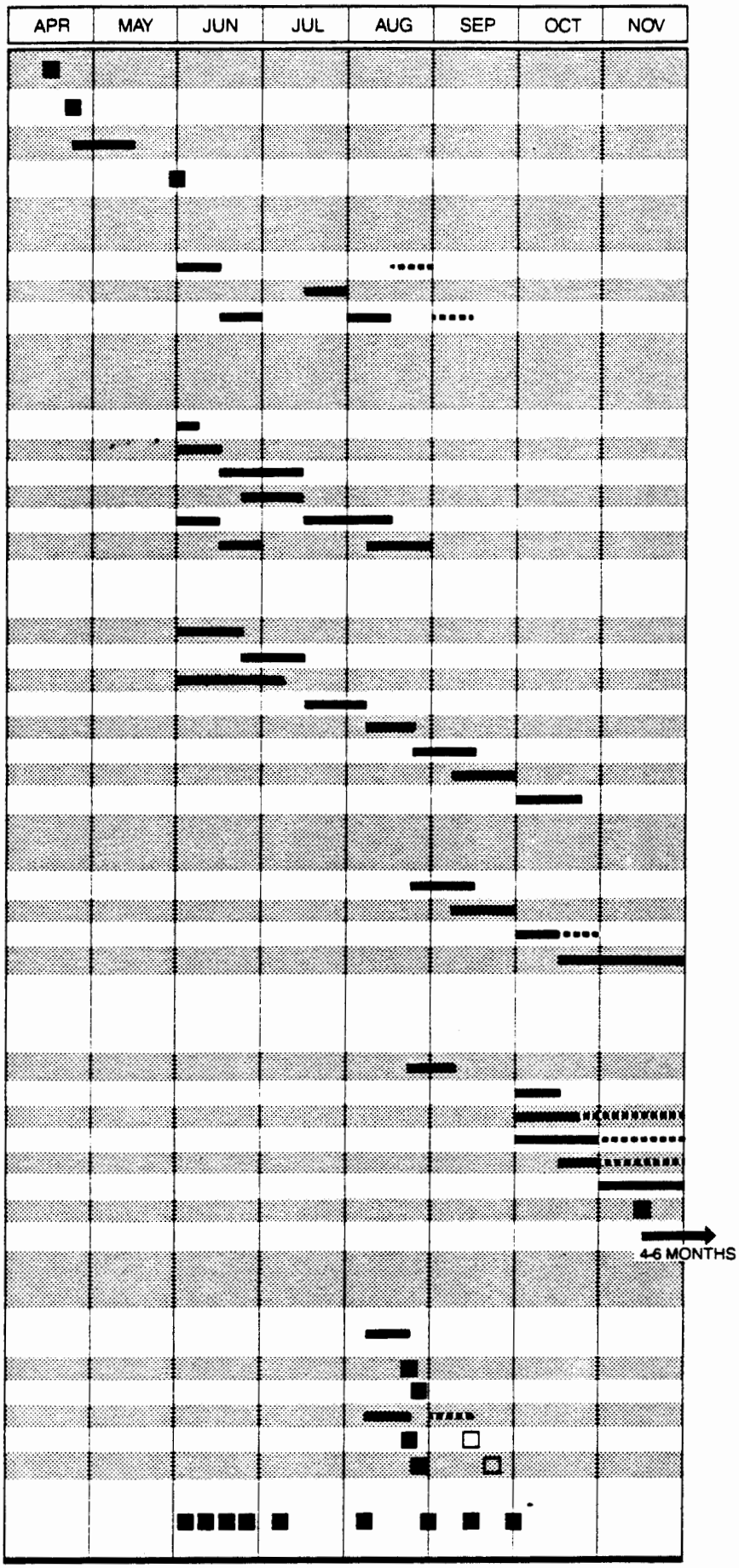
It is important as project manager that you be aware we cannot continue to work for a client who does not pay bills on time.

APPENDIX A

SOFTWARE EXAMPLES FOR PROJECT SCHEDULING

Project Schedule Done on Macintosh

Project Timeline for Cathcart Landfill Gas Management Plan



Submit Proposal and Interview

Consultant Selection By Solid Waste Division

Negotiate Contract

Notice to Proceed

Task 1.
Odor Study

- Survey Before Drilling and Gas Extraction
- Survey Gas Extraction
- Report Preparation

Task 2.
Install/Operate Test Wells, Trench; Analyze Data Including Air Quality

- Interview County Personnel, Assemble Data
- Design Wells, Trench and Probes
- Drill, Install Wells, Trench, Probes
- Install Manifold, Well Connections and Blower
- Operate and Perform Tests
- Analyze Data and Establish Design Criteria

Task 3.
Energy Recovery Feasibility Study

- Identify Energy Users On and Near Site
- Evaluate Data-Rank Candidate Users
- County Provides Finance Information
- Determine Feasibility of Onsite of Nearby Users
- County Evaluation of Users/Concepts
- Prepare Conceptual Facility Design
- Identify/Compare Alternative Systems
- County Evaluation of Alternative Systems

Task 4.
Prepare Gas Collection and Control Plan

- Final Determination of Design Parameters
- Prepare Conceptual Design
- County and Regulatory Agency Review
- Prepare Detailed Plans and Specifications

Task 5.
Prepare Plans and Specifications for Energy Recovery Project

- Final Determination of Gas Quantity, Quality and Impacts
- Verify Possible Users
- Obtain Letters of Commitment
- Obtain Regulatory Agency Approval
- Obtain Permits
- Negotiate Contract
- County Stop/Proceed Decision
- Prepare Plans and Specifications for Selected Alternatives

Task 6.
Supply Necessary Monitoring Equipment and Training

- Prepare Gas Monitoring System Operations and Maintenance Manual
- Train County Personnel in Gas System Theory
- Provide Gas Monitoring Equipment and "Hands-On" Training
- Prepare Odor Survey Manual
- Train County Personnel in Odor Theory
- Provide Odor Equipment and "Hands-On" Training

Task 7.
Conduct Meetings with Public Works Department and Regulatory Agencies

Project Schedule Done on Project Manager Expert Software Program

Establish Flow and Wasteload Criteria
1. Flow for conveyance system
2. Flow/wasteload for Physical-Chemical plant
3. Peak flows for stormwater treatment
4. CSO and stormwater separation evaluation

TM

CONVEYANCE ALTERNATIVES

Develop Upland Flow Transfer Routes
1. Duwamish Head
2. West Seattle Hill
3. Tunnel
4. Interurban System Alternatives
5. Geotechnical Support
6. Cost Estimates

TM

Develop Marine Flow Transfer Alternative
1. Alignment and Profile
2. Pipeline materials evaluation
3. Constructability
4. Geotechnical support
5. Cost estimates

TM

TREATMENT ALTERNATIVES

Develop Storm Weather Treatment Plant Alternatives
1. Effluent requirements
   — suspended solids
   — disinfection
2. Unit process design criteria
3. Plant modifications and layout
4. Operating scheme
5. Geotechnical support
6. Cost estimates

TM

Develop Physical-Chemical Treatment Alternatives
1. Establish effluent requirements
2. Supplemental treatment requirements
3. Unit process design criteria
4. Plant modifications and layout
5. Geotechnical support
6. Cost estimates

TM

Alternatives Evaluation
1. Screening workshops
2. Select preferred configuration
3. Value engineering support
4. Metro confirmation
5. Agency negotiations

TM

Detailed Predesign of Preferred Configuration
1. Final design criteria for conveyance and treatment facilities
2. Plan and profile of conveyance facilities
3. System hydraulic analysis
4. Plant and pump station layout
5. Architectural rendering
6. Right-of-way and easement support
7. Detailed capital and O & M cost and manpower estimate
8. Detailed project schedule
9. Predesign report and facilities plan
10. Value engineering support

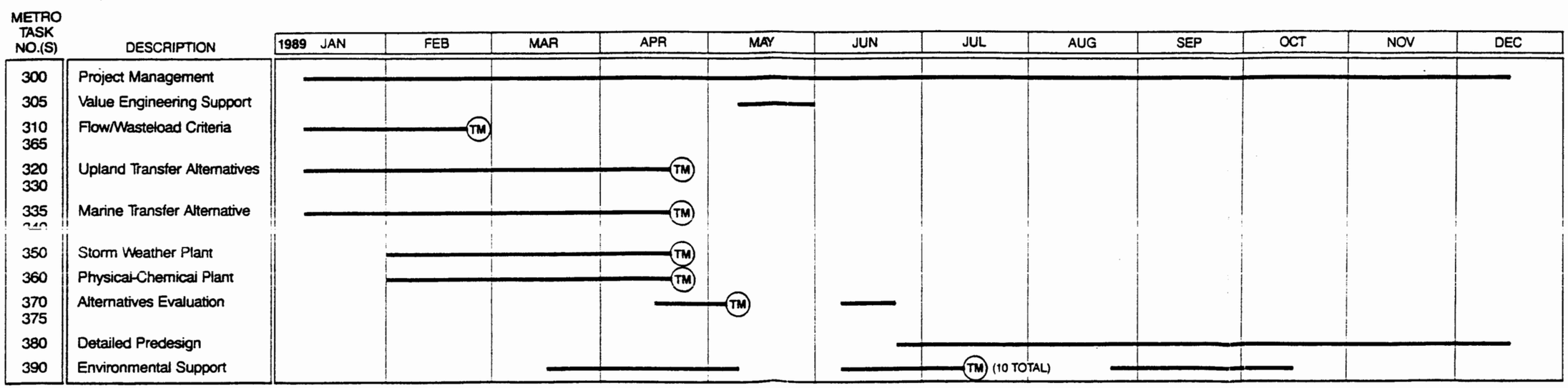
Final Design
1. Plans
2. Specifications
3. Final cost estimate

Construction
1. Bid review assistance
2. Construction engineering
3. O & M manual
4. Start-up assistance

Environmental Support
1. Environmental data assimilation
2. Permitting requirements

Environmental Support
1. Technical memoranda for SEPA and NEPA requirements
2. Support Metro for required permit applications

TM (10 TOTAL)



APPENDIX B

CUSTOMIZED SPREADSHEET EXAMPLE FOR PREPARING PROJECT BUDGETS

PARAMETRIX, INC. - PROJECT BUDGET Prepared by: MW Anderson
Project Title: Project No:
TASK: DATE:18-Dec-89
TASK LABOR: REVISION: 0

Title:	Name:	BILLING RATE	Week Ending: 1/5	1/12	1/19	1/26	2/2	1990 TASK HOURS -------> 2/9	2/16	2/23	3/2	3/9	3/16	3/23	3/30	4/6	4/13	4/20	4/27	5/4	TOTAL HRS	TOTAL COST
Project Manager		$85.00	2	10																	12	1020
Principal		$95.00		5																	5	475
Project Engineer		$60.00		10																	10	600
Project Chemist		$60.00		2																	2	120
H&S Associate		$45.00		2																	2	90
Lab Technician		$40.00		1																	1	40
Graphics		$30.00		1																	1	30
																					0	0
																					0	0
																					0	0
																					0	0
																					0	0
TASK SUBTOTAL HOURS			2	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	
TASK SUBTOTAL ($)			170	2205	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2375
SUBCONTRACTORS:																						
																						0
																						0
SUBCONTRACTOR SUBTOTAL ($)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
HANDLING CHARG 15%			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
SUBCONTRACTOR TOTAL ($)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
REBILLS: TRAVEL:	Airfare			400																		
	Lodging																					0
	Vehicle Rental			50																		50
	Parking/Mileage			40																		40
	Per Diem																					0
RENTAL EQPT:																						0
																						0
OTHER:	Freight & Shipping																					0
	Communications																					0
	Miscellaneous																					0
			1																			1
REBILLABLES SUBTOTAL ($)			1	490	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		491
HANDLING CHARG 10%			0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		49
REBILLABLES TOTAL ($)			1	539	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		540
PARAMETRIX FIELD	Field Equipment																					0
EQPT:																						0
OFFICE:	Photocopying																					0
																						0
																						0
LAB:			1																			1
																						0
PARAMETRIX EQUIPMENT SUBTOTAL ($)			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
TOTAL TASK ESTIMATE ($)			172	2744	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2916
CUMULATIVE TOTAL ($)			172	2916	2916	2916	2916	2916	2916	2916	2916	2916	2916	2916	2916	2916	2916	2916	2916	2916		2916

Customized Budget Spreadsheet

APPENDIX C

PARAMETRIX STANDARD CONTRACT FORM

Parametrix, Inc.

Sumner Bellevue Bremerton Portland

DRAFT

STANDARD AGREEMENT FOR PROFESSIONAL SERVICES

PARAMETRIX OFFICE ADDRESS _____

PROJECT NAME _____ PROJECT NUMBER _____

CLIENT _____

ADDRESS _____

SUBJECT TO THE TERMS of this agreement, Parametrix, Inc. shall perform the following services: _____

COMPENSATION by the CLIENT to Parametrix, Inc. to be on the basis of _____

When compensation is on a cost-reimbursable basis, a service charge of 15 percent will be added to Direct Expenses. All sales, use, value added, business transfer, gross receipts, or other similar taxes will be added to ENGINEER's compensation when invoicing CLIENT.

OTHER TERMS _____

Services covered by this Agreement will be performed in accordance with the PROVISIONS states on the back of this form and any attachments or schedules. This Agreement supersedes all prior agreements and understandings and may only be changed by written amendment executed by both parties.

Approved for CLIENT	Accepted for PARAMETRIX, INC.
By _____	By _____
Title _____	Title _____
Date _____	Date _____

PROVISIONS

1. Authorization to Proceed

Execution of this Agreement by the CLIENT will be authorization for Parametrix, Inc. to proceed with the work, unless otherwise provided for in this Agreement.

2. Salary Costs

Parametrix Salary Costs, when the basis of compensation, are the amount of wages or salaries paid Parametrix, Inc. employees for work directly performed on CLIENT's Project plus a percentage applied to all such wages or salaries to cover all payroll-related taxes, payments, premiums, and benefits.

3. Per Diem Rates

Parametrix Per Diem Rates, when the basis of compensation, are those hourly or daily rates charged for work performed on CLIENT's Project by Parametrix, employees of the indicated classifications. These rates are subject to annual calendar year adjustments; include all allowances for salary, overheads and fee; but do not include allowances for Direct Expenses.

4. Direct Expenses

Parametrix's Direct Expenses, when part of the basis of compensation, are those costs incurred on or directly for the CLIENT's Project, including, but not limited to, necessary transportation costs, including current rates for Parametrix vehicles; meals and lodging; laboratory tests and analyses; computer services; word processing services; telephone, printing, binding and reproduction charges; all costs associated with outside consultants, and other outside services and facilities; and other similar costs. Reimbursement for Direct Expenses will be on the basis of actual charges when furnished by commercial sources and on the basis of current rates when furnished by Parametrix, Inc.

5. Cost Opinions

Any cost opinions or Project economic evaluations provided by Parametrix, Inc. will be on a basis of experience and judgment, but, since it has no control over market conditions or bidding procedures, Parametrix, Inc. cannot warrant that bids, ultimate construction cost, or Project economics will not vary from these opinions.

6. Standard of Care

The standard of care applicable to Parametrix, Inc.'s services will be the degree of skill and diligence normally employed by professional engineers or consultants performing the same or similar services. Parametrix, Inc. will reperform any services not meeting this standard without additional compensation.

7. Termination

This Agreement may be terminated for convenience on 30 days' written notice, or for cause, if either party fails substantially to perform through no fault of the other and does not commence correction of such nonperformance within 5 days of written notice and diligently complete the correction thereafter. On termination, Parametrix will be paid for all authorized work performed up to the termination date plus termination expenses, such as but not limited to, reassignment of personnel, subcontract termination costs, and related closeout costs, if no notice of termination is given, relationships and obligations created by this Agreement, except Articles 9 through 13 will be terminated upon completion of all applicable requirements of this Agreement.

8. Payment to Parametrix, Inc.

Monthly invoices will be issued by Parametrix for all work performed under this Agreement. Invoices are due and payable on receipt. Interest at the rate of 1½% per month, or that permitted by law if lesser, will be charged on all past-due amounts starting 30 days after date of invoice. Payments will first be credited to interest and then to principal.

9. Limitation of Liability

To the maximum extent permitted by law, Parametrix's liability for CLIENT's damages will not exceed the compensation received by Parametrix under this Agreement.

10. Severability and Survival

If any of the provisions contained in this Agreement are held illegal, invalid or unenforceable, the enforceability of the remaining provisions shall not be impaired thereby. Limitations of liability and indemnities shall survive termination of this Agreement for any cause.

11. Asbestos or Hazardous Substances

To the maximum extent permitted by law, the CLIENT will indemnify and defend Parametrix and its officers, employees, subconsultants, and agents from all claims, damages, losses, and expenses, including, but not limited to, direct, indirect, or consequential damages and attorney's fees in excess of the Limitation of Liability in Article 9 arising out of or relating to the presence, discharge, release, or escape of hazardous substances, contaminants, or asbestos on or from the Project.

12. Interpretation

The limitations of liability and indemnities will apply whether Parametrix's liability arises under breach of contract or warranty; tort, including negligence (but not sole negligence); strict liability; statutory liability; or any other causes of action; and shall apply to Parametrix's officers, employees, and subcontractors.

The law of the state, or province, of _____ shall govern the validity of this Agreement, its interpretation and performance, and any other claims related to it.

13. No Third Party Beneficiaries

This Agreement gives no rights or benefits to anyone other than the CLIENT and Parametrix, Inc. and has no third party beneficiaries.

Parametrix's services are defined solely by this Agreement, and not by any other contract or agreement that may be associated with the Project.

APPENDIX D

PARAMETRIX STANDARD SUBCONSULTANT CONTRACT FORM

SUBCONSULTANT AGREEMENT

BETWEEN

Parametrix, Inc.
13020 Northup Way
Bellevue, Washington 98005

AND

PROJECT:

THIS Subconsultant Agreement, entered into this ____ day of _____, 1989, by and between Parametrix, Inc., a corporation qualified to do business in the State of Washington, hereinafter referred to as Parametrix, and _____, hereinafter called the "Subconsultant," combines all understandings relative to the Subconsultant's services for this Project into a single Agreement.

The performance of the professional services herein described and authorized by Parametrix, as well as payment for such services, shall be in accordance with the Terms and Conditions set forth in the following Sections, and attachments referenced therein, which, together with the acceptance, shall constitute the whole Agreement.

TABLE OF CONTENTS

TERMS AND CONDITIONS

1. RELATIONSHIP OF THE PARTIES

Section 1.1 Parametrix is the prime contractor under contract to provide professional services for _____, hereinafter referred to as "its client". The purpose of this Agreement is to engage the Subconsultant as a subcontractor to assist Parametrix in providing professional services related to said project in areas of expertise in which the Subconsultant has had practical experience. The relationship between the parties as set forth in this Agreement shall be limited to the performance of services as set forth in this Agreement and shall not constitute a joint venture, partnership, or the relationship of principal and agent or employer and employee. Neither party may obligate the other to any expense or liability except upon written consent of the other. The professional services to be performed and the results to be achieved by the Subconsultant as an independent contractor shall be as set forth in Exhibit A, scope of work, attached hereto. Subconsultant acknowledges that it will retain the right to select its own methods and manner of performing its work and to control its own employees and agents in the performance thereof. Nothing shall be construed as conferring upon Subconsultant any status or relationship with Parametrix other than that of independent contractor.

2. PAYMENT

Section 2.1 Compensation to the Subconsultant for services as set forth in Exhibit A shall be a time and expense payment not to exceed the amount of $_____ _____ (_____ dollars).

Section 2.2 Periodic partial payments to the Subconsultant shall be based upon the amount of work satisfactorily completed (as determined by Parametrix and its client), as described in monthly invoices forwarded by the Subconsultant. Partial payments shall be made to the Subconsultant within thirty (30) days of Parametrix' receipt of payment from its client. Invoices received by Parametrix from the Subconsultant by the twenty-fifth day of the month will be included in Parametrix' invoice to its client for services performed during that month. Invoices received after the twenty-fifth day of the month will be withheld for its client's invoicing until the following month. Compensation shall be based on costs and fees as set forth in Exhibit B.

Section 2.3 Direct non-salary expenses may include the following:

2.3.1 Living and traveling expenses of employees, partners and principals when away from the home office on business connected with the project.

2.3.2 Identifiable communication expense, such as long distance telephone, telegraph, cable, express charges and postage, other than for general correspondence.

2.3.3 Services directly applicable to the work, such as special legal and accounting expenses, computer rental and programming costs, special Subconsultants, laboratory charges, commercial printing and binding and similar costs that are not applicable to general overhead.

2.3.4 Identifiable drafting supplies and stenographic supplies and expenses charged to the client's work, as distinguished from such supplies and expenses applicable to two or more projects.

2.3.5 Identifiable reproduction costs applicable to the work, such as blueprinting, photostatting, mimeographing, printing, etc.

Section 2.4 No additional payments shall be under this Agreement unless otherwise specifically stipulated.

3. STANDARD PROVISIONS

Section 3.1 Professional Services. The Subconsultant shall provide the professional services authorized under this Agreement, and shall serve as advisor to Parametrix as an independent contractor. Opinions expressed by Subconsultant as part of its work are deemed to be solely those of Subconsultant. Subconsultant represents that the studies, reports, drawings, and all other consulting and analytical services furnished under this Agreement will be in accordance with generally accepted professional practices in the area of expertise in which the Subconsultant is providing services. The Subconsultant makes no other representation of warranty, expressed or implied.

Section 3.2 Time of Performance. The services set forth in Exhibit A shall be completed by the Subconsultant on or before the date(s) specified therein or other date(s) which may be mutually agreed upon in writing while the work is in progress.

3.2.1 The time schedule for performance of services set forth in Exhibit A is based on the Subconsultant's anticipation of the orderly and continuous progress of the project. If the Subconsultant is delayed in the performance of services by conditions which are beyond his control, he shall promptly notify Parametrix in writing of the cause of delay and the amount of delay anticipated. The Subconsultant shall then prepare a revised estimate of time and compensation needed to complete the project, and shall submit the revisions in writing to Parametrix for approval. An extension of time granted by Parametrix to Subconsultant shall not constitute cause for additional compensation to be claimed by Subconsultant, and no such additional compensation shall be paid to Subconsultant unless agreed upon in writing by Parametrix.

3.2.2 If the Subconsultant is late in the performance of services and has not notified Parametrix in writing of the cause of delay before it occurs, Parametrix may terminate this Agreement and allocate remaining funds and future phases of the project to other parties for completion. In addition, if the work of the Subconsultant is delayed through the neglect of the Subconsultant, or is delayed for any other reason which is not beyond the control of the Subconsultant, and such delay is not deemed to be justified by

Parametrix or its client, then Parametrix may terminate this Agreement as provided above. Any such termination of this Agreement shall be preceded by ten (10) days notice in writing by Parametrix, during which time the Subconsultant shall have the opportunity to cure such delay. A repetition of this or any other delay, without good cause (as determined by Parametrix or its client), shall be grounds for termination of this Agreement without further opportunity on the part of Subconsultant to cure its delay.

Section 3.3 Prime Contract. The Subconsultant shall comply with and abide by _____ _____ of the prime contract attached as Exhibit C, which was executed between Parametrix and its client, which prime contract is incorporated herein as a part of this Subconsultant Agreement. For purposes of incorporating the foregoing provisions of the prime contract in this Subconsultant Agreement, wherever reference is made in the prime contract to _____, substitute the name Parametrix, and wherever reference is made in the prime contract to Parametrix, substitute the name _____. To the extent that any provision of the prime contract is inconsistent with the terms of this Subconsultant Agreement, then the terms of this Subconsultant Agreement shall supersede such inconsistent terms of the prime contract.

Section 3.4 Indemnity. The Subconsultant shall observe and abide by all applicable laws, rules, and regulations of the federal, state, county and municipal governments (and subdivisions or agencies thereof) as they apply to the work described herein.

3.4.1 Subconsultants shall indemnify and save Parametrix and its client harmless from all claims, suits and actions (including costs, expenses and reasonable attorney's fees incurred by Parametrix or others in defending the same), of any character, nature, or description, made or brought for or on account of any injury, death or damage (physical or otherwise) actually received, suffered or sustained by any person, persons, firm, property, partnership or corporation, caused by the negligent error, act or omission of Subconsultant, his suppliers, agents, Subcontractors, and/or employees in or any way connected with the performance of this Subconsultant Agreement. This provision also is intended to indemnify Parametrix and its client specifically in any situation in which the employees of Subconsultant, its agents, representatives, and subcontractors commence a third party action for injuries or death otherwise covered by applicable workmen's compensation laws.

3.4.2 Under such indemnity Agreement, the Subconsultant agrees that upon written notice to it by Parametrix or its client of any such claim, suit or action, as provided in 3.4.1, the Subconsultant will at its sole expense investigate and defend any such claim, suit or action, whether groundless or not, on behalf of Parametrix or its client and will satisfy any judgment rendered against Parametrix and its client, its officers, agents, and employees. Parametrix agrees to defend at its own expense any suit, claim or action, arising out of the negligent error, act or omission of Parametrix.

3.4.3 If Subconsultant delays its work within the time required by this Agreement, except for causes beyond its control, or performs its work in a faulty manner so as not to be finally approved and accepted as required under this Agreement, and if through such failure Parametrix shall be penalized under its contract with its client, then, in such event, the Subconsultant shall reimburse Parametrix for any sums of money that Parametrix shall rightfully pay to its client because of such default of the Subconsultant.

Section 3.5 Site Conditions. Prior to the execution of this Agreement, it is the responsibility of the Subconsultant to ascertain safety conditions related to the project site(s). It is also the responsibility of the Subconsultant to have requested from Parametrix whatever information is deemed necessary to obtain an understanding of site conditions. Parametrix has, in turn, transmitted to its client the request for information from the Subconsultant and has provided the Subconsultant with the response from its client. Parametrix does not make any representations whatsoever as to conditions of any kind existing and/or anticipated at the project site(s).

3.5.1 Health and Safety Plans. In executing this Agreement, Subconsultant acknowledges that he is familiar with conditions at the project site(s) and has ascertained any health and safety plan requirements of applicable laws and regulations pertinent to the specific project site conditions. In the event a health and safety plan is required, the Subconsultant shall have said plan implemented prior to initiation of any of the work at the project site. The Subconsultant is responsible for the preparation of a health and safety plan which meets all applicable laws, rules and regulations.

Section 3.6 Responsibility for Technical Adequacy. Approval by Parametrix and/or its client of the work performed hereunder shall not in any way relieve the Subconsultant of the responsibility for the technical adequacy of the work. Neither approval nor acceptance of nor payment for services performed shall be construed to operate as a waiver of any rights under this Agreement, and the Subconsultant shall be and remain liable in accordance with applicable law for damage to the client or Parametrix caused by the Subconsultant's negligent performance or omission of the services furnished under this Agreement.

3.6.1 Parametrix may edit and review the Subconsultant's work product and, if it is not satisfactorily based on the scope of work set forth in Exhibit A, the Subconsultant will revise, amend, expand or correct the work product to the end that it is complete and appropriate without additional cost to Parametrix. A material deficiency in the work product based upon the scope of work set forth in Exhibit A may be sufficient cause to withhold or delay payment to the Subconsultant, provided that Parametrix notified the Subconsultant in writing of such deficiency within fifteen (15) days of Parametrix' receipt of the Subconsultant's invoice. Such notification shall specifically describe such deficiency and the estimated amount of the Subconsultant's charges reasonably attributable to the deficiency. In no event will Parametrix withhold payment under this paragraph for work satisfactorily completed, based upon the scope of work set forth in Exhibit A.

Section 3.7 Confidentiality. The Subconsultant shall instruct its employees to hold and maintain as confidential all information concerning its findings and recommendations, the business of its client, its relations with its clientele and its employees as well as any other information which may be specifically classified by its client in writing to the Subconsultant, in the same manner as client will hold and maintain that which the Subconsultant regards as confidential. The Subconsultant shall have an appropriate understanding with its employees to that effect provided, however, that the foregoing shall not apply to: (a) information which its client has released in writing from being maintained in confidence; (b) information which, at the time of disclosure, is in the public domain by having been printed and published and available to the public libraries or other public places where such data is usually collected.

Section 3.8 Insurance. Subconsultant shall obtain and maintain at its expense such insurance coverages, including errors and omissions and professional liability insurance, in such amounts as are required of Parametrix in its contract with its client attached as Exhibit C. Before beginning work under this Agreement, the Subconsultant shall provide Parametrix with certificates showing proof of the insurance furnished in compliance with the foregoing from insurance companies authorized to do business in the State of Washington. At a minimum, the Subconsultant agrees that he shall, during the term of this Agreement, procure and maintain appropriate workers' compensation insurance or employers' liability insurance for the protection of his employees, including executive, managerial, and supervisory employees engaged in the work required under this Agreement.

3.8.1 In addition, Subconsultant shall procure and maintain the following insurance policies, each of which shall provide primary coverage with respect to work performed under this Agreement: (a) comprehensive general liability insurance, including personal injury liability, blanket contractual liability, and broad form property damage liability. The policy shall name Parametrix as additional insured. The combined single limit for bodily injury and property damage shall be no less than $1,000,000; (b) Automobile bodily injury and property damage liability insurance covering owned, nonowned, rented, and hired automobiles. The policy shall name Parametrix as additional insured. The combined single limit for bodily injury and property damage shall be not less than $1,000,000; (c) Subconsultant shall, on demand by Parametrix, submit certificates for each of the policies listed above to Parametrix. Each certificate shall provide that the insurance carrier shall give written notice to Parametrix at least ten (10) days prior to cancellation and a copy of any endorsement or amendment to the policy subsequently issued by the Subconsultant's insurance carrier.

Section 3.9 Assignment. This Agreement is binding on the heirs, successors, and assigns of the parties hereto. The Subconsultant shall not sublet or assign any of the work covered by this Agreement, except with the prior written approval of Parametrix and in strict compliance with the terms, provisions, and conditions of this Agreement.

Section 3.10 Termination of Agreement. Unless terminated as provided hereinafter, or as provided in Section 3.2.2, this Agreement shall terminate upon completion and acceptance by the client of all the work specified under this Agreement.

3.10.1 This Agreement may be terminated in whole or part in writing by either party in the event of substantial failure by the other party to fulfill its obligations under this Agreement through no fault of the terminating party, PROVIDED THAT no such termination may be effected unless the other party is given ten (10) days written notice (delivered by certified mail, return receipt requested) of intent to terminate and an opportunity for consultation with the terminating party prior to termination subject to, however, the provisions of Section 3.2.2.

3.10.2 If this Agreement is terminated in whole or in part by Parametrix for reasons of default by the Subconsultant, an equitable adjustment in the price provided for in this Agreement shall be made, but: (a) no amount shall be allowed for anticipated profit on unperformed services, and (b) any payment due to the Subconsultant at the time of termination may be adjusted to the extent of any additional costs to Parametrix, occasioned by the Subconsultant's default. If termination for default is effected by the Subconsultant the equitable adjustment shall include a reasonable profit for services performed. The equitable adjustment for any termination shall provide for payment to the Subconsultant for services rendered and expenses incurred prior to the termination, in addition to termination settlement costs reasonably incurred by the Subconsultant relating to commitments which had become firm prior to the termination.

3.10.3 Upon termination, the Subconsultant shall (a) promptly discontinue all services affected (unless the notice directs otherwise), and (b) deliver or otherwise make available to Parametrix all data, drawings, specifications, reports, estimates, summaries and such other information and materials as may have been accumulated by the Subconsultant in performing this Agreement whether completed or in progress. Upon termination, all Subcontract related materials shall be the property of Parametrix and its client.

Section 3.11 Affirmative Action. The Subconsultant, with regard to the work performed by it after award and prior to completion of this Agreement shall not discriminate on the grounds of race, color, sex, age, sexual orientation, political ideology or national origin in the selection and retention of subcontractors, including, but not limited to, procurement of materials and leases of equipment.

4. DISPUTES

Section 4.1 Arbitration. All claims, disputes, and other matters in question between Parametrix and Subconsultant arising out of or relating to this Agreement and the scope of the work thereof, including the interpretation of this Agreement, or the breach thereof, may be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect, PROVIDED THAT the parties mutually agree to such arbitration. Each of the parties to this Agreement agrees that such arbitration proceeding may be joined or consolidated with any other similar arbitration proceeding involving any other party (not a party to this Agreement) whose contract likewise call for dispute resolution by arbitration under the rules of the American Arbitration Association, where such joinder or consolidation of arbitration proceedings will afford more complete relief to a party to this Agreement.

4.1.1 In any such dispute, whether referred to arbitration or otherwise, the losing party shall pay to the prevailing party all of the prevailing party's reasonable attorney's fees, costs and expenses incurred by the prevailing party with respect to such dispute.

DATED THIS ____ day of _____, 1989.

_____	_____
Parametrix, Inc.	(Subconsultant _____)

0001.RH

EXHIBIT A - SCOPE OF WORK

EXHIBIT B - BUDGET

EXHIBIT C
PRIME CONTRACT

APPENDIX E

STANDARD SUBCONSULTANT AGREEMENT (DRAFT VERSION)

Parametrix, Inc.

Sumner Bellevue Bremerton Portland

DRAFT

STANDARD SUBCONSULTANT AGREEMENT FOR PROFESSIONAL SERVICES

Parametrix Project No.: _____

SUBCONSULTANT's Name: _____

SUBCONSULTANT's Address: _____

_____

Parametrix, Inc. has entered into a written consulting agreement (the CONTRACT) with _____

_____

_____ (the OWNER) for providing

_____ services for the

_____

_____ (the PROJECT) as described in the CONTRACT dated

_____ 19 _____

Parametrix, Inc. and the SUBCONSULTANT have agreed that the SUBCONSULTANT will perform the following services which are part of the CONTRACT identified above.

The services covered by this SUBCONSULTANT AGREEMENT will be performed in accordance with the PROVISIONS included within this form and any attachments or schedules.

SCOPE OF SERVICES: _____

_____

_____

_____

_____

_____

COMPENSATION: _____

_____

_____

_____

_____

_____

OTHER TERMS: _____

_____

_____

_____

ARTICLE 1. TERMS OF PAYMENT

A. Invoicing

The SUBCONSULTANT may submit invoices to Parametrix for progress payments not more than once each month by the 20th of each month. Such invoices will represent the value of the completed Scope of Services and will be prepared in a form and supported by documentation as Parametrix may reasonably require. Invoices will be reviewed and approved by Parametrix before submittal to the OWNER.

B. Payment

Following receipt of reimbursement from the OWNER, payment will be made by Parametrix to the SUBCONSULTANT within 15 days for the approved invoice amount, less any retainage by the OWNER, less any retainage specified elsewhere in this SUBCONSULTING AGREEMENT.

C. Final Payment

Final payment of any balance will be made upon completion of the Scope of Services, and receipt of all deliverables and all PROJECT-related documents and data that are required to be furnished under this SUBCONSULTING AGREEMENT. Final payment will be made within 15 days of receipt of final payment from the OWNER.

D. Interest

Any interest received by Parametrix, Inc. from the OWNER for late progress payments or retainages will be shared with the SUBCONSULTANT on a pro rata basis.

ARTICLE 2. OBLIGATION OF SUBCONSULTANT

A. Independent Contractor

SUBCONSULTANT is an independent contractor and will maintain complete control of and responsibility for its employees, agents, methods, and operations. Nothing contained in this SUBCONSULTING AGREEMENT will create any contractual relationship between OWNER and SUBCONSULTANT.

B. Lower Tier Subcontracts

Any proposed or existing subcontract(s) with SUBCONSULTANT to perform a portion of the Scope of Services hereunder (Lower Tier Subconsultant) must, before work is begun, be submitted to and approved in writing by Parametrix, Inc. SUBCONSULTANT will bind all Lower Tier Subconsultants to the Provisions of this SUBCONSULTING AGREEMENT.

Neither this SUBCONSULTING AGREEMENT nor any Lower Tier subcontract will create any contractual relationship between any Lower Tier Subconsultant and Parametrix, Inc. nor any liability of Parametrix, Inc. to any Lower Tier Subconsultant.

C. Performance

The standard of care applicable to SUBCONSULTANT's services will be the degree of skill and diligence normally employed by professional engineers or consultants performing the same or similar services. The SUBCONSULTANT will reperform any services not meeting this standard without additional compensation. If such deficiencies are not corrected in a timely manner, Parametrix may cause the same to be corrected and deduct costs incurred from SUBCONSULTANT'S compensations.

D. Insurance and Indemnification

The SUBCONSULTANT will maintain throughout this SUBCONSULTING AGREEMENT the following insurance and will submit certificates verifying such to Parametrix, Inc.:

(1) Worker's compensation and employer's liability insurance as required by the state or province where the work is performed.

(2) Comprehensive automobile and vehicle liability insurance covering claims for injuries to members of the public and/or damages to property of others arising from use of motor vehicles, including onsite and offsite operations, and owned, nonowned, or hired vehicles, with $1,000,000 combined single limits.

(3) Commercial general liability insurance covering claims for injuries arising out of any negligent act or omission of the SUBCONSULTANT or of any of its employees, agents, or subcontractors, with $1,000,000 combined single limits.

(4) Professional liability insurance of $500,000.

(5) Parametrix, Inc. will be named as an additional insured with respect to SUBCONSULTANT's liabilities hereunder in insurance coverages identified in items "2" and "3," and SUBCONSULTANT waives subrogation against OWNER and Parametrix, Inc. as to said policies.

All insurance certificates will state that the insurance carrier will give Parametrix, Inc. thirty (30) days notice of any cancellation or material change of the policies.

SUBCONSULTANT agrees to indemnify, defend, and hold OWNER and Parametrix, Inc. harmless from any and all claims, liabilities, obligations, governmental penalties, fines, and causes of action of whatsoever nature, including injury to or death of any person or damage to or destruction of any property resulting from any and all negligent acts or omissions of SUBCONSULTANT or any Lower Tier Subconsultant, including court costs and attorney's fees, excluding only those caused by the sole negligence of Parametrix, Inc. or OWNER.

E. Liens

SUBCONSULTANT will promptly pay for all services, labor, material, and equipment used or employed in the Scope of Services and will maintain the materials, equipment, structures, buildings, premises, and other subject matter hereof, free and clear of mechanic's or other liens.

F. Codes, Laws, and Regulations

SUBCONSULTANT will comply will all applicable codes, laws, regulations, standards, and ordinances in force during the term of this SUBCONSULTING AGREEMENT.

G. Permits, Licenses, and Fees

SUBCONSULTANT will obtain and pay for all permits and licenses required by law that are associated with the SUBCONSULTANT's performance of the Scope of Services and will give all necessary notices.

H. Publicity

SUBCONSULTANT will not disclose the nature of its

Scope of Services on the PROJECT, or engage in any other publicity or public media disclosures with respect to this PROJECT without the prior written consent of Parametrix and the OWNER.

I. Key Personnel

The SUBCONSULTANT will provide qualified personnel to perform the Scope of Services. Within five (5) days of execution of this SUBCONSULTING AGREEMENT or receipt of a written authorization to proceed, the SUBCONSULTANT will submit a list of key personnel for its work, including a designated project manager, if requested by Parametrix. The SUBCONSULTANT will not change or reassign any of the designated key personnel without the written approval of Parametrix.

J. Copies of Data

One legible copy each of all notes, field notes, drawings, prints, and plans prepared under the terms of this SUBCONSULTING AGREEMENT will be delivered by the SUBCONSULTANT to Parametrix upon completion of the Scope of Services.

K. Additional Assignments

The SUBCONSULTANT will not separately solicit or accept any assignment from the OWNER directly related to the PROJECT during the life of the CONTRACT without Parametrix, Inc. written approval.

L. Access to Records

The SUBCONSULTANT will maintain accounting records, in accordance with generally accepted accounting principles and practices, to substantiate all invoiced amounts. Said records will be available for examination by Parametrix during SUBCONSULTANT's normal business hours for a period of 3 years after SUBCONSULTANT's final invoice to the extent required to verify the costs incurred hereunder.

M. Suspension of Work

The SUBCONSULTANT will, upon written notice from Parametrix, Inc., suspend, delay or interrupt all or a part of the Scope of Services. In such event, the SUBCONSULTANT will resume the Scope of Services upon written notice from Parametrix and an appropriate extension of time will be mutually agreed upon and added to the SUBCONSULTANT's time of performance.

N. Hazardous or Toxic Substances

If this SUBCONSULTING AGREEMENT involves hazardous or toxic substances, the following apply:

(1) SUBCONSULTANT will be indemnified for losses, damages, personal injuries, or death claim only to the extent that Parametrix, Inc. is reimbursed for such indemnification by the OWNER.

(2) SUBCONSULTANT will be indemnified for losses, damages, personal injuries, or death claim only to the extent that Parametrix, Inc. is reimbursed for such indemnification by the OWNER.

O. Completion and Acceptance

After submission of the final work project, as specified in Article 1-C and Article 2-J, and when SUBCONSULTANT deems the Scope of Services completed, the SUBCONSULTANT will give Parametrix notice thereof in writing. Within thirty (30) days after receipt of such notice, Parametrix will determine if the Scope of Services has been completed to its satisfaction; if so, Parametrix will advise SUBCONSULTANT in writing of its final acceptance thereof; if not, Parametrix, Inc. will notify SUBCONSULTANT of its lack or failure of performance, and SUBCONSULTANT will take remedial action as described in Article 2-C and will repeat the procedure stated herein until the Scope of Services has been satisfactorily completed and accepted.

P. Affirmative Action

The SUBCONSULTANT, with regard to the work performed by it after approval and/or award and prior to completion of this contract, shall not discriminate on the grounds of race, color, sex, age, sexual orientation, political ideology or national origin, and in the selection and retention of employees and subcontractors, including, but not limited to, services for procurement of materials and leases of equipment.

ARTICLE 3. OBLIGATIONS OF PARAMETRIX, INC.

A. Timely Review

Parametrix will examine the SUBCONSULTANT's studies, reports, sketches, drawings, specifications, proposals, and other project-related documents and render decisions required by SUBCONSULTANT in a timely manner.

B. Prompt Notice

Parametrix will give prompt written notice to SUBCONSULTANT whenever Parametrix observes or becomes aware of any development that affects the scope or timing of SUBCONSULTANT's Scope of Services, or any defect in the work of the SUBCONSULTANT.

ARTICLE 4. GENERAL PROVISIONS

A. Proprietary Information

All drawings, specifications, technical data, and other information furnished to SUBCONSULTANT either by Parametrix or OWNER or developed by SUBCONSULTANT or others in connection with the Scope of Services are, and will remain, the property of Parametrix or OWNER, and may not be copies or otherwise reproduced or used in any way except in connection with the Scope of Services, or disclosed to third parties or used in any manner detrimental to the interests of Parametrix or OWNER.

The following information will not be subject to the confidentiality requirements of the above:

(1) Information in the public domain through no action of SUBCONSULTANT in breach of this SUBCONSULTING AGREEMENT;
or

(2) Information independently developed by SUBCONSULTANT; or

(3) Information acquired by SUBCONSULTANT from a third party not delivered to SUBCONSULTANT in breach of confidentiality agreements that said third party may have with Parametrix or OWNER.

B. Assignments

This SUBCONSULTING AGREEMENT and the rights and duties hereunder will not be assigned, subcontracted, or transferred by SUBCONSULTANT, in whole or in part, without Parametrix's prior written approval.

C. Waivers

No waiver by either party of any default by the other party in the performance of any provision of this SUBCONSULTING AGREEMENT will operate as, or be construed as, a waiver of any future default, whether like or different in character.

D. Force Majeure

Neither party to this SUBCONSULTING AGREEMENT will be liable to the other party for delays in performing the Scope of Services, or for the direct or indirect costs resulting from such delays, that may result from labor strikes, riots, war, acts of governmental authorities, extraordinary weather conditions or other natural catastrophe, or any other cause beyond the reasonable control or contemplation or either party.

E. Authorization to Proceed

Execution of the SUBCONSULTING AGREEMENT by Parametrix will be authorization for SUBCONSULTANT to proceed with the Scope of Services, unless otherwise provided for in this SUBCONSULTING AGREEMENT.

F. No Third Party Beneficiaries

This SUBCONSULTING AGREEMENT gives no rights or benefits to anyone other than the SUBCONSULTANT and Parametrix and has no third-party beneficiaries.

G. Jurisdiction

The law of the state, or province, governing the CONTRACT between Parametrix and the OWNER shall govern the validity of this SUBCONSULTING AGREEMENT, its interpretation and performance, and any other claims related to it.

H. Soliciting Employment

Neither party to this SUBCONSULTING AGREEMENT will solicit an employee of the other party, nor hire or make an offer of employment to an employee of the other party, without prior written consent of the other party, during the time this SUBCONSULTING AGREEMENT is in effect.

I. Severability and Survival

If any of the provisions contained in this SUBCONSULTING AGREEMENT are held for any reason to be invalid, illegal, or unenforceable in any respect, such as invalidity, illegality or unenforceability will not affect any other provision, and this SUBCONSULTING AGREEMENT will be construed as if such invalid, illegal or unenforceable provision had never been contained herein. The provisions of articles 2C, 2D, 2N and 4A will survive termination of the SUBCONSULTING AGREEMENT.

J. Termination/Cancellation

Parametrix will have the right to terminate this SUBCONSULTING AGREEMENT for its convenience. After termination, SUBCONSULTANT will be reimbursed for services rendered and necessary expenses incurred to the termination date upon submission to Parametrix of detailed supporting invoices. SUBCONSULTANT will not be entitled to profit or other compensation on services not performed.

If SUBCONSULTANT during performance of the Scope of Services:

(1) Becomes insolvent or makes a general assignment for the benefit of its creditors; files or has filed against SUBCONSULTANT a petition in bankruptcy or an attachment or execution levied upon any of SUBCONSULTANT's property used hereunder; or has appointed a receiver for SUBCONSULTANT's business; or
(2) Has any legal proceeding commenced against SUBCONSULTANT that, in the opinion of Parametrix, interferes with the performance and satisfactory completion of the Scope of Services; or
(3) Fails or refuses to proceed with the Scope of Services in a prompt, safe, diligent manner, or to supply adequate equipment or properly skilled employees; or
(4) Fails to pay promptly all monies due Lower Tier Subconsultants for services, labor, or materials used in connection with the Scope of Services; or
(5) Fails or refuses to proceed in full compliance with all provisions of this SUBCONSULTING AGREEMENT;

then SUBCONSULTANT will be deemed in default and Parametrix, without prejudice to any other rights or remedy it may have, may give SUBCONSULTANT notice in writing setting forth the particulars of such default. Unless such default is corrected within seven (7) days from date of said notice, Parametrix, at its option, may terminate this SUBCONSULTING AGREEMENT.

K. Scope of Services

Parametrix may adjust the Scope of Services by either adding to or deleting from the services to be performed. If such adjustment increases or decreases the cost or time required for the SUBCONSULTANT's Scope of Services, adjusted compensation and/or time will be mutually agreed upon in writing. Additional Services provided by the SUBCONSULTANT will be entitled to additional compensation or extension of time only as authorized in writing by Parametrix.

L. Attachments and Schedules

The following attachments and schedules are hereby made a part of this SUBCONSULTING AGREEMENT:

This SUBCONSULTING AGREEMENT represents the entire agreement between the parties, supersedes all prior agreements and understandings, and may be changed only by written amendment executed by both parties.

Approved for Subconsultant

By _____

Title _____

Date _____

Accepted for PARAMETRIX, INC.

By _____

Title _____

Date _____

APPENDIX F

MIS STAFF AND PROJECT SUMMARY SHEETS

MIS STAFF ASSIGNMENT SUMMARY SHEETS

BELLEVUE MANAGEMENT INFORMATION SYSTEM
STAFF ASSIGNMENT SUMMARY

01/25/90

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
100 Beluche	44	42	42	46	48	51	51	44	55	48	48	55
Cat 1&2	37	38	38	42	48	51	51	44	55	48	48	55
101 Weitkamp	9	33	55	63	79	92	92	67	106	92	92	110
Cat 1&2	-61	-17	-47	-9	23	42	38	-31	14	82	90	110
102 WORD PROC(	64	72	96	126	262	276	282	204	318	297	282	368
Cat 1&2	12	2	-23	19	183	221	233	151	253	252	257	348
103 CLERICAL (	294	314	310	320	330	346	346	298	362	314	314	366
Cat 1&2	284	277	284	285	307	341	342	294	360	314	314	366
104 GRAPHICS (	75	176	229	306	286	322	312	264	348	290	294	368
Cat 1&2	63	158	194	277	279	315	307	219	283	265	289	368
105 EDITING	58	98	78	120	118	166	146	102	144	152	150	184
Cat 1&2	58	98	78	120	118	166	126	42	104	148	150	184
106 Storlie	69	81	81	81	101	106	106	51	110	96	96	110
Cat 1&2	69	81	81	41	101	106	106	51	110	96	96	110
107 Schadt	36	52	54	77	77	84	109	96	137	118	118	147
Cat 1&2	36	52	54	77	77	84	109	96	137	110	118	147
109 Schroeder	168	88	88	168	168	176	176	152	184	160	160	184
Cat 1&2	168	88	88	168	88	-24	-24	132	184	160	160	184
110 Johnson	168	88	88	168	168	176	96	32	184	160	160	184
Cat 1&2	168	88	88	168	88	136	56	32	184	160	160	184
111 Peters	79	151	71	151	151	78	158	137	166	144	144	166
Cat 1&2	79	71	51	151	71	78	158	137	166	144	144	166
113 Boyce	103	111	151	151	151	158	158	137	166	144	144	166
Cat 1&2	103	111	151	151	151	158	158	137	166	144	144	166
114 Shimek	-14	54	60	60	160	167	167	136	175	144	152	175
Cat 1&2	-34	54	60	60	140	147	7	-24	135	144	152	175
115 Whitman	36	-33	-33	52	80	87	87	44	167	132	152	175
Cat 1&2	6	-71	-106	-86	38	29	29	39	167	12	72	175
116 Sullivan	-120	-62	-32	48	48	116	116	92	144	160	120	184
Cat 1&2	-240	-202	-132	-52	-32	76	36	52	144	160	120	184
117 Williams	0	8	108	168	168	116	126	152	184	160	160	184
Cat 1&2	0	8	108	168	48	96	106	52	84	160	160	184
118 Thompson	56	88	63	168	168	151	176	152	184	160	160	184
Cat 1&2	56	0	23	168	168	151	176	152	184	160	160	184
119 Galstad	148	-2	8	168	168	176	166	42	184	160	160	184
Cat 1&2	148	-2	8	168	88	-24	-34	2	184	160	160	184

BELLEVUE MANAGEMENT INFORMATION SYSTEM
STAFF ASSIGNMENT SUMMARY

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
120 Hawes	128	148	146	116	168	176	176	152	184	160	160	184
Cat 1&2	128	148	146	116	138	156	161	137	184	160	160	184
121 Marine Tec	168	168	88	168	168	96	176	152	184	160	160	184
Cat 1&2	168	0	48	168	168	96	176	152	184	160	160	184
122 Spink	168	8	8	168	168	176	176	152	184	160	160	184
Cat 1&2	168	8	8	168	88	-4	16	72	184	160	160	184
123 Shields	158	168	88	168	168	96	176	152	184	160	160	184
Cat 1&2	158	0	48	168	168	96	176	152	184	160	160	184
124 Kumagai	148	148	148	148	148	156	156	132	164	160	160	184
Cat 1&2	68	68	-42	-172	-22	16	16	92	164	120	80	184
126 Riley	78	82	90	150	160	167	147	114	165	122	152	175
Cat 1&2	78	82	40	100	110	117	102	69	160	117	147	175
127 Good	88	84	112	130	158	170	164	142	170	148	150	180
Cat 1&2	88	84	72	90	118	130	124	102	150	146	130	180
129 Fagerness	-101	42	98	135	148	132	176	112	164	160	152	184
Cat 1&2	-121	42	29	110	143	127	131	87	164	155	152	184
130 Sweeney	55	47	81	85	97	84	76	103	142	60	100	166
Cat 1&2	55	23	81	85	97	84	76	103	142	60	100	166
132 Kelley	74	98	96	106	148	166	158	144	164	152	160	184
Cat 1&2	74	98	71	71	123	141	138	124	154	142	150	184
133 Neiman	-2	-38	94	108	98	86	126	132	184	120	160	184
Cat 1&2	-2	-38	94	108	98	86	126	132	184	120	160	184
134 Bruce	108	116	116	148	148	146	156	144	174	132	160	184
Cat 1&2	108	116	116	148	148	146	156	144	174	132	160	184
138 Laboratory	276	336	336	336	336	352	192	144	368	320	320	368
Cat 1&2	276	336	336	336	56	-48	32	144	368	320	320	368
139 Ecklein	-38	-38	-18	-18	22	28	28	-4	42	20	80	92
Cat 1&2	-40	-40	-20	-18	22	28	28	-4	42	20	80	92
141 Peterson	42	28	-4	20	88	102	102	84	108	90	90	108
Cat 1&2	18	4	-28	0	88	102	102	84	108	90	90	108
142 Campbell	22	116	160	160	160	167	167	144	175	152	152	175
Cat 1&2	22	116	155	155	155	162	162	139	170	147	147	175
144 Gallion	90	120	90	120	100	167	167	144	175	152	152	175
Cat 1&2	90	120	90	120	100	167	167	144	175	152	152	175
145 Dold	32	8	150	160	160	167	167	144	175	152	152	175
Cat 1&2	32	8	150	160	160	167	167	144	175	152	152	175

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
146 Zisette	124	128	158	128	168	176	176	152	184	160	160	184
Cat 1&2	44	48	78	48	88	96	176	152	184	160	160	184
147 Heilman	72	148	128	148	128	176	176	152	184	160	160	184
Cat 1&2	72	148	128	148	128	176	176	152	184	160	160	184
148 Butler	68	168	168	168	168	176	176	152	184	160	160	184
Cat 1&2	38	108	68	68	168	176	176	152	184	160	160	184
149 Wold	41	21	21	21	168	176	176	152	184	160	160	184
Cat 1&2	41	21	21	21	168	176	176	152	184	160	160	184
150 Planner	0	0	0	0	0	0	0	0	0	0	0	0
Cat 1&2	-220	-500	-660	-300	-560	-440	-160	0	0	0	0	0
152 Mattern	-34	-46	54	74	74	31	61	32	147	88	118	147
Cat 1&2	-34	-46	54	74	74	31	61	32	147	88	118	147
153 Georgianna	-3	93	90	85	81	95	110	81	101	100	86	101
Cat 1&2	-3	93	90	75	81	95	110	81	101	100	86	101
154 Maynard	-4	40	80	160	160	167	167	144	175	152	152	175
Cat 1&2	-4	40	80	160	160	167	167	144	175	152	152	175
155 Peterson	1	1	71	151	151	158	158	137	166	144	144	166
Cat 1&2	1	1	71	151	151	158	158	137	166	144	144	166
156 Evans	7	111	111	151	151	158	158	137	166	144	144	166
Cat 1&2	7	111	111	151	151	158	158	137	166	144	144	166
157 Shepherd	40	60	60	60	40	127	127	94	175	112	142	175
Cat 1&2	40	60	60	60	40	127	127	94	175	112	142	175
158 Meerscheid	28	52	68	88	88	136	136	92	124	100	160	184
Cat 1&2	28	52	68	88	88	136	136	92	124	100	160	184
159 Littler	32	44	73	67	79	84	84	79	98	94	94	109
Cat 1&2	7	17	50	44	58	63	63	58	77	73	73	88
160 Moore	-25	8	39	69	93	108	120	122	147	128	128	147
Cat 1&2	-89	-62	-35	-5	-1	10	56	52	71	72	68	87
161 Sullivan	-20	-10	28	60	64	131	133	122	147	128	128	147
Cat 1&2	-64	-54	-16	-6	-56	51	109	118	143	128	128	147
162 Neuner	60	90	94	118	126	143	143	144	175	152	152	175
Cat 1&2	-4	4	2	10	10	15	19	20	51	22	22	45
164 Emge	-46	-26	-22	-2	78	126	126	150	182	158	158	182
Cat 1&2	-66	-46	-42	-22	-42	6	26	90	122	158	158	182
165 Do	-16	8	-24	-2	88	117	117	142	173	150	150	173
Cat 1&2	-16	8	-24	-2	-62	-33	7	72	103	150	150	173

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
166 Mullen	96	112	116	136	136	128	148	144	136	152	136	156
Cat 1&2	96	92	106	126	126	118	138	134	126	142	126	146
167 Vieira	62	90	62	72	90	62	80	104	80	54	132	150
Cat 1&2	62	90	62	72	90	62	80	104	80	54	132	150
168 Williams	56	168	160	168	168	176	176	152	184	160	160	184
Cat 1&2	56	168	160	168	168	176	176	152	184	160	160	184
169 Shields	-43	93	103	63	71	78	98	117	150	144	128	166
Cat 1&2	-45	93	103	61	-11	-3	18	77	110	104	88	126
170 Wukelic	107	129	135	151	151	158	158	137	166	144	144	166
Cat 1&2	9	39	71	83	83	86	110	89	118	90	90	112
171 Anderson	-117	-87	-7	83	133	140	140	119	146	136	136	156
Cat 1&2	-149	-143	-47	43	-27	-20	-20	-41	-14	36	36	56
172 Swan	16	6	28	58	108	166	176	152	184	160	160	184
Cat 1&2	4	-28	-6	22	82	146	156	132	164	140	140	164
173 Hall	-52	-62	-52	-32	-22	113	123	106	129	112	112	129
Cat 1&2	-92	-82	-72	-52	-42	93	123	106	129	112	112	129
174 Brown	-30	-40	-40	-35	-30	176	176	152	184	160	160	184
Cat 1&2	-30	-80	-80	-85	-70	146	156	132	164	140	140	164
175 Baltzell	6	168	168	68	68	176	176	152	184	160	160	184
Cat 1&2	-2	148	148	28	28	132	132	108	140	116	116	140
177 Morley	-20	14	11	14	14	21	21	2	27	8	8	147
Cat 1&2	-20	14	11	14	14	21	21	2	27	8	8	147
178 Kane	-38	-8	-16	-8	-8	-9	-9	64	-9	72	-8	175
Cat 1&2	-46	-96	-104	-156	-156	-157	-157	-84	-189	-76	-188	27
179 Drennen	114	118	118	118	118	123	123	106	129	112	112	129
Cat 1&2	94	110	118	118	118	123	123	106	129	112	112	129
185 TECHNICIAN	54	64	-30	64	80	132	152	152	184	160	160	184
Cat 1&2	-6	4	-98	-18	-48	4	96	136	168	160	160	184
201 Morck	2	-12	-20	8	12	27	27	8	65	48	48	131
Cat 1&2	0	-14	-20	8	12	27	27	8	65	48	48	131
202 Miller	-37	-3	25	91	115	158	158	137	166	144	144	166
Cat 1&2	-131	-67	-15	51	75	118	158	137	166	144	144	166
203 Massart	-20	-4	0	0	168	176	176	152	184	160	160	184
Cat 1&2	-30	-4	0	0	168	176	176	152	184	160	160	184
204 Bourque	8	8	8	128	88	96	96	152	184	160	160	184
Cat 1&2	8	8	8	128	88	96	96	152	184	160	160	184

BELLEVUE MANAGEMENT INFORMATION SYSTEM
STAFF ASSIGNMENT SUMMARY

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
205 Harrison	0	0	0	0	0	176	176	152	184	160	160	184
Cat 1&2	0	0	0	0	0	176	176	152	184	160	160	184
206 McKay	12	4	4	28	28	33	33	17	94	78	78	94
Cat 1&2	-44	-76	4	28	28	33	33	17	94	78	78	94
207 Richards	8	8	8	8	88	96	96	72	104	80	80	184
Cat 1&2	-2	-4	8	8	88	96	96	72	104	80	80	184
208 Hill	10	92	90	108	139	147	157	125	165	138	142	165
Cat 1&2	-60	22	20	38	29	37	52	20	60	33	37	60
209 Sorenson	8	76	90	136	118	123	147	110	147	124	118	155
Cat 1&2	-12	16	30	76	-2	3	27	-10	27	4	-2	35
210 Hanberg	59	123	127	107	147	154	147	144	175	152	152	175
Cat 1&2	-95	9	13	9	49	56	63	60	91	68	68	91
211 Martenez	-12	51	74	82	142	142	130	126	150	114	134	158
Cat 1&2	-12	-29	-6	2	-118	-158	-170	-174	-70	-106	-86	-62
212 Hicker	0	50	108	158	168	176	176	152	184	160	160	184
Cat 1&2	-207	-88	10	42	52	56	96	72	98	74	74	98
213 Churan	118	138	138	148	158	176	176	152	184	160	160	184
Cat 1&2	88	128	128	138	158	176	176	152	184	160	160	184
214 Wilkins	0	0	40	120	160	167	167	144	175	152	152	175
Cat 1&2	0	0	40	120	160	167	167	144	175	152	152	175
215 SW PROJ MN	-160	-160	-160	-160	-160	-80	-80	-80	-80	-80	-80	-80
Cat 1&2	-160	-160	-160	-160	-160	-80	-80	-80	-80	-80	-80	-80
216 SW ENG I	-160	-160	-160	-80	-80	-80	-80	-80	0	0	0	0
Cat 1&2	-160	-160	-160	-80	-80	-80	-80	-80	0	0	0	0

MIS PROJECT SUMMARY SHEETS

BELLEVUE MANAGEMENT INFORMATION SYSTEM
CATEGORY 1

Project		Billed Jan	Est'd Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Total
11-1533-14	West Point Shoreline Mit.		1.1	0.9	0.5	0.5								-		1.9
11-1533-16	West Point Permits		7.3	10.7	11.7	6.7	6.7	5.5	7.7	5.5						56.5
11-1577-07	LOTT SEIS Phase 2		20.8	15.4	8.7	3.4										27.5
11-1577-08	LOTT Haz. Waste		2.8	2.1	4.3	3.6	4.5									14.5
11-1600-11	Olympic View Special Wst.		4.2	5.2	4.0	2.5	2.8	3.8	2.0	2.6	3.6	2.0	2.6	3.6	2.0	36.7
11-1600-12	Olympic View EIS		1.7	3.3	1.1	0.3	5.5									10.2
11-1682-03	Mason County NW. PL.		5.6	7.0	3.7	3.7	5.8	5.8								26.0
11-1763-04	Kittitas Cty SWMP Update		1.0	1.0												1.0
11-1763-05	Kittitas Co. HW Plan		6.0	5.8	6.0	5.6	3.3	2.5	0.2							23.4
17-1750-01	Clackamas Co.		0.5													
21-1550-18	Midway Gas Control		0.8	7.2	7.2	7.2										21.6
21-1550-24	Midway Final Cover (Gas)		1.5	2.0	2.2	5.0	8.0	7.8	7.8	7.8						40.6
21-1564-09	Tacoma Northend Bionon.					7.2			7.2							14.4
21-1564-11	Tacoma City Waterway		8.5	1.8												1.8
21-1607-07	Tacoma Gas			3.0	3.0											6.0
21-1763-01	Kittitas Co. Hydrogeo A.			1.0	0.2	0.2										1.4
21-1763-02	Kittitas County Engineer		1.0	0.9	0.3	0.3										1.5
21-1763-03	Kittitas C & PC		1.6	0.5	0.5											1.0
23-1682-04	Mason County Landfill		2.1	3.9	3.0	1.9		1.0	0.8		1.0	0.8		1.0		13.4
31-1564-02	Tacoma Outfall Benthic		4.1	2.6					0.8	7.3	8.6					19.3
35-1540-05	1989 Accelerated Smolt.			1.0	0.5											1.5
35-1542-18	1988 Mid Columbia Studies		1.2	1.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		5.2
35-1562-11	Port of Sea Kellog Is.		5.8	6.5	4.4	2.3										13.2
35-1583-16	WDOE S-4		1.9	2.1												2.1
35-1617-04	BPA Hatchery Effectivenes		9.7	9.7	10.8	10.8	10.8	9.0	6.0	6.0	8.6					71.7
35-1650-13	Simpson Outfall Benthic		3.6	0.6												0.6
35-1795-03	Aquatic Lands Lease Rev.		1.7													
35-1795-04	UST - COMPOUND+CEDARCREEK		5.8	3.1	4.6	3.4	0.8									11.9
35-1849-01	Maine Net Pens		4.8	3.8	5.3	0.3										9.4
35-1856-01	Wollochet Wetland		1.1	0.6												0.6
35-1869-01	Kent Biotech			0.9	0.9		0.6	0.6	1.1							4.1
55-1513-09	Cathcart Landfill GMP		5.3	4.9	3.9	9.2	6.6	5.1	1.6							31.3
55-1513-13	Snohomish Co. Landfill		6.4	5.4	4.0	4.8	4.6	4.6	2.9	2.9	2.9					32.1
55-1521-10	Issaquah GWMP		2.2	8.1	5.7	2.2	2.9	2.2	2.2	2.9	2.2	2.2	2.2	2.2	2.2	37.2
55-1550-17	Midway Gas Phase II, Sup6		4.1	4.5	2.3											6.8
55-1550-22	Midway FS Pt.2 Grnd. Wat.		44.7	34.9	30.7	33.3	34.9	31.5	30.5	27.7	19.1	27.1	19.5	24.0	0.8	314.0
55-1550-23	Kent Highlands QC		0.3	0.3	0.3	0.3	0.3	0.3	0.3							1.8
55-1550-25	Midway Leachate Wells		1.0	1.0	0.5											1.5
55-1550-26	Midway Gas Opera.Sys.1989		9.2	9.1	8.4	8.4	8.4									34.3

Project		Billed Jan	Est'd Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Total
55-1568-12	Manchester Fuel Pier EA		1.0	0.7	0.7											1.4
55-1580-14	Bellevue Sensitive Areas		1.6	0.4	0.2											0.6
55-1586-08	Homeport SEIS		13.2	19.2	39.7	43.2	18.1	10.3	5.9	8.0	15.3	8.5	11.3			179.5
55-1591-04	Rabanco Special Projects															
55-1591-05	Rabanco - Grant County		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				18.0
55-1591-10	Grant County EIS		1.1	4.3	1.0	0.7	0.7									6.7
55-1600-05	Hansville Envir. Monitor.		2.7	0.8	1.5	2.0	0.8	1.3	2.0	0.8	1.3	2.0	1.7	0.9	2.2	17.3
55-1610-02	Terrace Hts. Landfill DCP		0.2	0.6												0.6
55-1610-04	Cheyne/Snipes Landfills		0.9	1.4	0.9											2.3
55-1610-05	Yakima Co. HWMP		6.5	6.3	6.0	4.4	3.4	1.1	1.1							22.3
55-1610-06	Yakima Co. on-call			0.7	1.8	1.6										4.1
55-1617-03	Yakima Hatchery EA															
55-1625-01	Newcastle Landfill Eng.		8.2	15.5	14.5	13.2	8.8	5.9	6.9	6.8	5.9	4.2	3.7	2.8	3.8	92.0
55-1625-03	Klickitat Co. Regional LF		30.5	30.7	26.9	26.5	24.1	13.6	13.6	13.6	9.8	9.8	9.8	9.8		188.2
55-1631-02	SR 509 EIS		9.7	1.5	7.9	9.7	10.3									29.4
55-1643-03	ASARCO RI/FS		26.2	24.5	20.8	12.7	3.8	2.2	2.2							66.2
55-1650-07	Simpson Landfill Siting															
55-1656-34	Small Projects Work Auth.		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		2.2
55-1656-40	SCL-Strandley FFS															
55-1656-42	Tansy Ragwort Bio./Contr.		3.6	1.6	1.3	0.2	0.8	1.1	0.5	2.0	1.1	2.7	3.8	2.8		17.9
55-1656-43	Strandley Monitoring '90			0.9		0.9			1.5		0.4					3.7
55-1656-44	LUSP EIS															
55-1656-49	Newhalem Creek FERC		21.6	24.4	19.9	10.0										54.3
55-1657-02	Palailai Lndfl Closure PL		9.8	8.9	9.4	9.8	8.9	9.4	0.9							47.3
55-1657-03	Palailai Gas System			4.7	3.9	4.3	3.7	3.4								20.0
55-1660-07	Kootenai Landfill Design		9.3	11.1	13.4	11.6	3.9	2.3								42.3
55-1692-06	Alki Value Engineering		1.8			2.4										2.4
55-1702-01	NW Enviroservices Support															
55-1723-02	South Lake Union Park EIS			9.8												9.8
55-1723-03	U.W. Branch Campus		19.5	8.6	4.0	8.6	3.1	5.5								29.8
55-1747-03	WDF Release Net-pens		5.3													
55-1768-01	Spokane Hazard.Wt.Mgt.Pln		11.5	10.9	10.1	10.1	10.1	10.1								51.3
55-1768-02	Spokane SWMP		6.8	2.7	6.6	1.6										10.9
55-1769-02	Boren Ave UST Removal		2.5	2.3	2.2											4.5
55-1774-02	Metro Rail															
55-1795-05	DNR - Larch Sampling		1.7	1.7	0.6											2.3
55-1800-01	Gas Works Park EIS		14.2	16.1												16.1
55-1810-01	Bogs Lake		2.8	4.5												4.5
55-1816-02	Seattle Univ. UST Removal		0.8	0.7												0.7

BELLEVUE MANAGEMENT INFORMATION SYSTEM
CATEGORY 1

Project		Billed Jan	Est'd Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Total
55-1823-01	Olivine Landfill		20.0	16.6	15.3	12.6								-		44.5
55-1825-01	Lowell Wetland		1.3	2.1	0.5											2.6
55-1833-01	Asotin Co. NW Plan		7.0	7.7	3.7	3.7	5.8	5.8								26.7
55-1840-01	CHUKAR - Seattle		0.5	0.7												0.7
55-1842-01	Union Station DHP			2.2												2.2
55-1846-01	Oregon DEQ		17.3	41.1	17.5	8.9	3.8									71.3
55-1846-02	DEQ/HRS			5.1	2.7		3.8	3.0	3.0	3.0						20.6
75-1600-05	Hansville GW Wells		2.1	2.8												2.8
80-1910-01	Snohomish County-On Call															
81-2011-01	Miller Creek		1.5		1.5	1.5	0.5				0.5	0.5	0.5			5.0
81-2070-01	Everett-Silverlake Pond		1.2	0.2	1.2	1.2	1.2									3.8
81-2095-03	Lakeside Industries			4.7	0.1											4.8
85-2115-02	Sockeye Spawning Channel		16.7	22.1	24.1	20.6	15.7	16.0	16.6	18.2	16.5	7.3	10.7	4.5		172.3
TOTAL		0.0	462.2	495.0	401.2	347.7	240.4	173.3	127.9	117.7	99.4	69.7	66.4	52.2	11.0	2201.9

BELLEVUE MANAGEMENT INFORMATION SYSTEM
CATEGORY 2

Project		Billed Jan	Est'd Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Total
11-1513-11	Swamp Creek						0.8	0.5	0.5	0.2				-		2.0
11-1779-01	City of DesMoines					2.7	2.7	2.7	2.7	2.7	2.7	2.5	1.9	2.5		23.1
21-1527-18	Sumner Comp. Drainage Pln					0.5	0.5	0.3	0.3							1.6
35-1542-19	FERC Proceedings			8.4	9.5	11.7	7.2	9.7	6.4	8.7	10.2	8.0				79.8
35-1542-20	Prototype Fishscreen			0.5	1.0	5.5	10.8	2.7	5.3	5.3		2.2	8.4	6.3		48.0
35-1542-21	Bypass Options			1.0	1.7	1.6	1.7	1.6								7.6
35-1542-22	Vernita Bar												1.5			1.5
35-1542-23	Smolt Transportation			6.1	3.5	3.5	6.0									19.1
35-1795-01	DNR-USTs REMOVAL PROGRAM				0.4	0.4	4.5	4.2	4.1							13.6
35-1795-06	DNR - Corson ST.		9.0	10.8	6.2	3.9	0.7									21.6
55-1625-04	Cascade Center		6.4	4.7	4.2	4.2	4.2									17.3
75-1625-03	Klickitat Demo Landfill		23.2	9.3	19.4	18.1	3.2	17.6	17.6	6.4						91.6
75-1653-01	Vashon Landfill EIS					7.8	6.7	4.8								19.3
81-2016-01	City of Kent-Millcreek					3.8	3.8	3.8	3.8	3.8	3.8					22.8
85-2118-01	Walla Walla MRWMP			10.2	9.5	9.5	12.0	8.9	8.0							58.1
85-2160-02	Ecology Ambient Monitor				13.9	4.2										18.1
85-2162-03	West Village EIS			3.2	7.4	11.4	11.4									33.4
95-1000-04	Bremerton - UST		4.4	3.8	3.0	1.6										8.4
99-1513-99	Cathcart Supplement 2			7.4	7.4	7.4	7.4	7.4	7.4							44.4
99-1550-99	Midway Gas Supplement 2							7.8	7.8	7.8	7.8	7.8				39.0
99-9999-85	ODEQ - Mmway							29.4	31.1	31.1	28.9	25.6	20.4	20.4	20.4	207.3
99-9999-86	Hanford			3.9	20.5	20.1	23.9	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	279.6
99-9999-87	Jackson County SW			8.9	9.6											18.5
99-9999-88	UST Cat. 3			6.0	8.3	9.3	10.0	10.7	11.5	12.2	12.7	13.1	13.4	13.8	13.8	134.8
99-9999-89	Site Assessments - 3			3.6	3.7	3.7	6.2	6.3	7.1	6.5	6.5	8.9	7.6	9.6	7.6	77.3
99-9999-90	Simpson Outfall '90 Monit							10.1	8.4	16.2	19.5	5.7				59.9
99-9999-91	Grant County		1.2	2.4	2.4	3.6	3.6	3.6	1.2	1.2	1.2					19.2
99-9999-92	Lake Union EIS		1.7	1.8												1.8
99-9999-93	Alaska															
99-9999-94	NWES-Continuing Services		0.7	3.5	3.5	3.2	3.2	3.2	3.4	3.4	3.4	3.4	3.4	3.4	3.4	40.4
99-9999-95	Strandley		1.9	0.9		1.9	0.9			1.9	0.9					6.5
99-9999-96	Simpson Cap Monitor 1990							15.3	19.1	15.5	12.9	4.5				67.3
99-9999-97	Lakeside Industries		3.3													
99-9999-98	S-6		1.1	1.8												1.8
99-9999-99	Cathcart Energy Recovery		3.5	2.2	2.2	2.5	4.3	12.0	9.7	5.6						38.5
TOTAL		0.0	56.4	100.4	137.3	142.1	135.7	189.0	181.8	154.9	136.9	108.1	83.0	82.4	71.6	1523.2

APPENDIX G

ENVIRONMENTAL PLANNING AND ANALYSIS STATUS REPORT

ENVIRONMENTAL PLANNING GROUP

Project Status Summary

June 4, 1990

Klickitat SEIS (55-1625-05, task 08) Evans

I tentatively have a meeting scheduled for early next week with Rick Morck and Ellen McKay to discuss the schedule. The subs are in various stages of progress; some are working on sections of the EIS while others still don't have the necessary technical information to begin their work. We still don't have enough information to work with to keep anyone full-time on this project.

Sockeye Spawning Channel (55-1750-02) Shepherd

This morning we will deliver to JMM a report on the hatchery siting process and preliminary site evaluations. We will also deliver a draft EIS outline. We have recently received the scoping comments and will be preparing a summary. The next Technical Committee meeting will be June 19th, when the future direction of the project may or may not be clarified.

Ocean Spray Permits (21-1753-02) Evans

Am planning on submitting the environmental checklist and shoreline permit application to Grays Harbor County by Friday, June 8.

LOTT (21-1577-07) Evans

The Hearings Examiner ruled that the SEIS was adequate and approved the shoreline permit with the conditions attached by the Olympia Planning Department.

Issaquah GWMP (55-1521-10) Jon A. Boyce

Jon Boyce is currently negotiating scope of work and budget with King County Health Department.

UW Branch Campuses EIS (55-1723-03) Betsy Gallion

Due to the stop-work situation at TDA, the schedule for the publication of the two DEIS documents has been altered. The Bothell/Woiodinville Pre-Draft and DEIS are now due on June 14th and 28th, respectively. The Tacoma Pre-Draft and DEIS are now due on June

21st and July 6th, respectively. At this point, both documents are approximately 90% complete; missing air, noise, and transportation elements for new sites; and need final editing. Jeff, Carol, Art, and Betsy will be meeting Wednesday, June 6th to coordinate these final preparation stages occurring while Betsy is on vacation.

Grant County HWM Facility EIS (55-1691-10) Betsy Gallion

Jerry Smedes has requested additional truck traffic accidents on the potential haul routes to the proposed Grant County Waste Management Facility. This request includes the 1980-1983 data to compliment the information Betsy already gave to him as well as the equivalent information for five additional potential haul routes. This information (in data format) will be provided to both the Grant County Citizen Committee as well as not URS.

Homeport Phase II (55-1586-09) John Meerscheidt

The Navy is discussing the direction of the wavetank work and they should have a "united front" pulled togather fairly soon. Don Morris has tentatively scheduled a Public Scoping meeting for July 11.

S4 EIS (35-1583-16) John Meerscheidt

WDOE didn't approve of the Affected Environment section that was submitted. WDOE felt that we should describe the elements of the Puget Sound environment that might be affected by the deposition of dredge material, rather than discuss how the environment of the disposal site might be changed. We will incorporate their suggestions and resubmit a section on either Friday (June 1) or Monday.

Olympic View SEIS (11-1600-12) Wally Zisette

We should receive comments on the preliminary draft from Sumner sometime this week. Although revisions are minimal, several sections are being added to the document. A final preliminary draft should be on its way to Kitsap County by the end of May.

City of Bellevue C&G Permits (55-1580-18) Art Campbell

Storm and Surface Water Utility will be losing yet another person in about two weeks, so more work will be coming our way.

SR12 Environmental (81-2242-03) Art Campbell

NO CHANGE

Seattle City Light FERC Recreation Study Chuck Peterson

NO CHANGE

SR 167 Corridor EIS (85-2209-03) Evans
NO CHANGE

City Waterway Environmental (21-1564-11) Art Campbell

NO CHANGE

Mason County SWMP/EIS (11-1682-02) Art Campbell

NO CHANGE

Manchester Fuel Pier (55-1568-12) John Meerscheidt

NO CHANGE

West Village EIS (85-2162-03) Pat Butler

NO CHANGE

Gas Works Park FEIS (55-1800-01) Pat Butler

NO CHANGE

SR 509 EIS (55-1631-02) Ann Dold

NO CHANGE

Spokane County SWMP/EIS (55-1768-02) Ann Dold

NO CHANGE

Union Station District Heating and Cooling (55-1842-01) Ann Dold

NO CHANGE

City of Sumner SMP Update (55-1527-22) Ann Dold

NO CHANGE

Rabanco Everett Shipping Yard (55-1625-05 tasks 03 and 04) Art Campbell

NO CHANGE

Rabanco Renton Shipping Yard (55-1625-05 task 05) Art Campbell

NO CHANGE

12. EQUAL EMPLOYMENT OPPORTUNITY

Parametrix is committed to providing employment opportunities within our affirmative action plan and agrees to abide by all federal and state laws, rules, regulations and executive orders pertaining to equal employment opportunity.

Applied Research Associates, Inc. also maintains an equal employment opportunity policy. A copy of their EEO policy follows this page. TRC is committed to providing equal employment opportunities and agrees to abide by all federal and state laws, rules, regulations, and executive orders pertaining to EEO.

APPLIED RESEARCH ASSOCIATES, INC.

POLICY AND PROCEDURE GUIDE

Title			Page 1 of 1
EQUAL EMPLOYMENT OPPORTUNITIES			
Number	Issue Date	Approval	
1	1 February 1979	J. L. Pratt	

Purpose

To set forth the basic policy with respect to Equal Employment Opportunity.

Policy

Applied Research Associates, Inc., (ARA), is an equal opportunity employer. It is the policy that all applicants for employment will be considered without regard to race, color, religion, sex, or national origin, except where sex is a bonafide occupational qualification. Such policy includes, but is not limited to, the following: employment, promotion; demotion, transfers, layoff and termination; recruitment and recruitment advertising; rates of pay and other forms of compensation; selection for training; and all company-sponsored social and recreational programs. It is further the policy that all vendors, contractors, and others doing business with ARA adhere to the principles of Equal Employment Opportunity and that they take affirmative action to ensure positive progress in such adherence.

Responsibility

It is a basic responsibility of all employees to conform to both the letter and spirit of Executive Order 11246 and all related civil rights orders and laws. It is the primary responsibility of the Personnel Manager to develop, coordinate, and monitor the Equal Employment Opportunity programs, including the Affirmative Action Plan. The appropriate records required to execute the Equal Employment Opportunity programs will be maintained.

Implementation

The policy stated above is a reaffirmation of a policy of long standing. The strengthening of this policy shall be done through the development of specific and result-oriented procedures including an appropriate grievance procedure, and through their implementation by all employees. Collectively, the procedures referred to above will constitute the Affirmative Action Plan.

These action-oriented procedures shall be developed and, prior to implementation, shall be submitted to the Principals for approval.