

**ALASKA LEGISLATURE**

**2450**

**HOUSE and SENATE FINANCE COMMITTEE FILES, 2003-2004**



**ASRC Energy Services**  
E & P Technology

**A PROPOSAL FOR  
CONCEPTUAL ENGINEERING STUDIES  
FOR AN ALASKA INITIATIVE LNG SYSTEM**

FOR:

Alaska Natural Gas Authority  
411 West 4<sup>th</sup> Avenue  
Anchorage, Alaska 99501

September 08, 2003



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## 1.0 Project Description

This project will prepare a Conceptual Engineering Study for an LNG Plant and Marine Loading Equipment for an Alaska Initiative LNG (Liquefied Natural Gas) system. The conceptual studies for the pipeline & compressor stations and the marine terminal are being handled under separate, but closely related studies.

The initial capacity of the system is to be a nominal 2 BSCFD (annual basis) with potential future expansion. The LNG Plant will and the terminal will be linked by a common, integrated communications and SCADA system to the compressor stations and North Slope processing facilities.

The objective of the conceptual Phase is to develop an optimum system configuration and location and to prepare a conceptual level (-30% to +50%) estimate for the installed cost of that configuration.

Existing Studies: Several conceptual studies have been developed by various parties in recent years. Yukon-Pacific has agreed to make their previous study available for review, but not to be copied. It is assumed that the results of simulations are available, but not the actual process simulations, economic models, or estimate back-up data.

The Alaska Natural Gas Authority has invited ASRC Energy Services (formerly Natchiq Inc.) to submit a proposal to prepare conceptual studies for the liquefaction plant and the marine loading system. This invitation was based on ASRC Energy Services experience in preparing similar studies in the past. ASRC Energy Services has agreed to submit the attached proposal. The focal point of the work will be our offices at 3900 C Street in Anchorage.

Because of their in-depth knowledge of gas processing in Alaska, ASRC Energy Services will employ key individuals from Parsons Energy & Chemicals under a sub-contract agreement. ASRC Energy Services and Parsons E&C have a long and successful history of working together on Alaska projects. Recent projects of note include: GHX-1, GHX-2, Point Thomson Gas Cycling Facility, Alaska Gas Producers Prudhoe Bay Gas Treatment Plant and the ConocoPhillips Alpine Development.



## 2.0 Deliverables List

Report on Existing Bechtel Study  
Pre-Conceptual Evaluation & Recommendation on Location & Configuration of Plant  
Screening Study on Process Options  
LNG Process Technology Selection Report  
LNG Storage Technology and Tankage Study  
LNG Loading Technology  
Communications Requirements  
Brainstorming Notes  
Process Design Basis and Premises  
Description of Facilities  
Recommended Standards & Specifications  
Block Flow Diagram  
Process Flow Diagram  
Summary of Major Compression & Drivers  
Utility Flow Diagrams  
Utility Summary and Balances  
Major Equipment List  
Export Gas Quality Control Recommendation  
Minimum Set of Codes and Standards Required  
Preliminary Location Maps  
Preliminary Plot Plans (Selected Location and Process Only)  
Preliminary Module Layouts (Selected Location and Process Only)  
Infrastructure Requirements  
~~Preliminary Process Hazards Evaluation Report (Deferred)~~  
Control System Philosophy  
~~Preliminary Procurement Plan (Deferred)~~  
Conceptual Level Cost Estimate  
Level 2 Project Schedule  
Preliminary Construction and Logistics Plan  
Constructability Plan



Not Included:

Cogeneration or Power Sales Studies

Permitting Support Activities (other than schedule allowances)



### 3.0 Work Plan

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The Conceptual Study for the Alaska LNG Plant will follow the Deliverables List. The following are descriptions of the work plan for each task. The description does not necessarily state all the required details for the given scope of work.

#### **Task 1.0 Kick-off Meeting**

ASRC and subcontractor Parsons E&C will mobilize immediately following contract award. Key activities to be accomplished during this initial "Kick Off" period include:

- Setup of office space for the team and client Representatives
- Setup of project dedicated resource requirements, including computer, phones, faxes, copy machines and furniture
- Mobilization of key personnel
- Preparation of Project Procedures
- Preparation of "Kick Off" Meeting Agenda
- Clarification of work scope and communication to all project personnel
- Definition of deliverables and communication to all project personnel
- Determination of approval needs, reporting requirements and documentation matrix
- Establish a plan to coordinate and facilitate site data and communications
- Establish a simplified Quality Assurance and Quality Control Plan

#### "Kick Off" Meeting

The "Kick Off" Meeting agenda will include as a minimum the following:

- Project Team Introduction
- Project Scope & Objectives



- Process Design Criteria, including feed stream composition and capacity

- Lessons Learned from the ANS LNG and Alaska Gas Pipeline Gas Treatment Plant (GTP) Studies

- Client Standards and Specifications

- Review of Deliverables

- Confidentiality

### **Task 2.0      Review of JPO Files & Field Trip to Valdez**

ASRC Energy Services will deploy a team of engineers to the JPO Library to review and assimilate data from the existing studies.

ASRC Energy Services will deploy a team of engineers to the alternative Valdez locations to gather background information for this study. At a minimum, the team will consist of a process engineer, a piping engineer and a civil engineer. This team should be accompanied by the Marine Consultant.

The review of existing studies and Valdez conditions will be used to prepare the "Pre-Conceptual Evaluation & Recommendation on Location & Configuration of the Plant."

Prior to deployment of any individual into any existing Alaska facilities, Parsons personnel will participate in all safety training as required by the "Authority". ASRC Energy Services Personnel are current in Alaska Safety Training. All personnel will be equipped with the appropriate safety gear and equipment.

### **Task 3.0      Establish Process Design Basis and Premises**

Most of the information for the Process Design Basis document will either be presented at the kickoff meeting by the Authority, be obtained from the site visit or become available from the review of previous studies. For example, information such as utility supply conditions, site data and special design considerations may have to be obtained during the site visit.

Process Engineers will review the process design parameters including plant capacity, feedstock composition, product specifications, battery limit



conditions, existing utility supply criteria and special design conditions for incorporation in the design basis.

#### **Task 5.0 Review Previous Work and Brainstorm For Future**

The Team will review previous conceptual engineering work, noting in particular lessons learned from ANS LNG and the Bechtel studies.

Relevant information from similar studies completed by Parsons will also be reviewed. Brainstorming is intended to produce a list of ideas that could reduce costs and improve project viability.

#### **Task 6.0 Screening Study – Select Candidate Processes**

General approach to the study is to evaluate the several technologies and reduce the number for closer evaluation. The Team will recommend elimination of any technologies early in the screening process if they contain obvious shortcomings that do not meet the Design Criteria. This approach will save time and improve the efficiency of the selection process. Technical reasons for eliminating any of the candidates will be formally documented for future reference.

With input from Licensors and Vendors, process engineers will prepare the process flow diagrams and rough heat and material balances, equipment list and utility, catalyst and chemical requirements. Key operating and design parameters for all major equipment will be specified.

Although most of the process data will come from licensors and vendors in some cases process engineers may have to do simulations to supplement or validate licensor data. Parsons process engineers have access to PRO/II, TSWEET, ASPEN PLUS, HYSIS or PROSIM and simulators specified in the design basis for this study will be used.

#### **Task 8.0 Select LNG Technology**

Various LNG technologies will be surveyed, existing studies revisited and a recommendation will be made, via inspection, primarily based on the number of commercial units currently in service worldwide. The conceptual design will then be based on information provided by selected licensor and vendors.



**Task 9.0 Select LNG Storage Technology and Prepare Tankage Study**

Various Storage Options will be evaluated. A Tankage Study will be prepared with a recommendation for the type of storage, total storage capacity, tank size and tank location. This study will rely heavily on input from the Marine Terminal consultant and the selection of marine tankers.

**Task 10.0 Select LNG Loading Technology**

The team will review current technology for LNG loading systems and prepare a recommendation for the design basis.

**Task 11.0 Define Communication Requirements**

The communications engineer will determine communication requirements which include telephone, intercom/paging, computer data network, closed circuit television and radio.

**Task 12.0 Complete Process Design for Selected Process**

Following the final selection of LNG technology, the process engineers will finalize the process design. Preparation of final documents will include process description, heat and material balances, process flow diagrams, utility flow diagrams, utility summary and balances. Compression and driver requirements will be summarized and issued to disciplines for evaluation of potential equipment. The control system philosophy will be prepared including a recommendation for export gas quality control strategy.

**Task 13.0 Make High-Level Recommendation on Standards and Specifications**

A recommended listing of applicable specifications will be prepared based on Alaska industry experience.

**Task 14.0 Prepare Preliminary Plot Plan and Module Layout Drawings**

Process Engineers will provide input for the development of preliminary plot plan by Mechanical Process and Piping. The input will be based on in-

formation provided by licensors and vendors and review of previous studies.

#### **Task 15.0 Prepare Infrastructure Requirements**

Architecture, Civil and Structural will determine the roads, storage, offices, warehouses, maintenance buildings, living quarters required for the ~~GTP~~ and LNG facilities.

#### **Task 16.0 Prepare Preliminary Process Hazards Evaluation**

~~A Preliminary Hazards Evaluation (PHE) will be prepared for the facilities in accordance with guidelines in the process design basis. The PHE will be performed after the detail design review of the Process deliverables is complete and all comments from the review have been incorporated.~~

~~ASRC Energy Services will provide meeting facilities, the team leader and scribe, technical personnel representing process technology and engineering, and will provide drawings and back-up calculations as needed.~~

The Process Hazards Evaluation has been deferred to the FEED Phase.

#### **Task 17.0 Prepare Preliminary Procurement Plan**

A preliminary procurement plan will be prepared for the selected ~~GTP~~ and LNG processes.

#### **Task 18.0 Prepare Operations, Maintenance & Start-up Strategy**

~~A startup strategy will be developed based on Parsons E&C experience and input from Client operating personnel. Parsons E&C and AES will supplement the development with in-house documentation from previously completed similar projects.~~

The Operations, Maintenance & Start-Up Strategy has been deferred to the FEED Phase.



**Task 19.0 Prepare Preliminary Construction Plan**

A preliminary construction plan will be prepared by construction and logistics personnel and will recommend the possible range of module sizes based on fabrication sites, logistics and bathymetry. Engineering and construction will review the requirements for site development including what and when additional buildings, utilities, roads are required to support the construction activities. Construction will review potential fabrication sites. Piping will determine the optimum module size based on layout requirements. Our objective will be to put as much of the plant outdoors as possible to reduce cost.

**Task 20.0 Prepare Conceptual Level Capital Cost Estimates**

Conceptual level capital cost estimates (-30% to +50%) will be prepared for the selected cases.

**Task 21.0 Prepare Level 2 Project Schedule and Capital Expenditure Schedule**

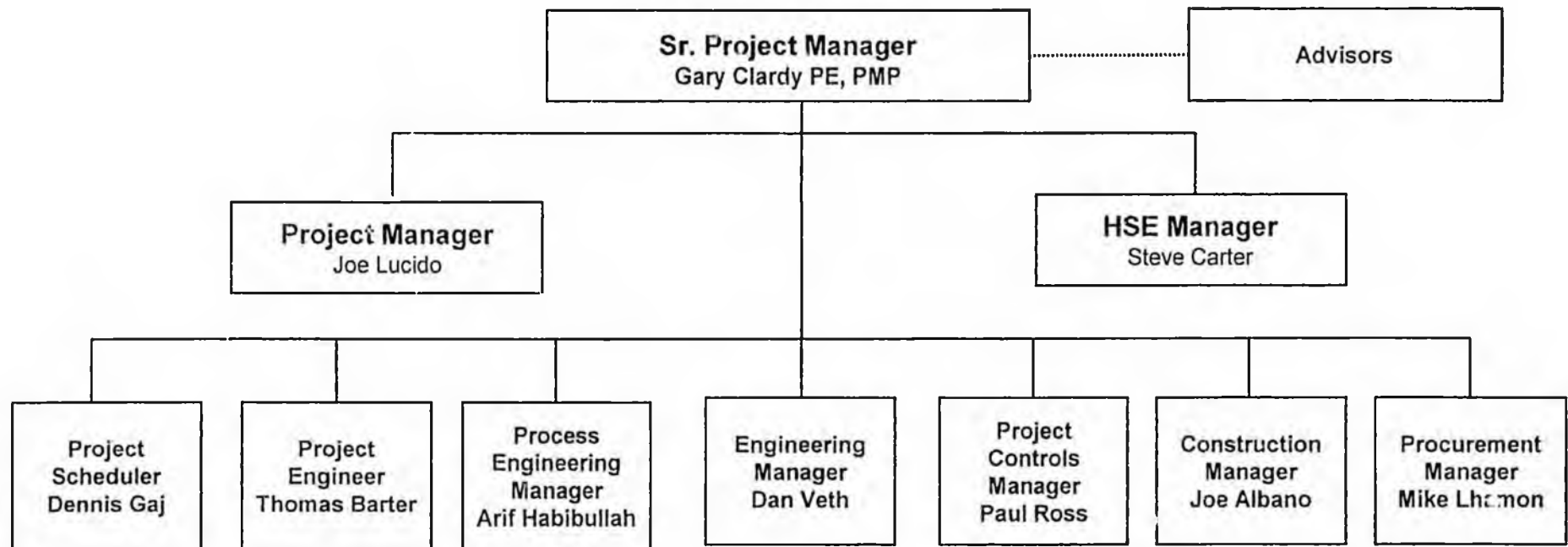
A Level 2 project schedule and capital expenditure forecast will be prepared.

**Task 22.0 Prepare Final Project Report**

A final report that will be prepared to present the results of the study and will contain the deliverables listed. This final report will also include any associated backup documents that are required to verify the conclusions and recommendations.

# Alaska LNG Plant Conceptual Study

## Engineering Services Organization



Note:  
See Section 5.0 for Resumes of Key Personnel



**5.0 Key Personnel**

The following Key Personnel have been nominated for the work. Their resumes are attached. Other professional personnel will be utilized as appropriate for a given work task.

<u>Name</u>	<u>Project Function</u>
Gary Clardy	Sr. Project Manager
Joe Lucido	Project Manager
Steve Carter	Safety
Dennis Gaj	Scheduler
Thomas Barter	Project Engineer
Arif Habibullah	Lead Process Engineer
Dan Veth	Engineering Manager
Paul Ross	Project Controls Manager
Joe Albano	Construction
Mike Lhamon	Procurement

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## Summary

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Approximately thirty years of Project Management experience of oil and gas related projects. Projects varying in value from \$20 million to over \$800 million dollars. These projects include LNG Plants, NGL Plants, marine facilities, oil and gas processing facilities, terminals, pipelines, and petroleum processing plants. Experience has included all facets of engineering, procurement, construction, start-up and turn-over.

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## Experience

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- 2001 - Currently      **General Manager, ASRC Energy Services, Anchorage, Alaska**  
General Manager of Facilities Engineering and Project Management of the Natchiq Companies, the largest oil field services company in Alaska.
- 1999 - 2000      **Project Manager, ASRC Parsons Engineering, LLC, Anchorage, Alaska**  
Engineering and Project Management for LLC combining the resources of Parsons Energy & Chemicals with Alaska's Natchiq Companies. APEL provided approximately 100 professional engineering, procurement and project management staff to the Alaska oil and gas industry.
- 1998      **Project Manager, ASRC Parsons Engineering, LLC, Anchorage, Alaska**  
Responsible for Design, Procurement and Construction Supervision for Central Facilities Pad for the ARCO Alpine Crude Production Project, North Slope, Alaska.
- 1988 - 1997      **Sr. Operations Engineer, Saudi Aramco, Dhahran, Saudi Arabia**  
Developed economic studies and capital program for modernization of all Saudi Arabian Government refined-products distribution facilities; a one billion-dollar program of multi-product pipelines, state of the art terminals and control systems. Prepared detailed studies with Williams Pipelines on assignment in Tulsa, Oklahoma. Prepared plant and multi-product pipeline prototype designs with SNC-Lavalin in Calgary, Alberta. Took to Central Province of Saudi Arabia for installation and start-up by Saipam.
- Project Manager, Senior Company Representative for reimbursable engineering and procurement contact with Parsons Engineering, Pasadena, California. Design, Procurement and Contract Development for major crude expansion and water injection program. Included gas-oil separation plants, seawater injection plant, crude, sour gas and high-pressure seawater injection pipelines; Peaked at 800 personnel. Specialist in Oil and Gas Separation Plants for wet-sour crude and sour gas recovery. TIC in excess of \$1 billion.
- Project Controls manager, supervised Lump Sum Turn Key Contract for design and construction of marine crude oil export facility with Snamprogetti in Milan, Italy. Included crude pipeline, ballast transfer lines and control and safety systems. TIC approximately \$800 million.

- 1987 - 1988      **Construction Manager, Fluor-Daniels, Jeddah, Saudi Arabia**  
Responsible for construction of utility systems supporting a university teaching hospital, including central utilities plant with 24,000 tons refrigeration, water and sewage treatment systems and major underground utility system. Korean contractor peaked at 5,000 personnel.
- 1976 - 1985      **Project Manager, Arabian American Oil Company, Dhahran, Saudi Arabia**  
Responsible for design, procurement and construction of pipelines, control and operation centers, LPG processing, firewater systems, pump stations, tankage, and marine facilities. Managed an organization of 45 engineers, planners/schedulers, cost engineering and construction personnel.
- 1974 - 1976      **Senior Design Engineer, Lockwood Green Engineers, Atlanta, Georgia**  
Supervised design of industrial piping, HVAC, plumbing, fire protection and process refrigeration for pharmaceuticals, textiles, steel mills and nuclear power plant.

## Education

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- ◆ MBA (Finance/Economics) - Georgia State University
- ◆ BS Mechanical Engineering - University of Alabama

## Registrations/Affiliations

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- ◆ Professional Mechanical Engineer, State of Georgia
- ◆ Professional Mechanical Engineer, State of Alaska
- ◆ Project Management Professional, Project Management Institute



Resume

## Summary

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Over 30 years of experience related to project management, engineering, and construction management of projects in the oil/gas, refinery, and gas utility industries. Project assignments have included the responsibility for overseeing project development, feasibility studies, preparation of schedules and cost estimates, engineering design, procurement and award of construction contracts. This experience is complemented by involvement with facility operating groups and managing technical staff responsible for environmental and permitting activities.

Specific project management experience includes gas handling, gas-lift, water-flood, and enhanced oil recovery projects.

## Experience

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1997 - Present

### Principal Project Manager

- Responsible for preparation of conceptual design deliverables for the ExxonMobil Point Thomson Project. The conceptual design involved evaluating various development options and identifying a selected case with design basis, process design, modular layout, equipment list, logistics plan, project schedule and cost estimate.
- Responsible for preparation of a confidential modular/logistics studies for oil and gas projects in an arctic environment. The studies involved alternate plant layouts, construction and logistics plan, FPC schedule and total installed cost estimated.

1996 - 1997

### Principal Project Manager

Responsible for preparation of a preliminary design basis and cost estimate for an Enhanced Oil Recovery (EOR) Project to be installed at the Endicott Production Facility for British Petroleum Exploration, Alaska. This EOR Project includes a turbine driven centrifugal compressor to supply 45-MMscfd of miscible fluid to be injected into the reservoir, related process/control systems and a pipeline/distribution system. The turbine/compressor and control room will be housed in an arctic enclosure and the remaining equipment located on an open skid.

1996

### Principal Project Manager

Responsible for preparation of a Technical and Cost Comparison Study for a Crude Oil Pipeline in Northern Russia for Conoco Arctic Incorporated. This study was performed with Tri Ocean and involved a 20" diameter, 154-kilometer pipeline to supply 180,000 BBL/day of crude oil. The study compared the design and construction of a buried pipeline in various permafrost conditions and an above ground piping system on vertical support members. The study included the economics of a crude cooling facility using the fit for purpose philosophy.

1993

### Principal Project Manager

Responsible for engineering, procurement, and construction management for modifications required at the Exxon Benicia Refinery for Exxon USA. This project involved installation of process equipment and related facilities to expand the existing refinery capacity to meet new regulations.



**Resume**

1992 - 1993

**Principal Project Manager**

Responsible for engineering, procurement, and construction support for a project to expand the gas handling capacity for the Central Gas Facility in Prudhoe Bay, Alaska for Atlantic Richfield Company (ARCO). This project involved the construction of oil/gas facilities housed in buildings transported by barge to Alaska and modifications to existing facilities.

1991 - 1992

**Principal Project Manager**

Responsible for a feasibility study of an Arctic offshore oil and gas production platform and underwater pipeline for Amerada Hess. Project involved conceptual design, environmental assessment, execution plan, logistics, schedule and cost estimate for these facilities.

**Other Experience**

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1988 - 1991

**Project Manager**

Responsible for managing engineering design, procurement, and construction activities for projects in support of the natural gas industry and related energy facilities for Pacific Gas and Electric Company, Southwest Gas Corporation, and Stanford University.

1986 - 1988

**Project Manager**

Responsible for design and construction for modifications and additions to refinery and manufacturing facilities for Exxon, Tosco, Pacific Refining, Chemical Waste Management, and Clorox Company.

1986

**Manager Environmental/Regulatory Affairs**

Responsible for managing the activities of an environmental and permitting group in support Alaskan operations and projects. Duties included supervising technical staff, developing operating and project budgets, preparing staffing plans and providing key interface with state agencies on environmental and permitting issues.

1978 - 1986


**Project Manager**

Responsible for planning and managing oil and gas production projects for Prudhoe Bay, Alaska, including Well Pad Manifolding (five phases of projects), gas lift, water flood, and general oil and gas projects. Organized and directed technical staff in the preparation of project scope documents, schedules, budgets and engineering/construction contracts.

1969 - 1978

**Mechanical Engineer**

Assigned to Shell's Martinez, California, manufacturing facility, responsible for design, construction and startup of numerous process projects.



Resume

### Education & Professional Affiliations

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- BS, Mechanical Engineering, University of Santa Clara, 1969
- Registered Professional Engineer, California (M02549)



## Resume

### Summary

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Twenty-five years of experience in Project Quality Assurance, Quality Control and Construction Quality Management. Supervision of quality personnel in the manufacturing, engineering and construction fields.

Responsible for Safety Management, office and field for the Parsons E & C.

Previous experience applicable to Point Thomson Project:

Oil field and pipeline construction quality manager

Oilfield start-up team member (Endicott Alaska)

Operator of oil/gas production, separation, injection and pipelines facilities

Member of British Petroleum Drilling department (Houston)

Member of Emergency Response, Fire and Emergency Medical teams (BP Endicott)

Member of PE&C project team for North Slope Gas Treatment Plant and Point Thomson study team

Attended well control training class utilizing drill rig simulator

### Experience

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1997 - Present

#### Manager of Quality Assurance

Responsible for the Arcadia, CA office, Quality Assurance organization, project QA/QC programs, regional field surveyors, QA and Safety programs. Provide assist to the PE&C Vice President of QA in the establishing and implementation of corporate QA, Safety and QC programs. Directly responsible for the quality program of Alaska Gas Treatment Plant (North American Natural Gas Pipeline Group), BP Boqueron, Ibn Zahr PPII, and Petrokemya Olefins Projects. Provide assistance to Business Development with QA/QC input to proposals, interface with alliance partners regarding QA/QC programs, assist with ASME code certification program for Parson's Constructors Inc. Provide QA and QC personnel and supervision to Parsons Infrastructure and Technology division. Member of CII committees representing PE&C.

1993 - 1997

#### Senior Manager, Supplier Quality Surveillance

Responsible for the Irvine, California Office, Supplier Quality Surveillance organization and member of corporate SQS management group. Directly responsible for the SQS programs on major project with Shell Oil - Thailand Refinery, UNOCAL Geothermal - Indonesia, ARCO Refinery - Los Angeles and various power projects.

Equipment for these projects included major turbine and compressor packages, large motor driven vertical and horizontal pump packages, large cast valves, various smaller pump orders, piping fabrication and structural steel. Establish inspection program for review and monitoring of production, welding, weld repair and NDE of equipment castings and forgings.

1979 - 1993

#### Quality Assurance/Quality Control Manager

- Alaska Projects - Established and managed QC Program for the Gas Handling Expansion Project (GHX-2), ARCO, BP, EXXON partners.



## Resume

Equipment for this project included major turbine and compressor packages, piping fabrication, structural steel, separation and treating equipment, large cast valves and various pump orders. Establish inspection program for review and monitoring of production, welding, weld repair and NDE of equipment and materials.

- **QA/QC Manager - Drilling Department, Houston, Texas.** Managed QA and QC Programs for Drilling and Offshore Production facilities/equipment. Also supported Alaska, North Sea, US and worldwide drilling operations. Inspection of large high-pressure drilling and well control equipment and high pressure production valving components. Equipment installed in offshore, onshore and subsea facilities. Welding inspection of heavy fabrication, offshore platform components and pipelines.
- **Start-up and Operations Technician - BP Alaska, North Slope – Endicott.** Member of construction and startup team for the Endicott Oil Field facilities. Startup and operations technician for oil and gas separation equipment, turbine driven seawater injection pump units, electric motor driven pipeline pump units and turbine driven gas compressor units.
- **Project Quality Engineer - Prudhoe Bay Projects.** Member of client team at various EP&C contractor offices for various North Slope of Alaska production, separation, re-injection and shipping facility projects. Inspection programs were established and managed for all types of major equipment associated with these type facilities. Worked closely with technical discipline engineers for welding/NDE, metallurgy and rotating equipment.
- **Senior Inspector - British Petroleum.** Performed and monitored inspection activities at various oil field, production and chemical plant equipment suppliers facilities. Heavy concentration on drilling and well control equipment. Extensive inspection activities at foundries and forging facilities. At casting facilities conducted monitoring of pattern, melt, pour, shake-out, heat treatment, finishing, NDE and mechanical testing of cast components.

1973- 1978

### Shop Inspector and NDE Technician

Performed duties of Shop Inspector and NDE Technician in an ASME Code authorized fabrication facility. Monitored materials, forming, machining, welding, testing, hydro and maintained documentation requirements. Certain components were manufactured from large castings that required RT, PT and MT inspections. NDE Experience - Three years experience as NDE Technician, ASNT certified technician in RT, UT, MT, PT and Eddy Current. Further certified for RT film interpretation and re-certified for UT, PT and MT with Lawrence Allison Company.

## Education & Professional Affiliations

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Spartan School of Aeronautics, Technical Program  
Pressure Vessel and Piping System Design Courses at UCLA  
BS Business Administration, University of Redlands, CA  
Oil & Gas Production training  
Well Control training with drill rig simulator  
ISO Lead Auditor Training  
Certified Welding Inspector

Construction Industry Institute (CII) Committee Chairman, Implementation Update Team, Member CII Knowledge Committee



## Resume

### Summary

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More than twenty years experience as a project controls specialist. Industry experience includes energy, infrastructure and government. Scheduling software includes Primavera Project Planner (since 1986), Suretrak Project Planner (licensee, since 1991) and MS Project. Microsoft Office suite of programs - Excel, Power Point and Word. Some knowledge of Access. Speak and understand Spanish.

### Experience

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2000 - Present

#### Senior Project Controls Specialist

Currently assigned to a conceptual study of a gas treating plant on the North Slope of Alaska. Project is composed of 44 tasks, which are divided into three work orders. Client's strategy is to complete the work orders sequentially and within very tight time limits. So far, all milestones have been met and the project is under budget. Currently, developing an overall EPC schedule, along with manpower and cash flow curves. This information will be:

- Phillips Alaska Inc., Alpine Field Development (North Slope of Alaska) - Home office project control specialist for the Alpine Drill Site (CD-2) project. Successfully met very aggressive schedule and cost targets.
- Alaska North Slope LNG Project (Study) - Project controls specialist for the gas treating plant (GTP) portion of this project. Participated in the development of an integrated critical path schedule for the total program. Wrote the project execution plan for the final report.

1997 - 1999

#### Project Controls Representative

Petrokemya Olefins III Project (1998-1999) a major chemical plant constructed in Saudi Arabia. Developed and integrated the initial construction schedule into the Level 3 engineering and procurement schedule. Used critical path analysis to resolve bottlenecks. Also, developed preliminary manpower curves for construction.

Next, relocated to Mexico City to manage Petrokemya design work subcontracted to Bufete Industrial - a large Mexican E&C contractor. Primary responsibility was cost and schedule oversight - with an emphasis on the accuracy of progress data and the adherence to project schedules and milestones. Analyzed Bufete's monthly schedule update for conformance to project schedules and milestones. The result was transmitted to Pasadena for inclusion in the overall monthly report. Other responsibilities included review of change requests; review and approval of invoices; and the preparation and maintenance of all cost/schedule reports.

Onshore Gas Development (OGD) II Project (1997) Part of a consulting team contracted by the Abu Dhabi National Oil Company (ADNOC) to assist in the selection of a LSTK EP&C contractor for their OGD II project. Reviewed contractor bid submittals, developed relative contractor ratings and justifications, participated in bid review meetings with prospective contractors and recommended the winner. Work was accomplished in Abu Dhabi, UAE.

1995 - 1997

#### Senior Project Controls Specialist

Uthmaniyah Gas Plant Expansion Project (1996-1997) - LSTK EP&C program for Saudi Aramco. Integrated Parsons E&P schedule with our construction subcontractor's schedule. Used CPM analysis to identify potential bottlenecks and advised project management on their elimination. Hurricane



## Resume

1990 - 1995

Recovery Managers (HRM) (Parsons/Brown & Root JV) (1996) HRM was contracted by the government of the US Virgin Islands to manage the reconstruction of public and private facilities damaged or destroyed by hurricane Marilyn in September 1995. Cost/schedule oversight of contractors rebuilding the public schools on St. Thomas, USVI.

Shaybah Facilities Project (1995-1996)- Front end engineering design and award of LSTK EP&C contracts for a large oil field development project for Saudi Aramco. Developed preliminary construction plans and participated in a study to shorten the project end date by one year.

### Planning Scheduling Section Manager

Primary responsibility was personnel administration - including recruiting, project staffing, training and development, salary administration, EEO compliance, and terminations. At peak, the section head count was approximately 50 professionals, located in the home office and around the world.

Provided scheduling support for proposals and projects not requiring full time scheduling support. Representative projects include major paid studies for development of the Soviet arctic; the An As-building Program for Alyeska Pipeline Services Co.; the National Ignition Facility (NIF) for the U.S. Dept. of Energy; the Laser Interferometer Gravitational Wave Observatory (LIGO) for the National Science Foundation; and other national and international projects.

Researched and wrote a report to management on the adequacy of the planning and scheduling procedures used on the Los Angeles Metro Red Line project. Also, assembled and led a task force to review and revise Parsons' Corporate planning and scheduling procedures.

Assisted the US Department of Energy in recommending revisions to their Cost/Schedule Control System Criteria (C/SCSC). This later evolved into the Earned Value Management System (EVMS).

1987 - 1990

### Project Controls Manager

Project Controls Manager on a proprietary project executed for a confidential client. Project controls activities were established and conducted in accordance with US Government's Other duties included the monitoring and reporting of construction subcontractor progress; preparation of contract scope changes and their negotiation; and participation in monthly contractor progress reviews.

Prior to 1987

### Lead Planner/Scheduler

Lead planner/scheduler on a number of petrochemical projects. Notable projects include: field planner/scheduler on the first increments of Arco's North Slope Project at Prudhoe Bay Alaska; lead scheduler on British Petroleum's Endicott Facilities Project, also on the North Slope. Lead planner/scheduler on a grass roots refinery for Shell Oil at Jubail, Saudi Arabia. Planner/scheduler scheduler on a number of small EP&C projects in the Sulfur Projects Group.

## Education & Professional Affiliations

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BS, Operations Management (1972), California State University, Northridge, CA.

## Resume

### Summary

Twenty years experience in the Architectural, Structural, and Civil Engineering field. Experience includes industrial and commercial design projects performing structural analysis, UBC code evaluations, inspections, design and construction coordination of working drawings with multi-discipline Design Engineers and Architects

### Experience

May 2001 to Present

Principal/Structural Engineer, ASRC Energy Services

Project Manager for Point Thomson Front End Engineering and Design (FEED) phase of the project. Managed two sub-contracts to Parsons E & C of Arcadia, CA. Provided design services for the wastewater treatment plant and the potable water treatment plant, finalized studies developed during the pre-feed phase of the project. Developed the project construction, logistics and regulatory plan and the constructability program used during the EPCm phase.

Manager for the Millennium Test Separator Module detailed design documents and construction field support. This was a multi discipline fast track design and construction project of a mobile well test separator module to be contracted out at Prudhoe Bay Alaska. Deliverables included scope definition and initiation, project budget and interface of all disciplines to meet client requirements.

Principal Engineer for Alaska Gas Producers Gas Treatment Plant conceptual design development project. Worked as an integrated team member with Parsons Energy and Chemical Group in Arcadia, CA providing North Slope Field Facility surveys into the development of the concept design. Reviewed all concept studies and provided input into the final selection of existing North Slope facilities integration into the Gas Treatment Plant design at Prudhoe Bay.

May 1997-May 2001

Senior Principal Structural Engineer, ASRC Parsons Engineering, LLC.

Primary duties are to provide turnkey Architectural / Civil / Structural Engineering design services within the APEL Organizational Matrix as a part of an Alliance responsible for executions of respective scopes, schedules and budgets for the development of the Phillips Alaska Alpine Oilfield. Responsibilities during this project were as follows:

- Relocated to Calgary Alberta, Tri-Ocean Engineering as Alaska Principal Lead Structural Engineer on all Process Facility Modules for the Alpine field.
- Provided Field construction support for the construction of Oil train modules constructed in Nikiski, Alaska for the 1999 Sealift.
- Project Engineer for Alpine Camp infrastructure design and construction.
- Provided North slope Engineering support in the field for installation and start up of the facility.
- Project Manager / Engineer for Alpine Water and Waste Water Design and construction.

Dec. 1996-May 1997

Architectural/Civil/Structural Engineer, VECO Engineering Co.

Design documents for site design, foundation design, architectural facility relationships, and specifications for five steel pre-engineered insulated panel facilities for Alyeska Pipeline.

1988-1997

Civil/Structural Engineer, Fluor Daniel, Inc.

Design Civil / Architectural Engineer for NISC, Alaska Region completing project management and design IFB documents for various FAA airport facilities throughout the State of Alaska. Project management of construction for IFB design projects completed for various airport facilities in the arctic

## Resume

and sub-arctic regions of Alaska. Lead Structural Engineer on GHX-2 Modules Construction Project, New Iberia, Louisiana. Inspected and approved field design changes in structural/architectural construction. Completed material requisitions for field modifications and changes. Appointed as Load-out Engineer for all modules being barged to Alaska on the 92/93 Sealift. Assigned to Kuparuk on North Slope to complete structural analysis and design/inspection work on all facilities as problems were identified. Civil design work for the East SAG Regional Disposal Facility, using D.C. A. civil engineering design software to create a 3D computer module of the proposed site. Developed methods to quantify drilling wastes at five drill sites at Prudhoe Bay, Alaska. Designed valve access platforms and walkways on existing pipelines for 41 locations throughout the Kuparuk Oil field. Responsible for completing analysis/drafting of fabrication drawings, and coordination of fast track completion of project with contractors. Worked for Alyeska Pipeline Service Company, senior structural design on large storage platform addition in existing facility and two pipeline metering equipment modules in Valdez, Alaska. Work for ARCO Alaska, Inc. consisted of senior structural and civil design work on a seawater intake weir system and overhead crane system at the Kuparuk Oil Field.

1987-1988

Quality Control Representative, RG&B Contractors, Inc.

Responsible for material quality, construction techniques and acceptance of finished product for compliance to the Corp. of Engineers at Elmendorf, AFB, Alaska. Assisted the project managers in the mobilization and administration of several projects. Obtained and processed all material products submittals and coordinated with all subcontractors to insure compliance to requirements.

1984-1987

Structural Designer/Draftsman, Anderson-Bjornstad-Kane-Jacobs, Inc.

Involved on a number of projects from design and development to completion of working drawings. These included construction with steel, reinforced concrete and wood. Responsible for design analysis of complete projects and various elements of more complex projects. Drafted details and plans for two prototype high schools, a student nutrition center, elementary school remodel and a convenience store.

## Education

Bachelor of Science, Civil Engineering, Texas Tech University, 1984  
Bachelor of Architecture, Texas Tech University, 1984  
NCARB Certified for Architectural Exam  
PMP Prep Course Exam, May 2003  
AIA, Northern Design Course, University of Alaska Anchorage

## Registrations/Affiliations

Professional Engineer - Civil - Alaska (CE8054)  
Member - American Institute of Architects  
Member Project Management Institute, PMP  
Completed National Council of Architectural Registration Board Intern Develop Program

**Resume**

**Summary**

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Over 25 years of process design experience in the fields of Oil and Gas Production, Gas Processing, LNG and Petroleum Refining. Responsible for managing the Process Department, involved with technology projects, including Technology Advisory roles, specifically in the areas of Oil and Gas. Design experience includes conceptual design, feasibility studies, process design and detail engineering and plant commissioning and start-up assistance.

**Experience**

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1999 - Present

**Senior Technical Director and Manager, Process Technology**

- Responsible for managing the Process Department and supporting Business Development. Also responsible for leading technology projects and/or feasibility/conceptual studies.
- Process Manager & Lead Engineer for the Gas Flow Station (GFS) Study for the Prudhoe Bay Unit, Alaska North Slope. The study involves evaluation of turboexpander schemes followed by cryogenic fractionation for CO<sub>2</sub> removal. The facilities will be designed to process 6Bscfd to produce pipeline specification gas at an inlet pressure of 2500psig. Other units include low temperature separation, molesieve dehydration, MDEA for acid gas removal from off-gas and TEG dehydration.
- Process Manager & Lead Process Engineer for a feasibility study of the Gas Treatment Plant for the Alaska North Slope Pipeline Project for Alaska Gas Producers, BP PLC, Phillips Petroleum Co., and ExxonMobil. This technology selection study involves the evaluation of several competing technologies to deliver 4.8BSCFD of ANS natural gas to the Lower 48. Responsible for technology evaluation and selection and overall process design for acid gas removal, sales gas dehydration, compression and chilling, acid gas dehydration and re-injection. Technologies evaluated included several physical, chemical and hybrid solvents, cryogenic fractionation, membranes, and mole sieves and TEG for dehydration.
- Technology Advisor for the Point Thomson Gas Cycling Project for ExxonMobil. The project involves condensate recovery and re-injection of 1BSCFD of gas from a gas/condensate reservoir located on the North Slope about sixty miles east of Prudhoe Bay. Technology selection involves separation, stabilization, dehydration and compression.
- Process Manager and Lead Engineer of a conceptual study for the Alaska North Slope (ANS) LNG Project, for ARCO Alaska, Inc. This Stage 1 Study involved evaluation of technologies to commercialize 1.9BSCFD of Prudhoe Bay gas via LNG production. The project consists of gas treating at the ANS and transportation of the gas via buried pipeline to an ice-free port 800 miles to the south, for delivery to a proposed LNG plant at Nikiski. Responsible for technology selection and overall process design for acid gas removal, benzene and heavy hydrocarbon removal, dehydration, sales gas chilling and mercury removal. Technologies evaluated included activated MDEA, Ryan-Holmes, Ipexol, Selexol, membrane technologies, TEG dehydration, molesieves & expanders. Also specified all utilities & offsites for the facility.

1997 - 1999

**Technical Director and Manager of Process Engineering**

- Process Manager, responsible for administration of Process personnel. Responsible for overseeing the process design and issues related to technical content of the process deliverables for various projects.



## Resume

1991 - 1997

- Technical Advisor for GC-15 Gas Gathering Project for Kuwait Oil Company, to increase capacity from 280 to 380-MBOPD.

### Chief Process Engineer

- Led the process design and FEED package for two grassroots gas gathering centers GC-27, 190,000BPD, 100MMSCFD and GC-28, 220,000BPD, 170MMSCFD, for Kuwait Oil Company. Scope involved multi-phase separation, dehydration/desalting and compression. Subsequently involved in supervision of the LSTK contractor in Beijing, China.
- Led the feasibility study, technology selection and conceptual design and subsequent development of a FEED package for a 250,000BPD grassroots gas gathering center, GC-25, for Kuwait Oil Company. Technology selection studies involved 3-phase separation, dehydration, compression and waste-water treatment.
- Led the conceptual study and development of FEED package for a 500,000BWPD sea water injection project, for Kuwait Oil Company. Involved with technology selection for seawater clarification/filtration, deaeration, multi-media filtration and subsequent water injection at 4000psi.
- FEED package for the 600,000 BPD Shaybah Development program for Saudi Aramco. Process studies of separation, dehydration, desalting, compression & water disposal. Design of crude stabilization facilities at Abqaiq.
- Process design of a 60,000-bpd gas oil hydrotreater FEED package for Hanwha Energy Co., Ltd..
- Led a process team for a conceptual study of a 60,000BPD crude unit revamp project for SIR, Abidjan, Ivory Coast.
- Feasibility study and front-end process design of a 180,000-bpd grass-roots refinery for Asia Pacific Refining, Malaysia. Process design of open-art units (crude unit & sats gas plant) and licensor evaluation and selection for gas oil & kero hydrotreaters.
- Led a feasibility study for evaluation of world competing technologies for Novoil Export Refinery Revamp Project in Ufa, Russia. Process units included crude & vacuum, naphtha hydrotreater, C5/C6 Isomerization, diesel hydrotreater and utilities.
- Led a process team for various projects related to reformulated gasoline for meeting the Clean Air Act and CARB requirements at Shell Oil Company's west coast refineries at Martinez, California and Anacortes, Washington. Extensive modifications to existing naphtha hydrotreaters, catalytic reformers for meeting benzene and aromatic reduction, a grass-roots C5/C6 Isomerization unit and a process study of the Martinez Sats Gas plant. Column configuration studies and design of new fractionation facilities.

1983 - 1991

### Supervising Process Engineer

Led the process design of a wide variety of refinery projects including a crude and coker revamp for ARCO Los Angeles Refinery, cat reformer revamp for Golden West Refining, California, and a MTBE plant for ARCO Chemical Company. Also a wide variety of revamp projects for Shell Oil Company, Martinez, California, including crude and vacuum units, Hydrotreaters, cat cracking and flexicoking.



## Resume

1979 - 1983

### Senior Process Engineer

Front-end process design packages for two hydrocrackers for Union Oil, 200,000-bpd crude unit expansion project for Pertamina Cilacap Refinery, Indonesia, front-end process package for an LLDPE (Unipol) facility for Union Carbide, Canada. Turboexpander revamp project for Coastal States, San Antonio, Tx.

1974 - 1979

### Process Engineer

Process design of several baseload LNG plants using Air Products MCR<sup>®</sup> process cycle, and participated in startup. Projects included: Lightends fractionation, dehydration and refrigeration for ADNOC, Das Island LNG project, Abu Dhabi. Acid gas removal and propane refrigeration for Arun LNG project, and Badak LNG projects for Pertamina, Indonesia.

Other miscellaneous process design experience includes turbo-expander plants, sour water strippers and vapor recovery systems.

## Education & Professional Affiliations

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- o MS, Chemical Engineering, California State Polytechnic University, Pomona, California
- o BS, Chemical Engineering, Diploma in Industrial Studies, Loughborough University of Technology, United Kingdom
- o Registered Professional Engineer (CH 3804), California
- o Member of AIChE

## Recent Publications

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- Arctic Gas Plant Design- A Unique Challenge, paper presented at the 82th Annual Convention of the Gas Processors Assoc., San Antonio, TX, April, 2003
- CO2 Removal Technologies for Alaska LNG, paper at the at the 81st Annual Convention of the Gas Processors Assoc., Dallas, TX, March 3, 2002
- Gas Processing Technologies for Alaska LNG, presented at AIChE Spring National Meeting, April 22-26, 2001, Houston, TX
- Cost Reduction Ideas for LNG Terminals, 78th Annual Convention of the Gas Processors Assoc., Nashville, TN, March 3, 1999
- Designing LNG Terminals for Safety, Petroleum Technology Quarterly, Spring 1999 issue
- Reduction of LNG Terminal Costs, Petroleum Technology Quarterly, Winter 1998/99
- Crude Vacuum Design Optimization, Refinery Modifications for Producing Reformulated Gasoline, Petrotech 98, Bahrain, Sept. 1998
- Revamping Crude Units to Increase Capacity, Petroleum Technology Quarterly, Summer 1998
- Trends in Column Internals for Refinery Revamp Projects, 1997 AIChE Meeting, Los Angeles, California, Nov. 16-21, 1997
- Clean Fuel's Impact on Refinery Distillation, Crude Vacuum Distillation: Wet, Dry or Damp, 1997, Maastricht, Holland, Sept. 6-8, 1997



Resume

## Summary

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Practical, systems-oriented Rotating Equipment Engineer with extensive experience in the application, modification, maintenance, repair and operation of rotating equipment in petroleum production service, especially gas-turbine-driven compressor trains. Strengths include problem solving, performance evaluation, maintenance planning, and capital project support. Works effectively with maintenance and operations technicians, vendors and consultants to resolve and prevent equipment problems and to achieve goals for plant performance and budget.

## Experience/Accomplishments

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- Lead \$100 million project to increase the capacity of a gas compression plant which entailed in-situ upgrade of 13 GE Frame V gas turbines and driven compressors, effectively "installing" 130,000 additional horsepower, while maintaining plant operation.
- Lead technical/commercial/legal investigation of failure of GE Frame V gas turbine, quickly returning the unit to service and then obtaining a 50% participation by the manufacturer in engine replacement costs.
- Commissioned four GE Frame 6 gas-turbine-driven compressor trains – the first mechanical drive application for the Frame 6 single-shaft gas turbine engine.
- Lead project engineering, procurement, field construction and start-up of a \$130 million project to upgrade a gas conditioning and injection plant for a processing capacity increase of a 500 MMSCFD. Project included upgrades to ten turbine/compressor trains and two refrigeration trains as well as the addition of a pipeline booster compressor train.
- Coordinated the surveillance and maintenance program for a fleet of Rolls Royce RB211 gas turbines in gas compression service, coordinating repairs and failure analyses at off-site repair depots, and working with operations to lengthen engine run-times and move from break-down maintenance to preventive maintenance.
- Designed and implemented a Management of Change procedure and work process which met legal and company mandates and improved design control and documentation of facility modifications, enhancing reliability, safety and maintainability.

## Professional Experience

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1988 – 2001

ARCO/BP (Venezuela, California, Alaska)

- QA/Pre-commissioning Manager
- Supervisor, Engineering & Construction
- Senior Rotating Equipment & Plant Engineer
- Senior Project Engineer



## Resume

1978 - 1988

### Exxon (California, Texas)

- Staff Engineer
- Senior Engineer
- Senior Project Engineer
- Senior Research Engineer
- Research Engineer

## Education & Professional Affiliations

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- Bachelor of Science – Mechanical Engineering, Texas A&M University
- Registered Professional Engineer – State of Texas No. 73724
- American Society of Mechanical Engineers



Resume

Summary

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Over 27 years of experience in Program Controls for upstream oil and gas, refining, petrochemical, and U.S. Government projects.

Background experience includes program control management for major three and five-year projects, as well as fast track projects, conceptual planning, coordination and implementation of project trending / forecasting, project impact analysis, development of detailed work breakdown structures, project procedures, and major program management review presentations for engineering, procurement, construction and construction management.

Project experience includes gas injection / compression facilities, North Slope modular facilities, grass root refineries, chemical processing plants, synfuel refineries, hydrotreater process and offsite revamp, modular well pad manifolding, and waterflood facilities.

Experience

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1998 - Present

**Principal Project Controls Manager**

Currently Project Control Manager for the BP Holdings Limited Group Boquerón Project in Eastern Venezuela. Responsibilities include working directly with our joint venture partner in Venezuela to coordinate two office locations to administer effective overall project control system for successful project execution. Direct responsibility for Parsons Home Office Estimating, Cost Engineering, Planning / Scheduling, and coordination of material control status for equipment & material deliveries to the jobsite in Maturin, Venezuela. Work directly with Project Management, Project Controls staff in Venezuela and BP personnel to maximize visibility of all aspects of the project, including detailed planning, scheduling, prioritizing, progress, costs, estimates, forecasts, productivity, monthly status reporting, and path forward analysis.

1995 - 1998

**Senior Program Controls Manager**

Responsible for overall project control systems for the ARCO Miscible Injection Expansion (MIX) Project at Prudhoe Bay, Alaska. Activities involved supervision of capital cost estimates, project planning, cost control, material management for offsite fabrication, and coordination of project status reporting at the Module Assembly site, located in Anchorage, Alaska, and at the North Slope Module installation site in Prudhoe Bay.

1990 - 1995

**Program Controls Manager**

Responsibilities included assisting and reporting directly to the Program Director, complete control in the implementation of all controls procedures and overseeing system output from the four control disciplines involving Cost Estimating, Planning / Scheduling, Cost Engineering, and Parsons Material Management System (DMCS). Duties also included continuous communication with the ARCO Controls Manager, establishment of all project reporting format / content, coordination of the semi-annual total project reforecast, direct responsibility for coordination and preparation of the GHX-2 total project management review meetings. Other responsibilities involved initiating development guidelines to focus training programs for program controls personnel, development of a test-case physical progress measurement system for Procurement activities. Project: ARCO Alaska, Gas Handling Phase 2 (GHX-2), for ARCO Alaska, Prudhoe Bay, Alaska.



**Resume**

1986 - 1990

**Chief Planner/Scheduler**

Manager of Planning and Scheduling for all ARCO Alaska Projects involving the Prudhoe Bay and Kuparuk Fields for the 1989 and 1990 Sealifts. Complete responsibility for initiation, preparation and implementation of all levels of plans and schedules for both large and small projects, utilizing computerized control systems such as Primavera, Excel, and DMCS. Direct responsibility for presentation of all project plans, schedules narrative analysis and reports to client and project management. Duties have also included the opportunity to serve as acting Section Manager of Planning / Scheduling during the Section Manager's absence and participation in development of a planning / scheduling section overview for presentation to company management. Projects included Produced Water Handling (PWI and PWT), Gas Handling Expansion (GHX-1 and GHX-2), Local Injection Plant expansion (LIP-3), and numerous drillsite facilities for ARCO Alaska. Additional assignment with direct field experience: FCC Feed Hydrotreater Revamp and Offsite Project, Mobil Oil Corporation, and Torrance Refinery, California.

1980 - 1986

**Principal Planner/Scheduler**

Lead responsibility for Project planning staff in the development, analysis, and reporting of major North Slope Modular engineering, procurement and construction plans and schedules, reporting directly to project management. Computer systems utilized included MSCS, MRCS, DMCS and modified C/SCSC. Projects included: NGL / EOR Project, Central Gas Facility, ARCO Alaska, Inc., Prudhoe Bay, Alaska; Well Pad Manifolding Project, Phase 4 and West Side Waterflood Project, SOHIO Construction Company, Prudhoe Bay, Alaska; preliminary design and assessment of a 50,000 BPD Coal to Methanol to Gasoline plant for W.R Grace and Company, Baskett, Kentucky; preliminary design, estimates, specifications and schedules for an Aircraft Maintenance Facility at Abu Dhabi International Airport for the Gulf Aircraft Maintenance Company, Abu Dhabi, U. A. E.; preliminary design package and related schedules of a South Terminal Expansion Project for the King Abdul Aziz International Airport, Jeddah, Saudi Arabia; upgrade process and utilities for the TOSCO Sand Wash Project, TOSCO development Corporation, Denver, Colorado.

1977 - 1980

**Senior Planner/Scheduler**


Responsible for representation of project scheduling for client and project management review meetings, pinpointing problem areas, and subsequent solutions; development of detailed cost estimate data to a comprehensive construction package providing critical activities, long lead materials and manpower requirements for a five-year project, and monitoring status of equipment from design drawings to fabrication and delivery.

Projects include: Space Defense, Space and Missile Systems Organization for space shuttle development, Vandenberg AFB, California; High Performance Fuel Laboratory Facility for Nuclear Fuels Fabrication for U.S Energy Research and Development Administration, Washington; 50 million lb/yr. Herbicide Manufacturing Plant for Shell Oil Company, Mobile, Alabama.

1976 - 1977

**Planner/Scheduler**

Responsible for preparation, evaluation and revisions of detailed time-scaled and CPM networks; front-end and production scheduling for engineering, procurement and construction contracts; generating and monitoring progress and manpower distribution curves for project management; developed detailed drawing status system designed to track all drawings and their relative progress; supervised computer input, cost coding, construction sequencing, loading and data control. Projects in-



## Resume

cluded: 250,000 BPD Crude Processing Plant, Dow Chemical Company, Oyster Creek, Texas; Butadine Purification and Hydrotreating Facility, Shell Chemical Company, Deer Park, Texas.

1975 - 1976

### Associate Planner/Scheduler

Duties included development of project control systems for a grass-roots refinery including preparation of detailed computerized curves; development of detailed pipe fabrication status reporting system designed to track fabrication, shipping and jobsite location; troubleshooting spool fabrication from corresponding system output; develop consistent and effective reporting. Project involved: 200,000 BPD grass-roots refinery for Marathon Oil, Garyville, Louisiana.

## Education

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- BS, California State University, Long Beach, California (1971)
- Completed Parsons course for the Quality Education System (1989)
- Completed Dale Carnegie Management Seminar Program (1993)

## Recognition

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- Numerous Project Incentive Awards for outstanding performance
- Parsons President's Award, Employee of the Month, April 1992



Resume

## Summary

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Over twenty-seven years experience in the petrochemical and construction industry with extensive experience in module engineering, design, construction, and arctic engineering.

## Experience

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2001 - Present

### Engineering Manager

BP Exploration (Alaska) CCP High Stage Compressor Replacement Project. Presently filling the role as Engineering Manager, Project Engineer and Construction Manager responsible for the development of the overall design, constructability reviews and implementation, and the fabrication/construction strategy. Conducted a detailed study and evaluations for determining the optimum design solution and construction plan for the optimum compressor removal plan. This project is being executed simultaneous with the LTS-3 Project.

2000 - Present

### Engineering Manager

BP Exploration (Alaska) LTS-3 Gas / Gas Exchanger Replacement Project. Presently filling the role as Engineering Manager, Project Engineer and Construction Manager responsible for the development of the overall design, constructability reviews and implementation, and the fabrication/construction strategy. Conducted a detailed study and evaluations for determining the optimum design solution and construction strategy for the project.

1999 - 2000

### Engineering Manager

Alpine Drill Site CD-2 Project. Filled the role as Engineering Manager, and Project Engineer responsible for all issues related to the design development, procurement activities, constructability reviews, and construction work packages.

1997 - 1999

### Project Engineer

Arco Alaska MIX Project. Responsible for constructability of the module design development, and multiple revamp work packages for the existing facility. Transferred to the Module Assembly Site as the Arco Construction Manager. Responsible for all field activities associated with construction, the site safety program, scheduling, rigging, and cost. Also responsible for Module Installation at the CGF Facility at the North Slope.

1995 - 1997

### Project Engineer

BPX Cusiana Full Field Development Project. Responsible for managing the work progress of the engineering disciplines, defining changes in the scope of work, and preparing change orders. Additional responsibilities included working with the joint venture construction organization in developing construction work plans, schedules, and turnover packages.



**Resume**

1994 - 1995

**Construction Supervisor**

Alyeska Code Compliance Project. Responsible for managing all on-site activities of the execution contractor and facilitate the activities of the investigative inspection phase of the project for Pump Station's 1 through 4. Responsible for schedule and budgetary control of all site activities. Also interfaced with other Alyeska groups and outside Federal and State inspection groups.

1993 - 1994

**Construction Supervisor**

Assigned to ARCO Alaska's GHX-2 Project in New Iberia, Louisiana. Responsible for coordinating all area on-site activities of the execution contractor. Responsible for schedule and budgetary control as well as supervising all logistic activities for module preparation for sealift.

1991 - 1993

**Staff Construction/Logistics Engineer**

Assigned to ARCO Alaska's GHX2 Project in Pasadena, California. Directly associated with all construction planning and scheduling during the design development of the project. This included creative approaches for design and procurement strategies for improving fabrication efficiencies as well as conducting a full constructability review during the design phase. Duties also included construction coordination with the North Slope and the Lower 48 fabrication.

1988 - 1991

**Senior Construction Engineer**

Assigned to ARCO Alaska's GHX-1 Project in Portland, Oregon. Responsible for supervising the execution contractor's work associated with all the civil/mechanical work on two Turbine Compressor Modules. Construction activities included structural steel erection, pipe installation, hydrotest, insulation and all architectural components. Responsibilities also included schedule, estimate and budget reviews. Additional responsibilities included overseeing the module preparation for sealift and execution of sealift activities both on the Lower 48 and the transporting and setting on the North Slope.

Assigned to ARCO Alaska's Produced Water Handling Project in Portland, Oregon. Responsible for supervising the execution contractor's work associated with all the Civil/Mechanical work for all Production Modules. Construction activities included structural steel erection, pipe installation, hydrotest, insulation and all architectural components. Responsibilities also included schedule, estimate and budget reviews. Additional responsibilities included overseeing all module preparation for sealift and executing sealift activities in the Lower 48.

1987 - 1988

**Principal Structural Engineer**

Assigned to Radio Relay Station for Voice of America. Lead Engineer responsible for the detailed engineering required adapting a prototype design to a specific site in Sri Lanka, India. Work required a re-analysis of load carrying systems, shear walls and foundations for reinforced concrete and masonry structures.

1986 - 1987

**Construction Engineer**

Responsible for the modules fabricated in Portland and Astoria, Oregon, and installation and start-up on the North Slope for the Lisburne Production facility modules fabricated in Oregon. Other responsibilities included work on a variety of project at all ARCO Alaska's facilities. Each project required supervision of new construction, retrofit and/or shutdowns for tie-ins.



## Resume

1983 - 1986

### Project Structural Engineer

Lisburne Facilities Project, ARCO Alaska, Inc. Discipline Structural Engineer responsible for all structural engineering work associated with the design for module base frames, superstructure, pipe pile foundations and miscellaneous structures. Responsibilities also included the development of the Logistics plan.

1980 - 1983

### Senior Structural Engineer

Produced Water Expansion (PWX-1, 2, 3) SOHIO Construction Company Prudhoe Bay, Alaska. As Lead Engineer for PWX-3, coordinated all structural engineering work associated with the design for module base frames, superstructure, pipe pile foundations and miscellaneous modular structures and skids. Responsibilities also included the development of the Logistics plan.

## Education & Professional Affiliations

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- BS, Architectural Engineering, California Polytechnic State University, 1971 - 1974
- Masters of Architecture, California Polytechnic State University, 1971 - 1975

6.0 RatesLabor Rates:

ASRC Energy Services proposes to undertake the subject work at the following hourly rates. All invoices will be supported by electronic timesheets.

<u>Position</u>	<u>Straight-Time Rate</u>	<u>Over-Time Rate</u>
Sr. Project Manager	\$140	\$140
Project Manager	\$140	\$140
Project Controls	\$125	\$125
Scheduling/Estimating	\$125	\$125
HSE/Quality	\$125	\$125
Process Engineering	\$120	\$120
Construction Engineer	\$115	\$115
Discipline Engineer	\$108	\$108
Procurement	\$100	\$100
Stenographics	\$ 50	\$ 65
Coordination	\$ 45	\$ 58

\* Hourly rates exclude reproduction, communications and travel.

Consultants:

If required, outside consultants will be billed at cost without mark-up.

Other Direct Costs:

ASRC Energy Services will be reimbursed at a rate of \$2.00 per man-hour to cover incidental reproduction and communications. Major outside reproduction will be billed at cost without mark-up.

Travel and associated costs will be billed at cost without mark-up. All travel is to be coach class unless otherwise authorized.



Office Space:

ASRC Energy Services will provide Client office space with office furniture in our facilities located at 3900 C Street at the rate of \$2.00 per square foot per month. Given an estimate of three offices at 140 square feet each, the total cost would be \$840 per month. The Client has indicated he will provide his own computer equipment.

Contract:

The above is based on the assumption of a mutually acceptable contract with terms similar to those currently in use in the Alaska engineering community.

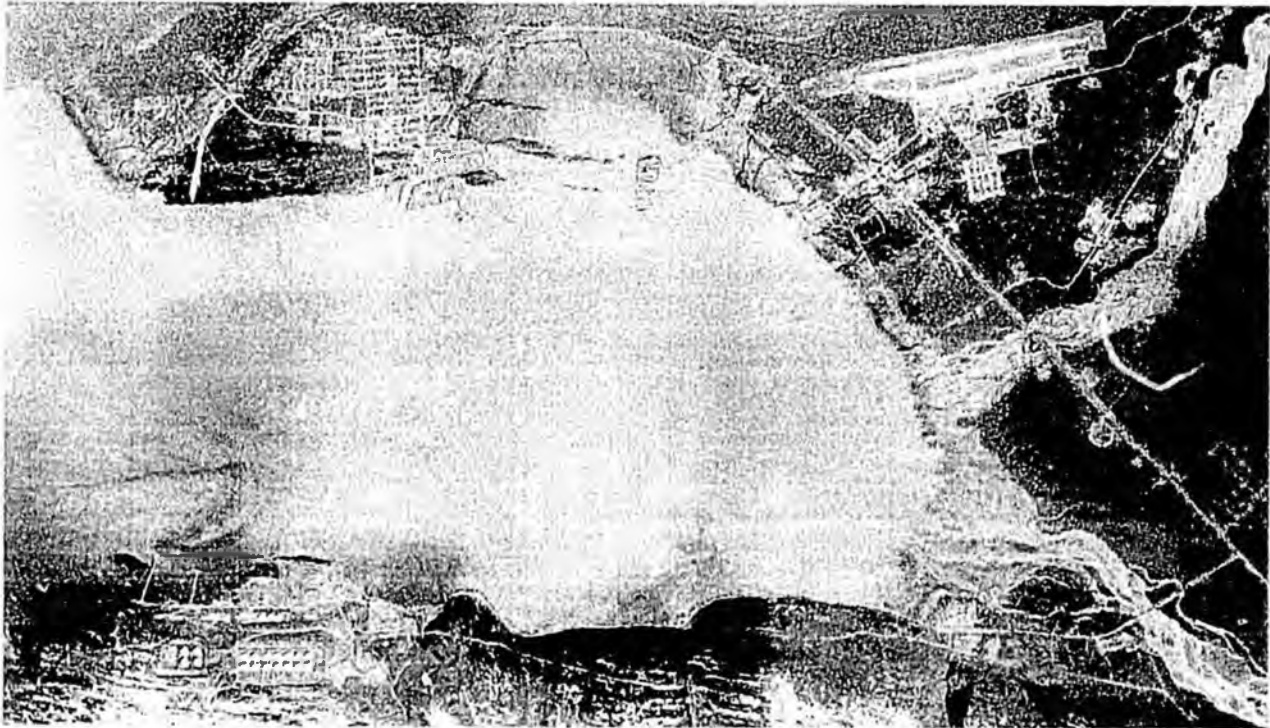
  
7.0 Budget Estimates

ASRC Energy Services has been asked to provide a priced proposal for a Conceptual Engineering Study for the LNG Plant and the Loading System.

Budget Estimate – LNG Plant & Loading System

Category	Basis	Estimate
Labor	7,630 man-hours	\$858,000
Repro & Communications	7,630 m-h @ \$2.00	\$15,000
Travel	16 trips @ \$4,000	\$64,000
General & Administrative Expense	6%	\$41,000
Client Offices	4 months @ \$840	\$3,000
Estimate		\$981,000.00

**PROPOSAL**  
**LNG MARINE TERMINAL**  
**CONCEPTUAL STUDY**



*Prepared for the:*

**Alaska Natural Gas Development Authority**

**September 8, 2003**

*Prepared by:*

**PND, Inc.**  
**Consulting Engineers**  
1506 West 36<sup>th</sup> Avenue  
Anchorage, AK 99503  
Ph: (907) 561-1011  
Fax: (907) 563-4220



**Peratrovich, Nottingham & Drage, Inc.**

**Engineering Consultants**

1506 West 36th Avenue • Anchorage, Alaska 99503 • 907-561-1011 • Fax 907-563-4220

Harold Heinze  
Chief Executive Officer  
Alaska Natural Gas Development Authority  
411 W. 4<sup>th</sup> Ave.  
Anchorage, AK 99501

03A-116

September 8, 2003

Dear Mr. Heinze:

Peratrovich, Nottingham & Drage, Inc. (PND Incorporated) is pleased to submit this proposal to provide conceptual port and site-civil studies for development of an LNG/petrochemical complex in Valdez.

We understand the Authority seeks to expedite engineering, timing and marketing plans for a gas pipeline project from the North Slope to Valdez.

PND has the experience, expertise and capacity to begin necessary studies immediately, and is prepared to meet the prescribed 120-day deadline for this initial work.

Methods, approach, cost and timeline are detailed on the following pages, followed by resumes for the PND project team, and representative, relevant firm experience. For example, in 1986, PND provided Yukon Pacific Corp. in 1986 with refined conceptual layouts for a proposed deep-water LNG port facility at Anderson Bay. In addition, PND has successfully completed dozens of projects in the Valdez area with and for established oilfield clients, the City of Valdez, and other private owners. This longstanding familiarity with operations in the area will serve the project well.

We are confident you will find PND well-qualified for this work, and we look forward to collaborating with your office on this very exciting project. Please call at any time with questions or if you need additional information.

Sincerely,

PND Incorporated

Dennis Nottingham, P.E.  
President

# ALASKA NATURAL GAS DEVELOPMENT AUTHORITY LNG MARINE FACILITY CONCEPTUAL STUDY PROPOSAL

## EXECUTIVE SUMMARY

September 8, 2003

PND, Inc. is pleased to present this proposal to provide engineering services to investigate siting a LNG Facility and associated marine terminal in the Valdez area. We are well qualified to assist the Alaska Natural Gas Development Authority (ANGDA) in reviewing the Prince William Sound area for the best location to site the proposed facility. PND has previously provided conceptual layouts, survey, geotechnical investigations, permitting, design, contract administration and performed construction inspection for a wide variety of marine and upland projects which been constructed in this area. Two of these projects were siting studies which involved LNG facilities and an associated marine terminal located at Anderson Bay and the ALPETCO project located in the vicinity of Old Valdez Townsite.

PND proposes to provide survey, geotechnical, marine, civil and structural services to conduct a fast track review and evaluation of a selected site and a comparison of that selected site to the Anderson Bay site. We understand that we will interface with other entities as appropriate to determine marine and site civil requirements and considerations. The final report will consist of design criteria, survey information, geophysical data, photographic mapping, geotechnical report, results of limited environmental sampling, seismic review, permitting review, marine and site civil concepts, ROM construction costs and a construction schedule for the selected site. PND proposes to provide the above services for a fixed fee of \$500,000 including our sub contractors and expenses in a time frame not to exceed 120 days from Notice to Proceed.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

## LNG MARINE FACILITY CONCEPTUAL STUDY PROPOSAL

PND, Inc. is pleased to present this proposal to provide engineering services to investigate siting a LNG Facility and associated marine terminal in the Valdez area. We are well qualified to assist the Alaska Natural Gas Development Authority (ANGDA) in reviewing the Prince William Sound area for the best location to site the proposed facility. We have previously provided conceptual layouts, survey, geotechnical investigations, permitting, design, contract administration and performed construction inspection for a wide variety of marine and upland projects which been constructed in this area. Two of these projects were siting studies which involved LNG facilities and an associated marine terminal. The map on page 3 shows the locations of some of these projects.

The first involved a feasibility study to locate a LNG facility and marine terminal in the vicinity of Anderson Bay just west of the Alyeska Oil Terminal. This effort involved a site investigation, development of design criteria, off shore bathymetry, uplands survey, marine terminal concepts, cost estimates and a construction schedule.

The second feasibility study (ALPETCO) evaluated siting a LNG facility, petro-chemical complex and marine terminal at the old Valdez townsite and/or at the City of Valdez Floating Dock. This effort involved a site investigation, development of design criteria, off shore bathymetry, uplands survey, marine terminal concepts, uplands facilities, utilities and access road layouts, cost estimates and a construction schedule. The map on page 4 shows the proposed location of the marine terminal and development facilities.

Additionally, we have worked with a variety of petroleum companies, public and private entities throughout Alaska in developing marine and associated upland facilities for a variety of uses including private use, fisheries complexes, tour ship operations, small boat harbors, graving docks, loading facilities, fueling facilities, and general cargo docks. We are very familiar with the Valdez area as we have preformed work in this area since 1979 and have been involved in a variety of projects including marine developments, roads, bridges, buildings, and site civil.

One of the companies PND often works with is VECO Alaska, Inc., which we understand will be involved in the pipeline and facilities study. We have worked with VECO on various oil field related projects such as BPXA's North Star and Liberty developments, various Alyeska projects, and currently ConocoPhillips Alaska, Inc.'s NPRA expansion project. PND is very familiar with VECO personnel and is prepared to interface with them in the development of the upland facilities.

### Scope of Work

PND understands the scope of work to consist of reviewing prior site studies as well as analyzing the general area for other sites which may be appropriate for the development of a LNG facility, marine terminal and potential petrochemical facilities. This would be followed by generating conceptual drawings and ROM cost estimates. Additionally, we also understand that we have 120 calendar days from the Notice To Proceed to accomplish the work scope. Based upon our understanding of the work scope we would anticipate the following steps to occur.

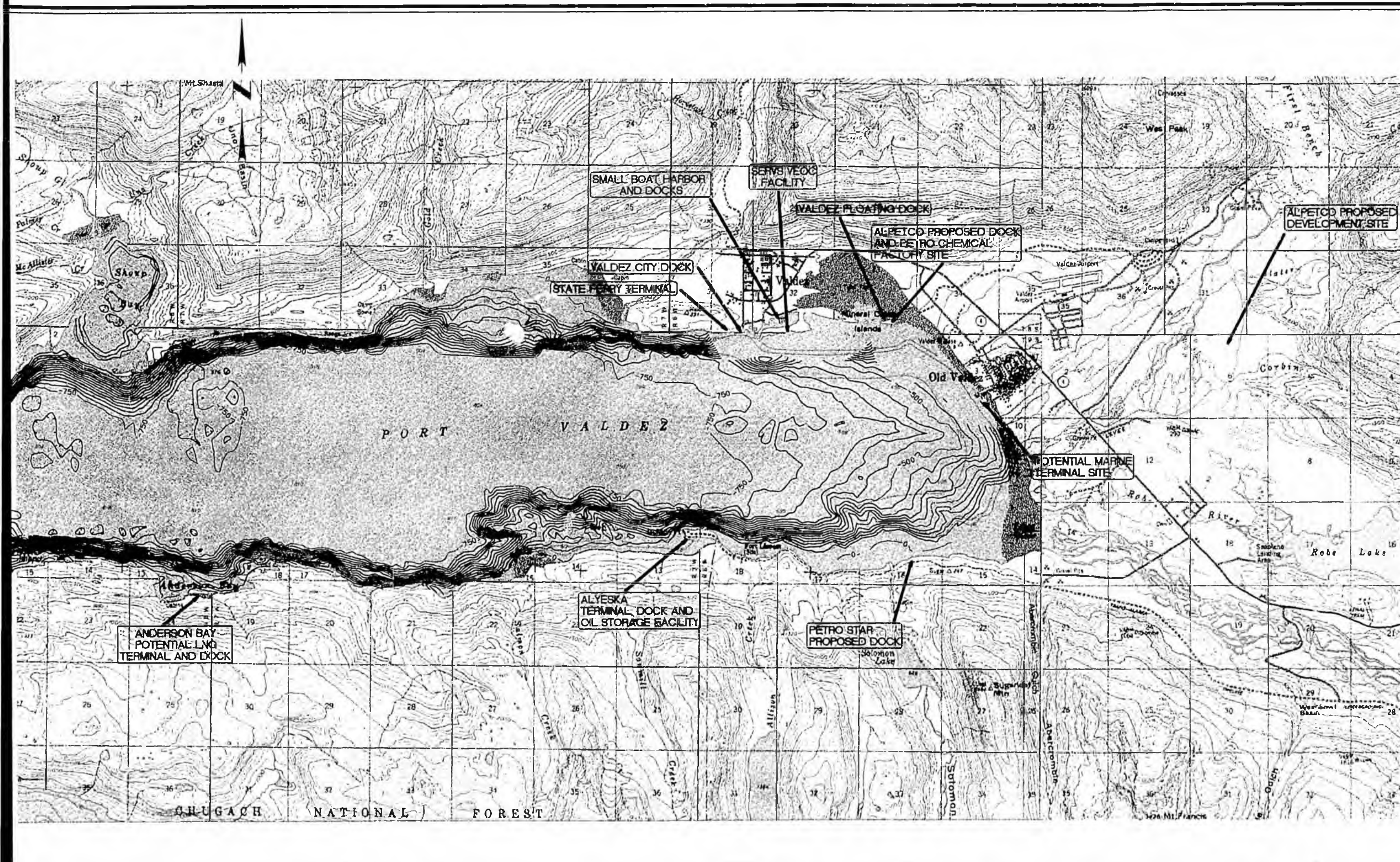


1. Obtain and review previous site studies and identify sites to be reviewed.
2. Develop design criteria for marine terminal and uplands site civil.
3. Review potential sites for environmental criteria, such as wind, wave, current, tides, topography, bathymetry, etc., which would facilitate the siting of a marine terminal.
4. Perform limited field survey to validate site bathymetry and upland topography.
5. Perform an offshore Geophysical Investigation of the ALPETCO Marine Terminal site. This will provide subsurface strata identification down to 40-60+ feet depending upon material or bedrock. This information will be used in the seismic analysis portion of the work.
6. Perform a limited Geotechnical and Environmental Investigation at the ALPETCO Marine Terminal site consisting of 3 holes drilled to 200 feet or bedrock whichever comes first. Geotechnical samples will be obtained at 10 foot intervals or at change of horizons and environmental samples will be taken at 5 foot intervals down to groundwater. The environmental sampling will be done for indicative purposes only, additional environmental sampling will probably be required during the permitting process.
7. Obtain aerial photographic topographic mapping of the ALPETCO Marine Terminal and Development sites.
8. Develop draft conceptual layouts and ROM cost estimates for marine facilities and uplands site civil at selected sites.
9. Submit draft report to ANGDA for review and comment.
10. Finalize draft conceptual layouts and ROM cost estimates for marine facilities and uplands site civil.
11. Develop preliminary construction schedule for marine facilities and uplands site civil.
12. Review Seismic criteria, such as liquefaction, global stability, etc. for the ALPETCO Marine Terminal site.
13. Prepare a comparison review of the ALPETCO and Anderson Bay sites for marine and site civil considerations.
14. Review permitting concerns and risks for selected site.
15. Prepare and submit final report which includes the above information.

We are prepared to begin immediately and perform the outlined tasks as directed by ANGDA and complete them within the stated time frame for a Fixed Fee of \$500,000. Alternatively, some of the tasks could be deleted from this study and included in future studies as best meets ANGDA's needs. Additionally, most of the field work is weather dependent, so the Notice to Proceed would have to be received no later than 10/1/03 to be able to include the field work portion in the 120 days. Otherwise the field work would be performed during spring 2004 with the resulting lag in field work dependent engineering tasks. The aerial photographic mapping is also dependent upon no snow cover existing at the time of overflight, or this work would also have to be delayed until spring 2004.

As part of the above work, PND would provide to ANGDA 3 work stations, excluding computers, with full access to phones, fax, copying and e-mail communications for the period of this contract (120 calendar days). Any additional services would be billed at PND standard rates





REV	DATE	DESCRIPTION	DWN	CHKD	APP


**Peratrovich, Nottinham & Drage, Inc.**  
 Engineering Consultants  
 1508 West 39th Avenue,  
 Anchorage, Alaska 99503 (907) 961-1011

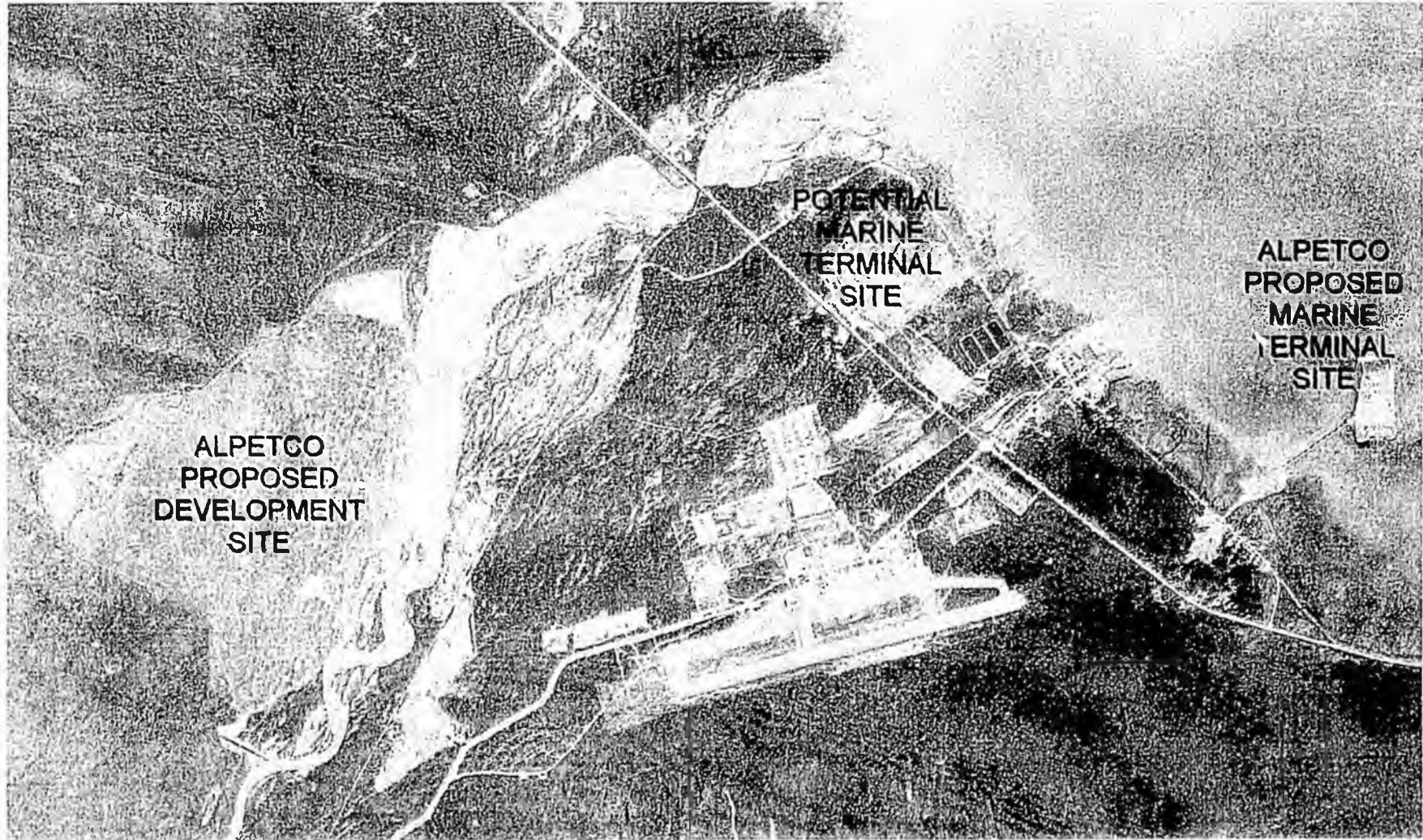
DESIGN: \_\_\_\_\_ CHECKED: \_\_\_\_\_ SCALE: 1" = 6000'  
 DRAWN: \_\_\_\_\_ APPROVED: \_\_\_\_\_

DATE: 9/5/2003

**PORT VALDEZ AREA  
PN&D DOCK AND HARBOR PROJECTS**

SHEET TITLE: **OVERVIEW**  
 PN&D PROJECT NO.: - - - - - DWG. FILE: - - - - -

## ALPETCO PROPOSED DEVELOPMENT AND MARINE TERMINAL SITES



PERATROVICH, NOTTINGHAM & DRAGE, INC.  
GENERAL STATEMENT OF QUALIFICATIONS

Peratrovich, Nottingham & Drage, Inc. (PND) is an Alaska corporation originally formed in 1979. Our main office is in Anchorage, with branch offices in Juneau, and Seattle. We have 75 employees, half of whom are licensed professionals – giving us one of the highest professional-to-staff ratio among engineering firms in Alaska and making us one of the largest of those firms.

During its 24 years of operation, PND has undertaken a wide variety of engineering projects. The majority of PND's work has taken place in Alaska, although we have a growing list of projects throughout the "Lower 48," Hawaii, Trinidad and Russia. Within the past several years, PND has increased its efforts to market services in the international arena.

PND's clients range from private individuals to Fortune 500 corporations to various Governments, encompassing the wide diversity of groups in between. We are especially proud of our reputation for devising innovative design solutions for private-sector clients. Efficiency in design, and the resultant savings in construction and operations costs, are attractive to private-sector organizations which must operate within a stringent financial environment. PND has long enjoyed the challenge of working for such clients. Many of our design solutions have been sufficiently innovative to receive national awards and worldwide press attention.

PND presently maintains the capability to provide engineering services in many different disciplines, including:

**Marine:** PND's dock and harbor designs can be found throughout the state and along the West Coast of the United States. We are especially proud of our cost-effective designs, which have been constructed in some of the most severe wave and ice environments in the world. PND is also involved in the design of such floating and fixed offshore structures as navigation buoys, mooring dolphins, and transmission line supports.

**Coastal Engineering:** PND's coastal engineering experience includes design of a major rubble mound berm breakwater (designed to withstand 50-foot offshore waves in the Bering Sea), as well as a similar value engineered design for one in the Dominican Republic. Our work also includes development of a permeable wave barrier, a pile-supported structure, for use along the Pacific Northwest coastline.

**General Civil:** Since its founding, PND has been involved in a wide variety of general civil projects throughout Alaska and the "Lower 48." We are especially known for our innovative civil designs in difficult permafrost-dominated situations. Our expertise in cold-region road and earthwork design has won us numerous awards.

**Structural:** PND is well known for its experience in large structural designs. Many of Alaska's major bridges were designed by PND principals. The firm is also extensively involved in solving building structural problems. Our structural experience encompasses all facets of engineering work, from bridges to offshore structures to buildings to deep foundations.



Peratrovich, Nottingham & Drage, Inc.  
Engineering Consultants

**Geotechnical:** PND undertakes a variety of geotechnical and foundation projects, with emphasis on difficult permafrost or ice-rich situations. We have conducted much original research in the fields of cold region foundation engineering, and a number of our cost-saving pile-driving techniques have evolved from this experience. Many of PND's innovative solutions to difficult geotechnical problems have received national awards.

**Hydrology:** PND's hydrologic experience encompasses both freshwater and marine environments. The marine capability includes extensive hindcasting and wave analysis experience; freshwater applications include the full range of open-channel hydraulics situations, supported by modern computer modeling capabilities. Our hydrology research has involved the ice mechanics of fresh and saltwater ice. The findings from this work have found direct application in some of our most innovative design solutions.

**Sanitary/Wastewater:** The PND staff includes several engineers with extensive experience in environmental engineering. Our expertise emphasizes design solutions for difficult cold-climate situations.

**Surveying:** PND maintains a full-time staff of professional land surveyors. This team is backed up by our inventory of corporate-owned surveying equipment, including a capability to undertake freshwater and offshore bathymetric surveys. Our computer-based CAD systems and full-sized drum plotters give us the capability to produce survey drawings on very short schedules. We have extensive experience in interfacing our CAD-based drawings with other firms' CAD systems.

**Value Engineering:** On a number of occasions, PND has been retained to provide value-engineering services to contractors and other design firms.

**Inspection, Q/A, Cost Administration:** PND is constantly involved in providing inspection and Q/A service to both design clients and to third parties.

**Permitting, Right-of-Way Acquisition:** Agency interaction is becoming an increasingly necessary skill in all areas of civil design. PND maintains an experienced staff of professionals who are familiar with permitting requirements; we have an excellent record of obtaining timely permits for our clients.

**Site Remediation/Pollution Control:** Since the Exxon Valdez oil spill, PND has become increasingly involved in pollution containment and environmental remediation. Our expertise draws heavily on our experience in marine design. Our pollution-containment booms have received international interest.

**Demolition:** PND has provided consulting services on several projects that have involved the removal or demolition of structures. This work has involved demolition engineering of bridges, as well as both building and ancillary structures such as communications structures. We have also been involved in projects where the recycling of the structure is the ultimate object.

**In-House Research:** Since its founding, PND has conducted physical research that has proven to be effective and beneficial to the public by generating the opportunity for economic, physical and/or social benefit. Some of these include new developments in pile foundations, retaining wall



structures, bridge structures, marine fendering systems, breakwater systems and pollution control systems.

This experience gives us the potential and flexibility to provide a diverse package of engineering services. We have the ability to provide the required personnel even on very short notice. PND maintains a sufficiently large work force and a constant workload to insure a stable pool of professionals in all our offices at all times.



# ALASKA NATURAL GAS DEVELOPMENT AUTHORITY LNG MARINE FACILITY CONCEPTUAL STUDY PROPOSED SCHEDULE

ID	Task Name	Month 1			Month 2				Month 3				Month 4				Month				
		W-1	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	
1	<b>NOTICE TO PROCEED</b>		◆																		
2	<b>SCOPING</b>		█																		
3	Obtain Site Information		█																		
4	Site Visit			█																	
5	Establish Design Criteria		█																		
6	<b>SURVEY</b>			█																	
7	Field Work			█																	
8	Office Work				█																
9	<b>CONCEPTUAL DESIGN</b>		█																		
10	<b>Marine Facilities</b>		█																		
11	Develop Draft Conceptual Plans			█																	
12	Prepare Draft ROM Cost Estimate								█												
13	Submit to ANGDA for Review																			◆	
14	ANGDA Review										█										
15	Prepare Final Conceptual Plans										█										
16	Prepare Final ROM Cost Estimate																		█		
17	Prepare Construction Schedule																		█		
18	<b>Upland Facilities - Site Civil</b>			█																	
19	Develop Draft Conceptual Plans			█																	
20	Prepare Draft ROM Cost Estimate								█												
21	Submit to ANGDA for Review																			◆	
22	ANGDA Review										█										
23	Prepare Final Conceptual Plans										█										
24	Prepare Final ROM Cost Estimate																		█		
25	Prepare Construction Schedule																		█		
26	<b>PERMITTING REVIEW</b>																		█		
27	Review Permitting Issues																		█		
28	<b>FINAL STUDY</b>																			█	
29	Prepare Final Study for Submittal																			█	
30	Submit Final Study to ANGDA																			◆	
31	<b>END OF PROJECT</b>																			◆	

Project: PND 03A-116  
Date: September 8, 2003

Task



Milestone ◆

Summary



TASK	Senior Eng. VI	Senior Eng. V	Senior Eng. III	Senior Eng. II	Staff Eng. V	Staff Eng. IV	Sen Land Survey	Land Surv. I	Surv. Tech III	Drafter IV	Tech V	Tech III	Subs	Expen.	Total
	\$135	\$125	\$95	\$90	\$80	\$75	\$80	\$70	\$65	\$70	\$85	\$65			
<b>PROJECT MANAGEMENT (120 Days)</b>															
Prepare Bi-Weekly Progress Report:	8	20										5			\$3,905
Team Meetings	20	40	20	40	20	20						5			\$16,625
Coordination with ANGDA	16	20										5		\$250	\$5,235
<i>Subtotal Hrs</i>	<i>44</i>	<i>80</i>	<i>20</i>	<i>40</i>	<i>20</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>15</i>			<i>239</i>
<i>Subtotal \$</i>	<i>\$5,940</i>	<i>\$10,000</i>	<i>\$1,900</i>	<i>\$3,600</i>	<i>\$1,600</i>	<i>\$1,500</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$975</i>		<i>\$250</i>	<i>\$25,765</i>
														Check Sum = \$25,765	

**PHASE I - SCOPING**

Obtain Existing Site Information	8	12	8	20	20		4	8	8	12	16	4			\$10,600
Complete Initial Site Visit (1 day)	12	12		12	12										\$5,160
Establish Design Criteria	6	8	8	16	16	8								\$1,160	\$7,050
<i>Subtotal Hrs</i>	<i>26</i>	<i>32</i>	<i>16</i>	<i>48</i>	<i>48</i>	<i>8</i>	<i>4</i>	<i>8</i>	<i>8</i>	<i>12</i>	<i>16</i>	<i>4</i>			<i>230</i>
<i>Subtotal \$</i>	<i>\$3,510</i>	<i>\$4,000</i>	<i>\$1,520</i>	<i>\$4,320</i>	<i>\$3,840</i>	<i>\$600</i>	<i>\$320</i>	<i>\$560</i>	<i>\$520</i>	<i>\$840</i>	<i>\$1,360</i>	<i>\$260</i>		<i>\$1,160</i>	<i>\$22,810</i>
														Check Sum = \$22,810	

**PHASE II - FIELD WORK**

**Preliminary Uplands and Bathymetric Survey**

Mob/Demob, Field Work, Travel	2	6					60	72	76						\$15,800
Data Reduction, Plotting, Research	2	4					48	36	44					\$7,500	\$17,490
<i>Subtotal Hrs</i>	<i>4</i>	<i>10</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>108</i>	<i>108</i>	<i>120</i>	<i>0</i>	<i>0</i>				<i>350</i>
<i>Subtotal \$</i>	<i>\$540</i>	<i>\$1,250</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$8,640</i>	<i>\$7,560</i>	<i>\$7,800</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>		<i>\$7,500</i>	<i>\$33,290</i>
														Check Sum = \$33,290	

**Geophysical Investigation**

Geophysical Survey														\$50,000	\$50,000
Coordination and Evaluation of Data	2	8	8							2				\$150	\$2,320
<i>Subtotal Hrs</i>	<i>2</i>	<i>8</i>	<i>8</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>0</i>				<i>20</i>
<i>Subtotal \$</i>	<i>\$270</i>	<i>\$1,000</i>	<i>\$760</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$140</i>	<i>\$0</i>	<i>\$0</i>		<i>\$50,000</i>	<i>\$52,320</i>
														Check Sum = \$52,320	

**Geotechnical & Environmental Investigation (3 holes @ 200')**

Mob/Demob, Field Work, Travel	2	8	120											\$50,000	\$62,670
Coordination & Reports	2	8	60	40						24				\$12,400	\$24,650
<i>Subtotal Hrs</i>	<i>4</i>	<i>16</i>	<i>180</i>	<i>40</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>24</i>	<i>0</i>				<i>264</i>
<i>Subtotal \$</i>	<i>\$540</i>	<i>\$2,000</i>	<i>\$17,100</i>	<i>\$3,600</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$1,680</i>	<i>\$0</i>	<i>\$0</i>		<i>\$50,000</i>	<i>\$87,320</i>
														Check Sum = \$87,320	

TASK	Senior Eng. VI	Senior Eng. V	Senior Eng. III	Senior Eng. II	Staff Eng. V	Staff Eng. IV	Sen Land Survey	Land Surv. I	Surv. Tech III	Drafter IV	Tech V	Tech III	Subs	Expen.	Total
	\$135	\$125	\$95	\$90	\$80	\$75	\$80	\$70	\$65	\$70	\$85	\$65			
<b>Aerial Photography and Topography</b>															
Aerial Photography and Topography														\$30,000	\$30,000
Coordination and Evaluation of Data	2	8					16			16				\$150	\$3,820
<i>Subtotal Hrs</i>	2	8	0	0	0	0	16	0	0	16	0				42
<i>Subtotal \$</i>	\$270	\$1,000	\$0	\$0	\$0	\$0	\$1,280	\$0	\$0	\$1,120	\$0	\$0		\$30,000	\$33,820
														Check Sum = \$33,820	

**PHASE III - CONCEPTUAL DESIGN**

**Marine Facilities**

Interface with other entities	16	40		10											\$8,060
Develop Draft Conceptual Plans	40	80	60	200	80	40				60	40	8			\$56,620
Prepare Draft ROM Cost Estimate	8	16		40		16						4			\$8,140
Prepare Final Conceptual Plans	32	60	40	160	60	24				40	10	8			\$40,790
Prepare Final ROM Cost Estimate	8	12		20		8						4			\$5,240
Prepare Construction Schedule	4	12	2	8	2	24								\$500	\$5,410
<i>Subtotal Hrs</i>	108	220	102	438	142	112	0	0	0	100	50	24			1,296
<i>Subtotal \$</i>	\$14,580	\$27,500	\$9,690	\$39,420	\$11,360	\$8,400	\$0	\$0	\$0	\$7,000	\$4,250	\$1,560		\$500	\$124,260
														Check Sum = \$124,260	

**Uplands Facilities - Site Civil**

Interface with other entities	20	40				10									\$8,450
Develop Draft Conceptual Plans	16	36	10	40	10	60				40	20	8			\$21,530
Prepare Draft ROM Cost Estimate	4	8		16		24						4			\$5,040
Prepare Final Conceptual Plans	8	20	8	20	8	40				24		4			\$11,720
Prepare Final ROM Cost Estimate	4	6		8		16						4			\$3,470
Prepare Construction Schedule	4	8	2	4	2	16								\$400	\$3,850
<i>Subtotal Hrs</i>	56	118	20	88	20	166	0	0	0	64	20	20			572
<i>Subtotal \$</i>	\$7,560	\$14,750	\$1,900	\$7,920	\$1,600	\$12,450	\$0	\$0	\$0	\$4,480	\$1,700	\$1,300		\$400	\$54,060
														Check Sum = \$54,060	

**Seismic Review**

Review Seismic Stability Issues, etc.	16	24	60	40		40				24		4	20,000	\$300	\$39,700
<i>Subtotal Hrs</i>	16	24	60	40	0	40	0	0	0	24	0	4			208
<i>Subtotal \$</i>	\$2,160	\$3,000	\$5,700	\$3,600	\$0	\$3,000	\$0	\$0	\$0	\$1,680	\$0	\$260	\$20,000	\$300	\$39,700
														Check Sum = \$39,700	

**Comparison of Preferred Site to Anderson Bay Cost Estimate**

Comparison of Cost Estimates	16	40	60	40		40						6		\$150	\$20,000
<i>Subtotal Hrs</i>	16	40	60	40	0	40	0	0	0	0	0	6			202

TASK	Senior Eng. VI	Senior Eng. V	Senior Eng. III	Senior Eng. II	Staff Eng. V	Staff Eng. IV	Sen Land Survey	Land Surv. I	Surv. Tech III	Drafter IV	Tech V	Tech III	Subs	Expen.	Total
	\$135	\$125	\$95	\$90	\$80	\$75	\$80	\$70	\$65	\$70	\$85	\$65			
<i>Subtotal \$</i>	\$2,160	\$5,000	\$5,700	\$3,600	\$0	\$3,000	\$0	\$0	\$0	\$0	\$0	\$390	\$0	\$150	\$20,000
													Check Sum = \$20,000		

Permitting Review

Review Permitting Issues	2	8		12	40							8		\$250	\$6,320
<i>Subtotal Hrs</i>	2	8	0	12	40	0	0	0	0	0	0	8			70
<i>Subtotal \$</i>	\$270	\$1,000	\$0	\$1,080	\$3,200	\$0	\$0	\$0	\$0	\$0	\$0	\$520		\$250	\$6,320
													Check Sum = \$6,320		
<b>Grand Total Hrs</b>	280	564	466	746	270	386	128	116	128	242	86	81			3,493
<b>Grand Total \$</b>	\$37,800	\$70,500	\$44,270	\$67,140	\$21,600	\$28,950	\$10,240	\$8,120	\$8,320	\$16,940	\$7,310	\$5,265	\$150,000	\$23,210	\$499,665
													Check Sum = \$499,665		
													Check Hours = 3,493		

**EXPENSES**

**TASK**

**PROJECT MANAGEMENT (120 Days)**

**Project Mgmt. Expenses**

Phone, Fax, photo copies, etc.	L.S.		\$250	\$250
<i>Subtotal P.M. Expenses</i>				<i>\$250</i>

**PHASE I - SCOPING**

**Scoping Expenses**

Airfare	4	Round Trips @	\$150	\$600
Per Diem	4	days @	\$25	\$100
Car Rental	1	days @	\$100	\$100
Photo & Development	6	rolls @	\$35	\$210
Phone, Fax, photo copies, etc.	L.S.		\$150	\$150
<i>Subtotal Scoping Expenses</i>				<i>\$1,160</i>

**PHASE II - FIELD WORK**

**Survey & Bathymetric Expenses**

Airfare	1	Round Trips @	\$150	\$150
Per Diem	15	days @	\$150	\$2,250
Car Rental		days @	\$100	\$0
Equipment Rental	L.S.		\$2,500	\$2,500
Purchase Aerial Photos	L.S.		\$2,500	\$2,500
Phone, Fax, photo copies, color copies, etc.	L.S.		\$100	\$100
<i>Subtotal Survey Expenses</i>				<i>\$7,500</i>

**Geophysical Investigation Expenses**

Phone, Fax, photo copies, etc.	L.S.		\$150	\$150
<i>Subtotal Geophysical Investigation Expenses</i>				<i>\$150</i>

**Geotechnical Investigation**

Airfare	1	Round Trips @	\$150	\$150
Per Diem	8	days @	\$150	\$1,200
Car Rental	8	days @	\$100	\$800
Environmental & Geotechnical Sample Testing	L.S.		\$10,000	\$10,000
Phone, Fax, photo copies, color copies, etc.	L.S.		\$250	\$250
<i>Subtotal Geotechnical Investigation Expenses</i>				<i>\$12,400</i>

**Aerial Photography & Topography**

Phone, Fax, photo copies, etc.	L.S.		\$150	\$150
<i>Subtotal Aerial Photography &amp; Topography</i>				<i>\$150</i>

**PHASE III - CONCEPTUAL DESIGN**

**Marine Facilities**

**Design Expenses**

Phone, Fax, photo copies, plans, report etc.	L.S.		\$500	\$500
<i>Subtotal Marine Design Expenses</i>				<i>\$500</i>

**Uplands Facilities - Site Civil**

**Design Expenses**

Phone, Fax, photo copies, plans, report etc.	L.S.		\$400	\$400
<i>Subtotal Civil Design Expenses</i>				<i>\$400</i>

**Review Seismic Issues**

**Seismic Review Expenses**

Phone, Fax, photo copies, plans, report etc.	L.S.		\$300	\$300
<i>Subtotal Permitting Review Expenses</i>				<i>\$300</i>

**Comparison of Preferred Site to Anderson Bay Cost Estimate**

**Comparison Expenses**

Phone, Fax, photo copies, plans, report etc.	L.S.		\$150	\$150
<i>Subtotal Comparison Expenses</i>				<i>\$150</i>

**Permitting Review**

**Permitting Review Expenses**

Phone, Fax, photo copies, plans, report etc.	L.S.		\$250	\$250
<i>Subtotal Permitting Review Expenses</i>				<i>\$250</i>

**TOTAL EXPENSES**

**\$23,210**

**PERATROVICH, NOTTINGHAM & DRAGE, INC.**  
**STANDARD RATE SCHEDULE**  
**EFFECTIVE JULY 1, 2003**

		<i>Regular Rate</i>	<i>Overtime Rate</i>	
<u>Professional:</u>	Senior Engineer VII	\$135.00	\$135.00	
	Senior Engineer VI	\$125.00	\$125.00	
	Senior Engineer V	\$115.00	\$115.00	
	Senior Engineer IV	\$105.00	\$105.00	
	Senior Engineer III	\$95.00	\$95.00	
	Senior Engineer II	\$90.00	\$90.00	
	Senior Engineer I	\$85.00	\$85.00	
	Senior Environmental Scientist	\$80.00	\$80.00	
	Staff Engineer V	\$80.00	\$80.00	
	Staff Engineer IV	\$75.00	\$75.00	
	Staff Engineer III	\$70.00	\$70.00	
	Staff Engineer II	\$65.00	\$65.00	
	Staff Engineer I	\$60.00	\$60.00	
	<u>Survey:</u>	Senior Land Surveyor I-Consulting	\$95.00	\$95.00
		Senior Land Surveyor I-Field	\$80.00	\$80.00
Survey Coordinator		\$80.00	\$80.00	
Land Surveyor I		\$70.00	\$70.00	
<u>Technician:</u>	Technician V	\$85.00	\$100.00	
	Technician IV	\$75.00	\$88.00	
	Technician III	\$65.00	\$76.00	
	Technician II	\$55.00	\$64.00	
	Technician I	\$50.00	\$59.00	
	CAD Designer V	\$75.00	\$88.00	
	CAD Designer IV	\$70.00	\$82.00	
	CAD Designer III	\$65.00	\$76.00	
	CAD Designer II	\$60.00	\$70.00	
	CAD Designer I	\$50.00	\$59.00	

*Each position also applies to other professional disciplines, such as hydrologists and geologists.*



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

## PND PROJECT TEAM

The following individuals will be assigned these respective roles:

Principal-in-Charge	Dennis Nottingham, P.E.
Project Manager/Marine Design	John Pickering, P.E.
Quality Assurance/Quality Control	Alan Christopherson, P.E.
Site/Civil - Lead	Doug Kenley, P.E.
Site/Civil	Carl Hall, P.E. Chris West, E.I.T.
Marine Design	Kenton Braun, P.E. Dempsey Thieman, P.E. Eric Fontaine, P.E.
Roads	Wade Lundberg, E.I.T.
Hydrology	Jim Campbell, P.E.
Structural	Chuck Kenley, P.E.
Survey	Maynard Taylor, P.L.S. Roger Ippisch, P.L.S.
Permitting	Jennifer Wilson, M.E.S.

*Resumes for the individuals named above follow, in alphabetical order.*

**KENTON W. BRAUN, P.E.**  
**Senior Engineer**  
*Peratrovich, Nottingham & Drage, Inc.*

*Registered Civil Engineer (CE 9808), Alaska, 1998*  
*AWS-Certified Welding Inspector, 2001, #95050043*

*B.S., Civil Engineering, 1993, Montana State University*  
*M.S., Civil Engineering, 2000, University of Alaska Fairbanks*

During Mr. Braun's tenure with PND, he has worked chiefly in the areas of structural, civil, geotechnical, and marine design, contract administration, and construction inspection. He has proven his knowledge of engineering design and industrial construction on many successful projects.

Mr. Braun has thorough marine design and inspection experience. He has designed several successful marine dock facilities including the 160-foot steel pile-supported replacement of the timber "T"-dock for Westward Seafoods, Inc. in Unalaska, Alaska, and open-cell sheet pile dock in Homer and Seward, Alaska. In addition, Mr. Braun has designed and inspected construction of several marine dolphin structures in Valdez and Unalaska, Alaska. He also designed and inspected the installation of a marine mooring buoy for SERVS/VEOC in Valdez, Alaska. His marine inspection projects include the Skagway Tour Ship Dock, Chenega Dock, Westward Seafoods Dock, and Herndon & Thompson Leasing Dock in Homer, Alaska.

Mr. Braun has extensive experience in the design and analysis of bridges. He has worked for several years in analysis and reconstruction of access bridges servicing the Trans-Alaska Pipeline. Mr. Braun has also designed six heavy-duty bridges on the North Slope of Alaska capable of supporting 2,000-ton drill rigs and modules. Two of these heavy-duty bridges are designed to completely submerge below the Kuparuk River during the annual spring breakup.

He wrote a computer program to analyze heavy vehicle loadings of the West Dock Causeway Bridge in the Beaufort Sea for ARCO Alaska, Inc., and participated in the ultimate ice loading analysis of the bridge piers. Mr. Braun has also analyzed several heavy vehicle-loading configurations for the Endicott Causeway Bridge, the West Dock Causeway Bridge, the Central Creek Bridge on the North Slope of Alaska, the Kuparuk River Central Channel Bridge and the Tarn Oil Field Access Bridges.

Mr. Braun has been involved in ice resistant structure design and analysis throughout his career. Mr. Braun developed a finite element model to analyze loads from ice failing in bending against conical bridge piers. Mr. Braun continues work in this area and is currently assisting the University of Alaska Anchorage in further analyses of this ice failure mechanism. Mr. Braun has designed several bridges on the North Slope of Alaska to resist ice loadings and has been involved in many other bridges throughout the state of Alaska.

Mr. Braun has also been involved in several large tank retrofits and movements. Mr. Braun recently designed a new ringwall for a pump station on the Trans-Alaska Pipeline. The design required development of a lifting plan to raise and lower the tank for replacement of the ringwall. Mr. Braun has also been involved in planning for transportation of relocated tanks.

Mr. Braun participated in design of large building projects including the Goldenview Middle School and Inuit Office Building in Anchorage, Alaska, the Alaska SeaLife Center in Seward, Alaska, the KANA Health Clinic in Kodiak, Alaska, and the Alaska Commercial Company stores in Nome and Dutch Harbor, Alaska.

**References:** Glenn Doran, ConocoPhillips Alaska Inc., (907) 265-6148; Greg Swank, BP Pipelines, (907) 564-5586; Mark Dawson, Swalling Construction Co., (907) 272-3461.



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**JIM CAMPBELL, P.E.**

**Senior Engineer III**

*Peratrovich, Nottingham & Drage Inc.*

*Registered Civil Engineer (CE 9311), Alaska, 1996*

*Registered Civil Engineer (CE 29793), Colorado, 1994*

*B.S., Civil Engineering, 1988, University of Colorado, Boulder*

*M.S., Civil Engineering, 1993, University of Colorado, Boulder*

Mr. Campbell has 14 years of combined project experience in surface and subsurface hydrology, hydrogeology, environmental investigations, and civil design and planning. He has been considerable experience with coastal erosion projects, including meteorological and oceanographic data collection and analysis, and shore protection design.

Some of Mr. Campbell's recent project experience includes:

- Oceanographic data collection for a proposed deep-water port for DeLong Mountains Mining District in northwest Alaska (Red Dog Mine). Purchased, deployed, maintained, downloaded and prepared data reports for acoustic doppler current profile meters, directional and non-directional wave gauges, tide gauges and sediment traps. Obtained meteorological data from existing port site weather station. Data collection program conducted over 3-year period.
- Geotechnical investigation and engineering for sheet pile bulkhead dock and armor stone shore protection at new Port MacKenzie marine terminal, located in Matanuska-Susitna Borough, across Knik Arm from the Port of Anchorage.
- Shore protection design for proposed Kenai Coastal Trail. Performed engineering study for armor rock sizing for bluff protection at the City of Kenai and managed sediment transport study to investigate potential project impacts on Kenai Dunes at the mouth of the Kenai River.
- Shore protection design, geotechnical evaluation, slope stability analysis and civil design of open-cell sheet pile bulkhead for Chevron north Kenai site, along the shore of Cook Inlet.
- Design for riprap revetment erosion control project on Mendenhall River in Juneau, and provided quality assurance inspection services during construction of the project. Assisted with design of Kizhuyak River spur dikes erosion control project, and prepared bid documents.
- Designed erosion control repairs and improvements for Trans-Alaska Pipeline crossing at the Tanana River to protect elevated crossing supports and guy cable anchors.
- Conducted geotechnical investigation and permitting of 900-ft-long seawall to protect Phillips Alaska Inc. Kenai LNG plant and loading dock from coastal erosion.
- Hydrologic and hydraulic engineering for design of the Kuparuk River bridges on Alaska's North Slope in 1998-99, including analysis of historical data and new data collection during spring breakup. Designed new and reconstructed stream crossings along eight miles of new road in Petersburg. Design of riprap revetments along the Mendenhall River in Juneau and the Alyeska Pipeline Tanana River crossing.
- Instrumental in developing a database of hydrologic data about streams crossed by suggested routes for a proposed Phillips/Exxon/BP natural gas pipeline from Prudhoe Bay, Alaska, to Edmonton, Canada.
- Performed marine and onshore geotechnical investigations for structure foundation design, and dredging studies, including a recent \$0.7 million investigation at the Red Dog port site, north of Kotzebue, and investigations at the port of Anchorage, in Seward, and on the Kenai Peninsula.

Mr. Campbell has provided permitting assistance to clients on numerous projects, including U.S. Army Corps of Engineers (Section 10 and Section 404) permits, Alaska coastal management consistency reviews, ADEC storm water reviews, ADF&G fish habitat permits, ADNRR land and water use permits, sewer and water



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

reviews, and municipal plan reviews. He recently completed hydrologic analyses, an erosion and sediment control plan, and storm water pollution prevention review package for ADEC for the Whittier Creek stabilization project.

Mr. Campbell was responsible for the complete design, permitting, and preparation of bid documents for a \$1.6 million, 40,000-square-foot Dillingham bulkhead dock; for a \$1.4 million seaplane base expansion and innovative post-tension slab marine ramp for Akutan; and a \$0.8 million groundwater recovery/ hydrocarbon removal system at a former Kenai refinery site.

**References:** (1) John Hammelman, Unocal Inc. 907-283-5507; (2) John Wood, AIDEA 907-269-3034; (3) Randy Romenesko, City of Nome, 907-443-6605; (4) Burt Rosenbluth, ConocoPhillips Alaska Inc., 265-1052; (5) Marc VanDongen, Port MacKenzie Director, 907-746-7414; (6) Steve Repp (re: gas line hydrology), 907-564-4505.



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**ALAN B. CHRISTOPHERSON, P.E.**

**Senior Vice President**

*Peratrovich, Nottingham & Drage, Inc. (PND)*

*Professional Engineer (CE 5786), Alaska, 1983*  
*Professional Engineer (CE 14218), Oregon, 1988*  
*Professional Engineer (CE 25617), Washington, 1989*  
*Professional Engineer (079647), New York, 2002*  
*Professional Engineer (0402 038 144), Virginia, 2003*  
*Professional Engineer (PE 0627900, Pennsylvania, 2003*

*B.S., Civil Engineering, 1975,*  
*University of Washington*  
*M.S., Civil Engineering, 1981,*  
*University of Alaska*

*American Welding Society Certified Welding Inspector (95050921), 1995*  
*North Slope Specialty Safety Training for work at North Slope Oil Fields, 2000*  
*Member, American Society of Civil Engineers*  
*Member, National Society of Professional Engineers*  
*Member, Society of American Military Engineers Institute*  
*Associate Member, Society of Naval Architects*  
*and Marine Engineers*

*Member, Deep Foundations Institute (DFI)*  
*Member, American Welding Society*  
*Member, Project Management Institute*  
*Member, Commonwealth North*

*Professional Affiliate, American Institute of Architects, Alaska Chapter*  
*Subcommittee Member, Commission on Privatization & Delivery of Government Services*  
*Director, Architects and Engineers Insurance Company*  
*Commissioner, Municipality of Anchorage Urban Design Committee*  
*Director, Gunderboom, Inc. (water containment booms)*

Mr. Christopherson is a professional civil engineer with more than 25 years of Alaska and Russia planning, design and construction experience. He is also an owner and financial officer at PND. He has extensive planning, design, project management and construction experience with marine, port and land structures constructed from steel, concrete and timber. In addition, he has special experience in the design and construction of special foundation systems and structures in remote arctic and subarctic regions.

Mr. Christopherson is also extremely skilled at organizing and motivated engineering teams to successfully complete fast-track and difficult projects. Related experience includes project planning, engineering concept studies, ability to develop new and innovative solutions for conditions and project constraints, financial planning and analysis, cost estimating, foundation investigations, marine dredging, rock quarry development, reburial of offshore pipelines, slope stability analyses, design of drainage systems, development of construction systems for difficult pile driving conditions, construction engineering and management, and computer analysis of design.

**ALASKA TASK ASSIGNMENTS**

*Peratrovich, Nottingham & Drage, Inc. (1981-Present)*

- Principal for the development of elevated and standard approach bridge access for a variety of proposed North Slope oil pad developments in varied soil and river conditions and locations to the west frontier of Alaska's North Slope oil development. To date, 12 bridges have been designed and constructed. Design vehicle loads exceed 4 million pounds.
- Principal for development of a safe plan to rebury two 40-year old gas lines both exposed for approximately 400-ft to Cook Inlet tidal action and extreme current induced vibration. These primary gas supply pipelines were in danger of catastrophic failure. Extreme daily tidal variations, poor soil conditions and limited access to the site created unique challenges to the work.
- Principal for compliance upgrades of 44 Alyeska Pipeline Service Company, Inc. workpad access bridges. Project involved remedial designs, costs estimating, coordination of material purchases with contractors, development of implementation plans for the contractors, staff manned field inspection programs, project technical support, as built documentation and closeout.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

- Principal and civil engineer for PND's role in the development of the BPX offshore Northstar oil production island in the Beaufort Sea. PND's unique open cell dock concept was implemented to allow construction of phased island, pipeline and sheet pile construction. In addition, driven pile foundations that would have been difficult and expensive to install on the limited island footprint were substituted with precast concrete footings. More than 400 footings were placed on green gravel filled through the ocean and supported loads up to 1,000 tons. The project involved an interactive team approach over two year's time.
- Principal and civil engineer for the Port of Kholmsk dredge project on Sakhalin Island. The project involved development of a concept that could be accepted by local and regional Russian technical and permitting agencies, while utilizing the capabilities of special Japanese dredge equipment from Hokkaido, and dump barges from Russian companies. Due to permit restrictions work was limited to the months of December through April and dumping 12-km offshore was only permitted. The 50,000 cubic meters of sand/rock dredging was completed on schedule and within expected budget limits. Construction at the port represented the first of its kind in more than 20-years. The project was in serious doubt by many technical reviewers because of the limited field investigation work. Many believed the rock would require drilling and blasting before it could be excavated. The dredge channel now allows Sakhalin Energy to access this harbor with all vessels in its inventory.
- Principal and civil engineer for several Sakhalin Island oil related studies and projects. Studies included development of concepts and cost estimates for several new and existing port upgrades.
- Principal and structural engineer for design of two bridges at the Tarn oil field development. This North Slope oil field was completed from discovery to oil flow in 14-months. PND participated in a strong team approach to assure approximately \$10 million of critical road access construction was permitted, designed, fabricated and constructed on schedule. The bridges were constructed with driven steel piles and sheet piles, including steel and concrete decks during the winter with temperatures below -25 F. The project was completed on schedule and was well received by government agencies as a positive solution for construction on North Slope rivers.
- Principal and structural engineer for analysis and upgrade of the West Dock Causeway dock head 2 facility for larger loads and dredging. Special extra heavy-duty fabric was used in layers behind the dock to provide a quick and cost effective long-term solution. PND has pioneered the use of geotextile fabrics in a variety of special applications such as strengthening of dredge spoils, low cost retaining walls, gravel roads on ice rich foundation soils, erosion protection, and marine containment booms.
- Principal and civil engineer for development of an avalanche berm to intercept and protect Alyeska Pipeline Service Company facilities from seasonal conditions. Innovative engineering design development provided significant cost savings. Special construction and drainage was required to maintain steep slopes during and after construction. Technical duties involved design, development of bid packages, selection of contractor, project management and administration of contract, field inspection and as built documentation.
- Principal and engineer for the development of special submersible and low water crossing bridges at the Kuparuk River east and west channels. This dynamic North Slope river presented many challenges with regard to structural ice, scour, foundations, construction and operations. Several papers are presented about the project.
- Principal and structural engineer for analysis of various new and modified drill rigs on Alaska's North Slope including new bridges constructed.
- Principal and geotechnical engineer for design of the Niakuk oil facility steel pile foundations on Alaska's North Slope. Services included design, field support to construction, monitoring and as built documentation of piles installed in saline permafrost.
- Concept design and planning for several marine facilities in Thailand and Indonesia. The Thailand projects involve the development of marine facilities for the loading and unloading of gypsum materials. The Indonesia work is as a subconsultant to a large international energy company bidding



- for the construction of a coal fired generation plant. PND developed concept plans for cooling water intakes and several coal unloading facilities along with ROM costs.
- Project Manager and designer for various Veco Engineering and Alyeska Alliance projects. Projects include development of inspection methods for deep buried pipelines on steep slopes, erosion control of interior Alaska rivers along the TAPS pipeline, inspection of aerial suspension bridges by cable systems, and oil spill protection systems in Prince William Sound that include deep water buoys, shore protection bulkheads and van storage pads for storage and rapid deployment of containment booms.
  - Project Manager for the Alyeska SERVS/VEOC oil spill response base at Valdez, Alaska. The base provides docking facilities for marine vessels and a 27,000-square-foot facility for command and control of oil spill exercises and real spill events. The project was developed under a competitive design/build arrangement. The project provides approximately 600 feet of docking, a floating dock and 450 feet of trestle. Special rock anchor designs were used to anchor foundation pile to rock near the seabed surface. Site work includes drainage design, paving, fencing, guard control buildings, utility connects to the City of Valdez, and a helipad. The facility cost was approximately \$16 million.
  - Designer and project coordinator for repair of the Red Dog Port dock cathodic protection system. Provided new design and construction drawings to attach anodes to the dock. Severe storms had damaged or destroyed previous attempts.
  - Project Manager for developing a working plan to provide international air service to Petropavlovsk-Kamchatski, Kamchatka, Russian Far East (RFE). The project required considerable commitment due to the rapid changes occurring in the CIS. Work included site reconnaissance, collection and translation of technical data, report on recommendations for development of the site, ROM costs and possible construction schedules. The final report is presented in English and Russian. Project duration was approximately 1-1/2 years.
  - Concept design for the Ayan-Maya deep-draft port (sheet pile dock) and 160 km road for resource extraction in the Khabarovsk Territory, Russian Far East (RFE). The port is a potential starting point for road access into remote central Siberia and various communities.
  - Assistance to the Regional Kamchatka Government, RFE, with development of Petropavlovsk-Kamchatski Port upgrade and opening to western commerce. The project included coordination of port and financial consultants. The final report presents the best information available about container cargo transport to the region, projected future growth, the regions future opportunities, financial planning and recommendations and cost estimates for upgrades at existing ports.
  - PND Project Manager for the proposed Denali Pipeline Project (MAPCO) from North Pole to Anchorage via Parks Highway Corridor. Project provided geotechnical assessment of the route, analysis of bridge crossings, route mapping, route selection and preliminary design concepts for an underwater crossing of Cook Inlet, property ownership maps, and concepts for routing pipeline through the complex Port of Anchorage facilities and buried utilities.
  - Analysis of 1.7-mile gravel causeway and breach offshore N.W. Milne Point near Prudhoe Bay, Alaska for Conoco. ROM estimates were made of material quantities, construction schedules and costs. Alternative concepts and innovative technical ideas were considered to reduce costs.
  - Project manager and engineer for development of Dismantle, Removal and Renovation (DR&R) for the KPL Plant, Marine Terminal, 3.6-mile Middle Shoal Ground Pipeline and 19.2-mile Swanson River Pipeline. The DR&R plan provided methods, procedures and costs to undertake restoring previously developed oil field lands back to it's natural state.
  - Conceptual design of oil spill response ferry transport docks at the Villages of Tatidek and Chenega, Alaska. Concept plan required field reconnaissance, concept drawings, concept cost estimates and development of a report for presentation to Alyeska management. The concept plan was used as the basis for an oil spill settlement between the oil companies and two native village corporations. Marine facilities were constructed at each village with the settlement money.
  - Design of 900-foot offshore breach at West Dock Causeway, Prudhoe Bay, Alaska. Bridge is twin steel box girders with precast concrete deck panels. Three all steel ice breaking piers each supported



by six 36-inch diameter steel pipe piles driven approximately 200 feet with spin-fin tension tip attachments. The piers are designed for approximately 45 feet of scour and 5-foot thick sea ice loadings. The bridge includes tilt-down rails for easy transport of low and wide loads, modular girder construction using weathering steel for low maintenance, and supports up to 10 oil, gas and water pipelines. The bridge was partial assembled in the shop and then shipped in components by ship, rail and truck to the site. Because bridge components were truckable they could be shipped to the site as required for greater schedule flexibility. Partial assembly in the shop made erection at the site fast and without requiring any field structural modifications. Precast concrete panels were grouted to steel girders for composite action.

- Project Manager for 5-year inspection of the Kuparuk Module Bridge at Prudhoe Bay, Alaska. The bridge was designed by PND and has been used to transport heavy oil field modules and drill rigs since 1981. The largest vehicle transported weighed 2,500-tons (5,000,000 lbs.).
- Structural analysis of the Kuparuk Module and Central Creek bridges (North Slope) for various oil field drilling rigs weighing in excess of 2.5 million pounds. PND regularly assists clients with analysis of special and heavy loads proposed for existing structures.
- Assisted Alaska Industrial Development and Export Authority (AIDEA) Value Engineering Team with evaluation of conceptual port development costs for the proposed Fire Island marine facility near the Anchorage airport. The team was able to reduce project cost by \$500 million over the proposed several billion-dollar project.
- Development of an Inner Harbor Arm marine mooring facility on St. George Island in the Pribilof Islands. Extreme wave conditions and short construction seasons make development of workable concepts a challenge.
- Design of barge improvements and deck crane additions for a 400-ft. x 100-ft. Alyeska Pipeline Service Company oil spill support barge. Project required working with naval architect to determine construction of the barge, field inspection to verify condition of the barge members and development of structural modifications to support the cranes. The barge was ABS certified before reuse.
- Developed civil plans and seismic analysis in accordance with API standards for Petro Marine Services, Inc. (PMS) fuel storage facility at Seward, Alaska. Piping and electrical construction was coordinated with PMS.
- Developed several conceptual offshore coal dock systems for sites along Alaska's North Slope. Concepts evaluated included barges, pile supported and gravel fill. Prepared ROM cost estimates, sketches and construction schedules.
- Project manager and designer for the \$22 million pipeline breach at the Endicott gravel causeway near Prudhoe Bay, Alaska. The causeway breach is 700 feet long overall and includes two all steel ice-breaking piers. Design scour is -45-ft. The construction is twin steel box girders with precast concrete deck panels and is designed for B-70 gravel hauler loads.
- Assisted Tesoro Project Team with conceptual design, cost estimate, and construction plan for an estimated \$250 million middle-cut pipeline from North Pole to Kenai by way of Alaska Railroad route through Alaska's interior. The project included preparation of ROM cost estimates, evaluation of foundation conditions, construction schedules, project financing, coordination with land owners, preliminary permit applications, preparation of preliminary route maps and construction schedules.
- Conceptual planning for development of a new Tesoro fuel tank farm and pipeline extension at Anchorage International Airport. The project required concept planning for the facility, preparation of cost and schedule information so the owner could program construction.
- Project Manager for conceptual study of the \$100 million Alyeska Oil Spill Response Base at Valdez, Alaska. Schematic dock and building ideas were presented. Findings were developed for presentation to owner company management.
- Coordinated support to Alyeska Pipeline Service Company to establish oil spill response facilities in the wake of the Exxon "Valdez" oil spill. Provided design for barge helipads, temporary offices, and



seven deep-water mooring buoy systems; conducted harbor concept studies; and inspected, and designed upgrades for, existing facilities.

- Provided conceptual plan and cost estimate for proposed dock capable of accommodating 140,000 DWT crude oil tankers at Tesoro's Kenai Refinery. Also prepared federal and state permit applications.
- As a result of an in-depth river control assessment, developed dike and low-water crossing design to protect access bridge, road, and buried portion of Trans-Alaska Pipeline at the midpoint of the alluvial fan formed by Unnamed Creek. Also assisted Arctic Hydrologic Consultants in hydrology analysis.
- Coordinated West Dock Causeway Breach Study for ARCO Alaska, Inc. Evaluated various alternatives for access over or under a 3,900-foot causeway breach, and provided detailed construction cost estimates and schedules for each. Design load for this North Slope project was a 5,700-ton module and carrier.
- Conceptual design of a 6,000-foot runway adjacent to Ballyhoo Mountain and Hog Island, in Unalaska. Nine alignments were reviewed to ascertain route that best met FAA clearance criteria, while minimizing fill requirements and reducing exposure to waves. Proposed concept called for blasting 5 million yards of material from Ballyhoo Mountain using a series of WWII-era tunnels.
- Project manager and designer and assisted with the construction management of two concrete-deck, steel-girder and pile-supported docks at the Port of St. George, with a total approximate dock area of 5,300 square feet. Construction was coordinated with the village to provide jobs and skill proficiency training, and local residents subsequently fabricated 75 panels measuring approximately 5-foot by 15-foot by 12 inches deep. Since material for the panels was not available locally, it was shipped to the site and batched into concrete. The steel superstructure, girders, and bullrails were fabricated in Seattle. The project was funded by several federal grants and was completed within budget. Approximately 60-65% of project funds were spent on the Island either in labor or the fabrication of construction materials.
- Developed and monitored driven pipe pile test program in support of foundation design for City of Kodiak's Pier II Dock expansion. Piles were driven from barge to determine expected depth of penetration and resistance. Results were used to develop a foundation system for the completed dock project.
- Performed approximately 100 load tests (uplift) on 2-, 8-5/8-, and 16-inch "*spin-fin*" anchor piles in sand and silt, and developed report on improved tension capacity of piles. This innovative pile type is now used in a wide variety of marine and soft soil conditions.
- Analysis of pile-driving systems using the wave equation, encompassing more than 5,000 piles of differing sizes and types and a variety of soil conditions, including installations in frozen and thawed soil conditions.
- Civil design services for 3,500-ton ship transfer facility and associated uplands at the Alaska Marine Industrial Center in Seward. The design/build project utilized driven pile foundations; a concept which saved the owner \$0.8 million. Provided contractor with design drawings, specifications, shop drawing review, pile-driving analysis, field inspection, and assistance meeting requests made by owner. Also performed post-construction analysis of pile capacity. The project won "Best of Program" in the 1990 Lincoln Arc Welding Award submittal.
- Layout and containment design for 2.0-million-gallon Ballyhoo Port Tank Farm in Unalaska. The project required the design and construction of concrete retaining walls for oil containment and to protect tanks from rocks falling from nearby Ballyhoo Mountain. The tank farm containment was designed to UFC code and State of Alaska Fire Marshall requirements. Piping and electrical design and truck loading facilities were coordinated with the owner.
- Under contract to Amerada-Hess to implement a plan to drive 20- and 30-inch-diameter conductor casings 140 to 160 feet below surface of North Star Offshore Island. Work was accomplished by coordinated planning with contractor. Procedures included using vibratory and impact hammers,



special screw-together casing connectors to eliminate welding. Approximately 560 linear feet of pipe was installed at three locations in four 10-hour shifts.

- Explored methods for driving piles in permafrost soils. Studies involved driving with vibratory and impact hammers, thermal pilot hole modification, and development of production driving systems. More than ten separate driving tests were performed, and all tests confirmed piles can be cost-effectively driven in permafrost.
- Developed design criteria for pile driving in permafrost. This parallel effort to other North Slope work we conducted resulted in publication of a research report for the Alaska Department of Transportation and Public Facilities, Division of Planning and Programming, Research Section. The report makes "state-of-the-art" information available to all practicing arctic foundation designers.
- Participated in development of new design criteria and highly efficient methods for driving piles in permafrost under contract to ARCO Alaska, Inc. Procedures were used to install support piles for various gathering lines and pipelines in the Kuparuk Oil Field.
- Project design for exterior cathodic protection system at Cominco's Red Dog shallow port dock. Project required design for extreme ice and wave conditions of Chukchi Sea. Also performed site reconnaissance and provided cost estimates.
- Provided preliminary foundation design concepts for dock systems at Oliktok Point near Prudhoe Bay. Proposed alternatives included fiber-fabric-reinforced fill, and cellular sheet pile walls in ring tension with friction wall tiebacks. Performed computer modeling for the selected cantilever retaining wall system and offshore mooring dolphin design.
- Designed foundation and provided construction engineering for all phases of the Kuparuk River Module Crossing. The bridge is capable of supporting loads up to 2,300 tons, and utilizes passive and active ground freezing systems to keep the soil permanently frozen around foundation piles. The bridge is designed for large ice impact loads from fresh water ice.
- Developed remedial underpinning concepts for buried portions of the Trans-Alaska Pipeline, which has since been implemented at four locations where the pipeline has failed. Design considerations included varying soil and thermal conditions and pipe burial depths; identification of simple, readily available structural components, and ease of construction.
- Design and cost estimates for several remedial design of North Slope foundations utilizing passive and active refrigeration systems. Often thawing due to ground water or heat from the building will cause the settlement of the building. Passive refrigeration such as heat pipes or active refrigeration such as mechanical systems can be used. Passive systems have lower first costs but are less effective because they shut off when the air temperature is above the ground temperature. Have learned considerable technical information about active and passive refrigeration systems from work on the TAPS pipeline and other North Slope foundation work.

*Alaska Pipeline Service Company (1975-1978 & 1979-1981)*

- Responsibilities and areas of emphasis included work planning, technical support, and Project Engineer/Coordinator functions for pipeline, pump station, terminal, and related facilities, to insure safe, continuous pipeline operation at lowest cost consistent with all regulations, standards, and prudent engineering practice. Worked three years in construction and one year in operations.
- Coordinated subsurface soils and pipe monitoring investigation program for ten miles of underground pipe. Located and evaluated potential pipe integrity problems, and developed remedial action plans. Devised methods for predicting further settlement and pipe curvature. Developed plans for winter installation of settlement rods to the pipe, directed the drilling of 32 refrigerated core holes to 100 feet, and provided a report of findings. Presented weekly progress reports to management.
- Coordinated thermal performance review of mechanically refrigerated portions of mainline pipe, which had been buried in thermally sensitive soils due to environmental restrictions. Maintenance breakdowns and groundwater affected system performance at some locations, and responsibilities included developing a team to determine where the problems were, how serious they were, and how



to fix them. The team retained key original designers and worked with mechanical and electrical engineering groups to solve concerns.

- Mechanically refrigerated foundation design for Kuparuk Metering Building at Pump Station 1. Performed thermal calculations to determine system component size and energy requirements. As the site is subject to annual groundwater intrusions; worst-case conditions were assumed.
- Provided design and construction plan for foundation for 40-room permanent housing and recreational facility at Pump Station 10, including special two-pile support and connection detail for highly loaded interior supports. Dense, compacted glacial deposits required a Becker drill with internal cutter to achieve pile design depth.
- Implemented 18-inch-diameter steel pipe piles for a variety of applications (i.e., bridge foundations and vertical support members) in different soil conditions and thermal regimes along the Trans-Alaska Pipeline route. Conducted uplift tests on driven piles in thawed cohesive river sediments and monitored freezeback rates and long-term performance for thermal piles.
- Conducted down-hole inspections of soil adjacent to thermal vertical support members placed in initially thawed fine-grained soils, to confirm computer-predicated freezeback calculations. Assisted with report on findings.
- Performed review function to evaluate overall integrity and durability of pipeline and pump station refrigerated-foundation installations, providing continuous monitoring of thermal conditions through design, supervision of installation, and checking of existing and new thermal monitoring devices.
- Provided analyses of soil thaw rates and thaw settlement predictions, and provided design analysis of as-built foundations placed on permafrost. Contributed to operational planning activities by providing data and projections for future thermal protection system needs, including estimated costs, to management.
- Contributed to effective completion of projects requiring integration of engineering disciplines by coordinating thermal protection system design and installation with activities of other engineering units. One such project was design of a mechanical refrigeration system for thermal protection of foundation soils under a buried hot oil relief and mainline pipe system at Pump Station 2. The design has been utilized at two refrigerated pump stations.

References: (1) Chris Hladick, City Manager/ Acting Port Director, City of Unalaska, (907) 581-1254; (2) Steve Repp, BP Exploration (Alaska), Inc. (907) 564-4505; (3) Mark Dawson, Swalling Construction (907) 272-3461.



**ERIC S. FONTAINE, P.E.**  
**Senior Engineer**  
*Peratrovich, Nottingham & Drage, Inc.*

*Registered Civil Engineer (CE 10679), Alaska, 2003*  
*Hazardous Waste Operations (HAZWOPER) certified per CFR 1910.120*

*B.S., Civil Engineering, 1995, University of Alaska, Anchorage*

Mr. Fontaine has more than eight years of civil, structural, and environmental engineering design experience in the state of Alaska. He is a lifelong Alaskan with an extensive construction background.

He has experience coordinating with government agencies to procure state and federal permits. He has participated in structural evaluations and design/upgrade of many bridges and marine facilities as well as overseeing their construction through completion.

His civil engineering experience includes design of small boat harbors, sheet pile and pile-supported docks, utilities, access roads, outfalls, retention basins, pipelines, and several types of foundations.

His project administration background includes project management, construction inspection, cost estimating, shop drawing and submittal review, fabrication review and inspection, and coordinating project logistics such as mobilization and demobilization of equipment and personnel to remote sites statewide.

Representative examples of Mr. Fontaine's inspection work include:

- Concept and final design of the Repair and Renovations to the Homer Small Boat Harbor. This project consisted of 30,000 sq. ft. of new timber floats, 3,000 sq. ft. of heavy-duty concrete floats, and repair and renovation to 25,000 sq. ft. of existing timber floats and existing timber maintenance grid. Additionally, Mr. Fontaine procured the permits, and provided construction inspection and management for the project. Contract modifications during construction were held to less than 2% of the original contract amount.
- Permit acquisition, design services, and construction support for the Unalaska Marine Center U. S. Coast Guard Dock. The USCG and the City of Unalaska combined to finance the construction of a 530-ft dock for use by USCG and the City. The dock consists of a heavy duty 325-ft. open cell sheet pile dock and a medium duty, 180-ft. pile-supported concrete dock as well as 2.5 acres of upland fill. The project also included design of water, sewer, electrical, phone, CATV, and fueling utilities.
- Condition inspection and structural evaluation of the City of Homer marine facilities. This project involved visiting three large industrial cargo docks and the City's vessel steel maintenance grid and inspecting all aspects of these facilities. Repair recommendations and a maintenance program was developed for each.
- Construction inspection of the Northstar Dock, Anchorage. This multimillion-dollar facility is the load out point for ARCO and BP modules constructed in Anchorage and bound for the North Slope. Modules as heavy as 2700 tons will be moved across this bulkhead. Mr. Fontaine provided on-site technical support and quality control for this project.
- Design and construction inspection of Cordova North Containment Dock improvements. The North Containment Dock was upgraded to provide a future base facility for the U. S. Coast Guard's 230' buoy tenders. Mr. Fontaine provided design services and remained on-site during the construction of this facility to provide technical support and quality control to the project.

**References:** Margy Johnson, Director of Economic Development, State of Alaska, (907) 269-8100; Greg Erickson, Red Dog Port Operations Manager, TeckCominco; Alaska, (907) 426-9401; Jan Jonker, Public Works, City of Homer, (907) 235-2170.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

**CARL HALL, P.E.**  
**Senior Civil Engineer**  
*Peratrovich, Nottingham & Drage, Inc.*

*Professional Engineer (CE 10059), -Alaska, 2000*

*B.S., Civil Engineering, 1994, University of Utah*

Mr. Hall has nearly eight years of general civil engineering, structural engineering, and construction management experience in the State of Alaska. He is proficient with AutoCAD and a variety of computer modeling and analysis programs including civil software packages. His design engineering experience includes marine, structural, geotechnical and general civil related projects. His construction management experience includes site surveying, cost estimates, and submitting/reviewing submittals.

Since joining PND in 1998, he has worked primarily in site development and earthwork; utility design; road and pedestrian pathway design; arctic engineering; foundation engineering; construction management; and inspection. Representative examples of Mr. Hall's relevant civil design team assignments include the following, all for which he developed site layouts utilizing 3D Design Software:

- Elmendorf AFB Child Development Center, Anchorage, AK – Provided grading, storm sewer, sanitary sewer, and water supply designs for this design-build center, currently under construction. It will accommodate 200 children and contains a kitchen, classrooms and administrative areas. The single-story, 24,000-square-foot structure is designed to the 2000 IBC code and incorporates the Department of Defense requirement for force protection.
- St. Paul Clinic, St. Paul, AK – Assisted with design elements including water and sewer main extensions, plat and site planning, grading and drainage, road extensions, and utility relocation.
- Kulis Air National Guard Maintenance and Vehicle Storage Facility, Anchorage, AK – This 12-bay, 21,000-square-foot facility includes an equipment fueling station, 180,000 square feet of paved vehicle maneuvering area, and area lighting. Extensive earthwork was required at the 15-acre site. Design elements included grading, storm sewer, sanitary sewer, and water supply.
- Arctic Boulevard Road Reconstruction, Anchorage, AK – Upgrades to this 1-mile stretch of urban arterial included lane straightening/widening, signalization, storm drain improvements and work on associated trail systems, sidewalks and intersection layouts.

Additional experience includes developing site layouts for Unalaska Elementary School; Office Depot (Anchorage); Whittier Tunnel Vehicle Staging Areas (Bear Valley & Whittier); Passage Canal Drive and Alaska Railroad Corp. Whittier Pedestrian Tunnel (Whittier); the Alcantra Recreational Facility, and Meadow Lakes Elementary and Greater Core Elementary schools, and Montana Creek Bridge and Pedestrian Improvements (Matanuska-Susitna Borough).

His current assignments include serving on the civil design team for the St. Paul Health Clinic, Anchorage Water and Wastewater Utility Emergency Response Center, National Oceanic and Atmospheric Administration/National Marine Fisheries Service Research Facility at Lena Point, Cordova Center, and Wasilla Sports Complex.

**References:** (1) Bud Courtright, Swalling Construction, (907) 272-3461; (2) Nolan Dugas, Phillips Alaska, Inc., (907) 659-7628; (3) Gary Simmons, Simmons & Associates, (907) 273-1641.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

**ROGER IPPISCH, P.L.S.**  
**Land Surveyor/Field Survey Crew Chief**  
***Peratrovich, Nottingham & Drage, Inc.***

*Registered Professional Land Surveyor, Alaska, 1994, LS 8855*  
*40 hr FLAZWOPER Certification*

Mr. Ippisch is a professional land surveyor with 20 years of experience surveying throughout Alaska.

Mr. Ippisch has been Survey Party Chief on numerous boundary, aerial photo control, bathymetric, design, construction and cable route surveys. He is experienced in using state-of-the-art surveying equipment including gps, total stations and various echo sounders.

Past and present clients include the Matanuska-Susitna Borough, Municipality of Anchorage, City of Unalaska, City Borough of Juneau, Alaska Department of Transportation and Public Facilities, and the National Forest Service. Example projects include:

- Aerial photo control and offshore mapping for the Port MacKenzie Dock Design.
- Topographic survey for road and building design at Meadow Lake Elementary School.
- Research for the Lake Louise Trails Project.
- Topographic survey for road and building design at Greater Core Elementary School.
- Topographic survey of the Wasilla Sports Complex property.
- GPS mapping for the Chenega Trail Project.
- Aerial photo control for the Kenai Coastal Trail Project.
- Eklutna Lake trail survey to replace bridges destroyed by flooding in 1996.
- Boundary survey for the DGPS Beacon site in Kenai.
- Provided horizontal and vertical control for aerial mapping of Fort Richardson, for Army National Guard improvements.
- Provided supplemental horizontal and vertical control, ran profile, cross-sections and set bench marks along a portion of the Tony Knowles Coastal Trail, from Point Woronzof to Kincaid Park, in Anchorage.
- Department of Transportation design survey of Arctic Boulevard from Dimond Boulevard to 68<sup>th</sup> Avenue for improvements and right-of-way alteration.
- Bathymetric and design survey for the Homer Small Harbor upgrade.
- Bathymetric and upland topographic for the design of the new Seward Railroad Dock.
- ATS survey experience includes Skagway (1502 and 1625), Chenega (1484), Akutan (1498), Tyonek (1516) and Valdez (1517).

References: Robin Hall, City of Unalaska Planning Director, (907) 581-3100; Steve Schmitz, PLS, Alaska Dept. of Natural Resources, (907) 269-8777; John Kerr, Chief of Surveys, Alaska Department of Transportation and Public Facilities, (907) 269-0713



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

**F. CHARLES (CHUCK) KENLEY, P.E.**  
**Principal, Senior Engineer V**  
**Peratrovich, Nottingham & Drage Inc.**

*Registered Civil Engineer, (CE 6251), Alaska, 1984*  
*Certified Welding Inspector*

*BS, Civil Engineering, 1979, Brigham Young University, Provo, UT*  
*MS, Structural Engineering, 1980, Brigham Young University, Provo, UT*

Charles Kenley is a structural engineer with 23 years of professional experience. He is a lifelong Alaska resident who has worked in virtually every region in the state. His assignments have taken him from major urban districts to isolated rural regions, enhancing his ability to resolve diverse design challenges. He has extensive experience in structural design of building, marine and heavy industrial structures.

As a PND principal and senior structural engineer, his responsibilities include supervision and design of architectural projects. He has been directly involved in computer-aided design and drafting (CADD) since 1984. He has provided structural expertise on projects with construction budgets of up to \$50 million.

Mr. Kenley's projects have included waterfront structures, medical, military and various institutional facilities, schools and auditoriums, and fish processing and other industrial facilities. They encompass timber, masonry, concrete and steel structures and their foundations. They have also included seismic design and analysis; Mr. Kenley's master's thesis was devoted to seismic analysis of building structures.

His recent assignments in Valdez include serving as lead structural designer on both the Valdez High School Pool Addition project and the Valdez High School Avalanche Risk Assessment/Upgrades project.

His current assignments include serving as lead structural engineer on the NOAA/NMFS facility at Lena Point near Juneau, Alaska. This \$50 million, 80,000-square-foot facility will include administrative offices, laboratory spaces, common areas and warehousing. Building forms will be two to three stories tall, constructed of steel framing.

Mr. Kenley is also serving as lead structural engineer and PND project manager for a 14,000-square-foot dormitory project at the Alaska Vocational-Technical Education Center in Seward, Alaska. He is also involved in compilation of the AVTEC Master Plan, and recently completed structural evaluations of the center's warehouse roof and mechanical shop.

Other representative project experience includes serving as lead structural engineer for:

- Alyeska's Ship Escort Response Vessel System/Valdez Emergency Operations Center (SERVS/VEOC), Valdez, Alaska - This design/build 25,000-square-foot center on the Valdez waterfront includes offices, shop facilities, a training center, state-of-the-art communications, and agency offices for the Coast Guard and Alaska Department of Environmental Conservation. It includes a 20,000-sq-ft pre-engineered metal building.
- Alaska SeaLife Center, Seward, Alaska - The center is a \$47 million, five-acre education and research center. A significant feature of the project is the seawater supply system. Outdoor habitat, viewing areas and research pools also made this a challenging project. PND provided civil, structural, survey, geotechnical and marine civil design services. Responsibilities included site investigation and evaluation, offshore bathymetry, shore protection, building and seawater well structural design, as well as site civil design. Lead structural engineer.
- Public Safety Building/Fire Station, Wasilla, Alaska - This project was a fast-track design-build with a local general contractor. The project consists of 25,000 sq ft of truck bays and public facilities.



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**Engineering Consultants**

including conference rooms, offices and dormitories. The structure is a combination of steel framing and concrete masonry. Lead structural engineer.

- Providence Family Practice Residency Center, Anchorage, Alaska – This 23,000-square-foot medical clinic includes exam rooms, lobby and classrooms. Total construction budget for the single-story masonry and steel building was \$4 million. Lead structural engineer and PND project manager.
- Kodiak Area Native Association Health Clinic, Kodiak, Alaska – This is a \$2.5 million, 20,000-square-foot, three-story health care facility. PND provided geotechnical, civil and structural design services for this project. Lead structural engineer and PND project manager.
- Meadow Lakes and Greater Core elementary schools, Matanuska-Susitna Borough, Alaska – Meadow Lakes is a two-story, 53,000-square-foot elementary school near Houston, Alaska, constructed of masonry and wood framing. Site work included on-site well and septic system as well as access road design. Total project costs were \$8 million. Greater Core is a reuse of the design for Meadow Lakes Elementary School; PND provided structural/civil design for the site adaptation as well as master planning for the 40-acre site. Lead structural engineer on both projects.

References: Kirk McGee, VP of Real Estate, Cook Inlet Region Inc., (907) 274-8638; Marcus Alden, President of Westward Fishing Co., (907) 341-9996; Mike Price, Anchorage School District, (907) 348-5241.



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**Engineering Consultants**

**DOUG KENLEY, P.E.**  
**Senior Engineer, Principal**  
***Peratrovich, Nottingham & Drage, Inc.***

*Registered Civil Engineer (CE 8176), Alaska, 1991*

*B.S., Civil Engineering, 1986, Brigham Young University*

Mr. Kenley has 17 years of design experience encompassing a broad range of civil and structural projects throughout Alaska. His experience includes all phases of design, from site development to construction administration. As a project manager, he routinely prepares fee proposals, manages project teams and budgets, and consults and coordinates with clients. Mr. Kenley's civil design assignments routinely require evaluation of existing utilities and site layouts, environmental assessments and permitting, and preparation of contract documents and specifications. They commonly entail relocation of existing utilities, easement work, sewer and water main extensions, and road extensions.

He is proficient with AutoCAD, and current computer modeling and analysis techniques for civil/structural engineering including water distribution system network analysis and civil software packages. His projects frequently comprise renovations, upgrades, additions, remodels and conversions of existing facilities, including educational facilities.

His experience in Valdez within the past five years includes serving as project manager for the Valdez Container Terminal Annual Inspection (1998), the Valdez High School Pool Addition (1999), the Valdez High School Avalanche Risk Assessment (1999), the Old City Dock Master Plan (2001) and the Small Boat Harbor Master Plan (2000).

Other projects representative of Mr. Kenley's experience and expertise include:

- Civil design for Kulis Air National Guard and International Airport Flight Line Fire Station
- Civil design for Kulis Air National Guard Vehicle Maintenance Facility
- Storm water drainage designs for Troy Air and Alaska Airlines
- Investigation of aircraft ramp settlement at Kulis Air National Guard Base
- Civil design for Kodiak Fish Meal Plant
- Civil design for Kodiak Area Native Association Health Care Center
- Petersburg water utility system modeling
- Civil design for Alaska Commercial Company stores in Cordova, Dutch Harbor and Nome
- Structural design of warehouse mezzanine for City of Unalaska
- Civil design for Unalaska Community Center, City Hall, Post Office and school addition
- Civil design for Westward Seafoods warehouse and bunkhouses
- Civil design for Peck Conveyor at Eielson AFB's Main Power Plant
- Established dismantling costs for major oil pipeline/ship loading facility for Mapco
- Civil design for domestic water distribution system, Homer Small Boat Harbor
- Civil design for Wasilla Public Safety/Fire Station
- Design of water treatment facilities and water transfer stations, and modernization of Nurses Creek Water Line Upgrade Project for the U.S. Navy at Adak, Alaska

References: Marc Van Dongen, Port Director, Port MacKenzie, Matanuska-Susitna Borough, (907) 746-7414; Carl Heidel, Eielson Air Force Base, (907) 377-1150; Daryl Schaefermeyer, Alaska SeaLife Center, (907) 224-6300.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

**WADE LUNDBERG, EIT**  
**Staff Engineer**  
*Peratrovich, Nottingham & Drage, Inc.*

*Engineer-in-Training, 2002, Alaska*  
*AWS Associate Welding Inspector, April 2002, Cert. Number 02050012*

*M.S. in Engineering Management, 2000, Cornell University, Ithaca, NY*  
*B.S. in Civil Engineering, 1999, University of Arizona, Tucson, AZ*

Mr. Lundberg is a civil engineer with more than two years of experience supporting concurrent projects with activities such as quantity calculations, cost estimation, processing permit documents, earth stability calculations, pipe flow analysis, and road alignments. His projects have consisted primarily of large earthen fill docks, remote transportation systems, and civil site plans.

Representative project experience includes:

- Kenai LNG Erosion Control Project, Nikiski - Provided onsite construction inspection for ConocoPhillips bluff stabilization project involving construction of 220 linear feet of open cell steel sheet pile retaining wall and provided design drawings for an additional 660 linear feet of adjacent open cell steel sheet pile retaining wall. Work included assistance with permitting.
- Chignik Harbor - Provided design for revetment for inner harbor development
- Kuparuk River East Channel Repairs - Provided cost estimating and revetment design for repairs to downstream east side of the low-water roadway following spring breakup flood damage.
- National Petroleum Reserve-Alaska transportation system - Provided cost estimating services for ConocoPhillips for development of water access, barge docks, pipeline and vehicle bridges, roads, pads, airstrip, hydrology, survey and material sources.
- Pyramid Creek Bridge, Unalaska - Provided on-site construction inspection for a 40' heavy duty steel bridge.
- Dillingham All-Tide Dock - Provided design drawings for a large open cell fill dock, including a civil site plan, sheet pile facing, and upland access plan as well as processing permit documents, contract documents, and cost estimates.
- Unalaska Marine Complex USCG Dock - Provided design drawings of a civil site plan, including a storm drain system, for a large open cell fill dock and adjacent quarry.

His previous experience has included eight years with South Coast, Inc., a heavy construction contractor in Ketchikan, Alaska. There he progressed through construction survey crew positions from Rodman to Field Engineer/Party Chief. Tasks included scheduling and performing layout for all phases of construction and all quantity calculations on various AK DOT projects in this capacity. He transitioned to line management as the Project Superintendent on the Sitka Airport Taxiway and Apron Reconstruction. He also completed projects in Southeast Alaska, on the Kenai Peninsula, along the Bristol Bay coast, Bethel area, and in the Aleutians.

References: (1) Jan Paulson, Vice President, South Coast, Inc., (907) 225-6125; (2) Dr. Juan Valdez, Civil Engineering and Engineering Mechanics, University of Arizona, (520) 621-2266; (3) John Fulton, Dillingham City Manager, (907) 842-5148.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

**DENNIS NOTTINGHAM, P.E., P.L.S.**

**President**

*Peratrovich, Nottingham & Drage, Inc.*

*B.S. Civil Engineering, 1959, Montana State University, Bozeman, Montana*

*M.S. Civil Engineering, 1960, Montana State University, Bozeman, Montana*

*Professional Engineer (CE 1204), Alaska, 1963*

*Professional Engineer (CE 18468), Washington, 1979*

*Professional Land Surveyor (LS 3429), Alaska, 1972*

*Certified Scuba Diver, 1971*

*Fellow, American Society of Civil Engineers*

*Member of numerous technical organizations*

Mr. Nottingham has more than four decades of Alaska experience in structural and civil engineering design, and management of complex, fast-track projects in Montana, Washington, Alaska, and internationally. His innovative designs show a thorough understanding of special conditions related to arctic and subarctic design and construction, including ice forces on structures, foundations in permafrost, cold climate effects related to roads, seismic forces and winter construction conditions.

Mr. Nottingham is a 14-time award winner in the James F. Lincoln Arc Welding Foundation awards program for structural design of bridges and marine facilities.

**ALASKA TASK ASSIGNMENTS**

*Peratrovich, Nottingham & Drage, Inc. (1979-Present)*

- Project Manager for numerous container and general use ports.
- Cordova Deep-Draft Port Study, including location evaluation and economic analysis for port to support the tourism, timber, cargo and fish industries.
- Shop drawings and construction calculations for fabrication and erection of girders for the DeArmour Overcrossing Project, in Anchorage.
- Evaluated feasibility of mining four million cubic yards of gravel at Fourth of July Creek, in Seward, for shipment to overseas markets.
- Numerous in-house research projects, such as development of the spin-fin pile, a high-capacity geotextile retaining wall, boat float systems, open-cell bulkheads, new bridge systems, and wave barriers; and formulation of methodology for driving piles in permafrost.
- Preliminary planning and design for the Whittier Tunnel.
- Preliminary waterfront master plan for the City of Seward.
- Served as expert witness for numerous statewide structural problems.
- Preliminary planning and design of Copper River Highway extension.
- Dock feasibility studies and preparation of two alternative preliminary designs for Tesoro. The planned dock, located in Nikiski, was required to accommodate 140,000-ton vessels.
- Preliminary engineering and cost studies for ALAGCO's proposed Wishbone Hill Coal-Loading Facilities, which would handle approximately one million tons of coal annually.
- Fast-track design of UnoCal Corporation's Lewis River Bridge, in upper Cook Inlet. The single-span, box-girder bridge was design and constructed in approximately eight months.
- Design of the 112-foot-long Barratt Inn Pedestrian Tunnel, which runs under Spenard Road, in Anchorage.
- Structural design and construction administration provided to U.S. Air Force/UnoCal Corporation for three modular process buildings, the largest of which was 70 tons.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

- Road access and port site study in the Katalla region of the Chugach National Forest.
- Design of dam and creek diversion to route water away from an open-pit mining operation at Valdez Creek.
- Conducted investigation and provided solution to tidal inflow problem at City of Cordova's solid waste disposal site.
- Value engineering redesign of foundation for 12,000-square-foot Riley Creek Visitor Access Center, in Denali National Park and Preserve.
- Economic analysis of existing port and related facilities for City of King Cove.
- Value engineering redesign of bridge overcrossings for \$2.3 million Rabbit Creek Interchange system on Seward Highway in Anchorage.
- Value engineering for \$1.5 million Fort Wainwright Bridge, over Chena River, for Corps of Engineers. Resulted in \$2 million life-cost savings.
- Design of Seward Marine Industrial Center Dock.
- Design of Valdez Harbor Fish Dock.
- Seafood Industrial Park planning for City of Dillingham.
- Design of Kenai River Dock for Royal Pacific Fisheries.
- Design and inspection of Seward Marine Center flood damage for the University of Alaska.
- Preliminary design of Homer Ocean Trawl Dock.
- Design of Portage Glacier Tour Dock facilities.
- Study and design of docking facilities for Greens Creek Mine in Juneau.
- Design of construction bridge at Copper Center for contractor.
- Design of Nome Docks for City of Nome and private company.
- Design of 3,000-ton ship transfer facilities at 4th of July Creek in Seward.
- Design of construction cableways for Eklutna Water Line project.
- Inspection and design analysis of floating concrete container dock at Valdez.
- Emergency design of bridges at Anchor River and Lost Creek, performed on a fast-track basis for the Kenai Peninsula Borough after severe flooding rendered existing bridges unusable.
- Design of bulkhead and upland facilities for contractor at Unalaska.
- Value engineering design of sewer outfall for City of Homer.
- Foundation structural evaluation for Municipality of Anchorage Central Transfer Facility.
- Design of Valdez Boat Harbor floats and bulkhead.
- Design of Homer Small Boat Harbor expansion, including floats, boat ramps, and dredging.
- North Forelands Dock reconnaissance and design, near Anchorage.
- Design of nine bridges along Red Dog Mine Access Road near Kotzebue. Worth \$15 million, the bridges are capable of accommodating 1,200-ton modules.
- Design services for Arctic Boulevard bridge widening project at Campbell Creek, for the City of Anchorage.
- Structural design of seven-story Waterfront Hotel in Juneau.
- Design of gravel rail car dump for contractor at Port of Anchorage.
- Design of dock at Womens Bay, Kodiak.
- Design of construction causeway bridges for Endicott Project on North Slope.
- Design of 5/8-acre floating fish pen at Valdez.
- Design of Central Creek Bridge on North Slope.
- Design of Pier III (container dock) improvements at Kodiak.
- ARCO Pile Driving Development. Developed new, highly efficient methods for driving piles in permafrost based on previous patent.
- State of Alaska Criteria for Pile Driving in Permafrost. Parallel development to ARCO pile driving development project to ensure "state-of-the-art" for this new field is available to other engineers.
- Developed sheet pile access dock at Tern Island in the Beaufort Sea suitable to resist ice forces.



- Developed frozen foundation featuring piles and a passive circulating cooling system for P-K & Sons' Co. at Prudhoe Bay.
- Developed high-energy fender system for high wave exposure dock at Kodiak.
- Fast-track design and construction consultation for \$200,000 Resurrection River Pedestrian Bridge--critical for tourist access to Exit Glacier near Seward.
- Developed contract documents for \$3 million Nenana River Bridge, a large steel box-girder bridge featuring precast deck panels and conical ice-breaking pier.
- Near Island Development Master Plan and Kodiak Port and Harbor Study. Provided a practical plan for marine development suitable for an ocean-dependent community. Developed conceptual plan for stabilization of dangerous slope conditions on Pillar Mountain.
- CIRI/Placer Beluga Railroad Bridges. Developed preliminary railroad bridge concepts for coal field access and coal transportation.
- Established criteria used to determine safest and most economical method of crossing the Yukon River with the proposed natural gas line. Range of cost between \$15 and \$20 million.
- Refined conceptual layouts for a deep-water liquid natural gas port facility, to be located along the south shore of Valdez Arm in support of proposed Trans-Alaska Gas System.
- Developed plans and design for Oliktok Dock, located in the Arctic Ocean, suitable to resist massive ice forces and extremely heavy oil field module loads.
- Studied currents, ice, and ship uses at various sites in Cook Inlet for the Point MacKenzie Port.
- Developed plans and design for \$500,000 ice breakers to protect the damaged Gulkana River Bridge. Also provided construction inspection.

*REM Consultants, Inc. (1972-1979)*

- Vice President and Manager of Anchorage office.
- Associate Engineer specializing in structural, foundation, and marine design and analysis.
- Developed ice force criteria for design of major river structures along the Trans-Alaska Pipeline.
- Developed vehicle transfer barge-bridge systems for Hoonah, Metlakatla, and Kake.
- Performed underwater materials source investigation during the dredging operations in conjunction with construction of Juneau Outer Drive.
- Designed a 2.5-million-gallon earth-fill dam in Juneau.
- Designed six highway interchange structures in Anchorage.
- North Slope Haul Road Maintenance Camp Study for the Alaska Department of Transportation and Public Facilities. Responsibilities included directing planning studies and design/build contract preparations for the location of road maintenance facilities along this 360-mile arctic road. Efforts involved a fast-track organization to examine a wide variety of environmental, geological, engineering, architectural, and policy parameters. Results of these efforts were published in a planning report of 500 pages, which took only three months to prepare.
- Participated in the structural design of three all-wood pedestrian overpasses and seven bicycle trail stream crossings in Anchorage.
- Involved in slope stability studies and landslide hazard recommendations.
- Participated in several hydrology and hydraulic studies.
- Involved in structural design review and special consulting for the Trans-Alaska Pipeline System.
- Conceptual and structural design for a \$2 million oil pipeline bridge required by Alyeska Pipeline Service Company to span the Gulkana River.
- Designed a \$1.5 million system of overhead cableways for use in material transportation up a steep mountain face during construction of the Trans-Alaska Pipeline. The cableways spanned 1,450 and 1,000 feet, had a 20-ton load capacity, and were some of the longest span structures built in Alaska to date.
- Design of lightering systems for tour ships and related dock facilities for the City of Juneau.
- Analyzed ice loads and reported on exposed Nikiski Products Pipeline across Turnagain Arm.



- Performed design for FAA radar sites at Kenai and Fairbanks. Aspects supervised included subsurface investigation; foundation, road, structural, water and sewer design; and surveying. This project was completed within 30 days, including preparation of 15 detailed engineering drawings.
- Design of a reinforced-earth/prestressed-concrete bridge over Campbell Creek at Arctic Boulevard in Anchorage.
- Design of steel and concrete dock and marine boat lift system in Petersburg.

*Alaska Department of Highways (1962-1972)*

- Designed many varied bridges for areas throughout the state.
- Designed a 407-foot, two-hinged, steel-arch bridge at Hurricane Gulch.
- Designed the American Institute of Steel Construction award-winning Chulitna River Bridge.
- Performed structural analysis and design check for the Sitka Harbor Bridge; the first cable-stayed bridge in the nation. Also provided underwater inspection services for foundation construction.
- Performed design services for 220-foot span, composite, continuous, steel-plate girders for approximately 1/2-mile of bridges crossing the Copper River at Flag Point.
- Performed design and project coordination services for the \$30 million Yukon River Bridge, a 2,280-foot steel orthotropic structure with 410-foot main spans. Developed quake and ice design criteria.
- Provided underwater inspection services for the Juneau-Douglas Bridge.
- Participated in bridge reconnaissance studies for Chilkat and Copper River Highways.
- Participated in extensive structural inspection of bridges and marine facilities including evaluation of earthquake destruction, normal deterioration, and other damage.
- Designed a large concrete dock-type parking structure in Ketchikan.
- Participated in scuba diving operations to locate abandoned artesian drill holes within the Kenai River.

*Private Consultant*

- Designed numerous docks, marine structures and facilities, airplane hangars, floating boat shelters, boathouses, riverboats, private homes, bridges, and a variety of other structures.
- Participated in design of an Alaska Marine Highway auto-ferry transfer bridge and associated mooring dolphins in Cordova.
- Participated in numerous salvage operations.

*University of Alaska, Juneau-Douglas Community College (1964-1970)*

- Instructor: mathematics, engineering, and science courses.

**TASK ASSIGNMENTS OUTSIDE ALASKA**

*Peratrovich, Nottingham & Drage, Inc. (1979-Present)*

- Inspection and foundation study of Pier 66 for the Port of Seattle.
- Inspection and foundation investigation of the Port of Seattle's Pier 69.
- Design of floats for 1,500-stall marina at San Pedro, California.
- Preliminary design of harbor at Mauna Lani, Hawaii.
- Development of all major foundation systems for the \$172 million West Seattle Freeway on the West Spokane Street corridor. The corridor, which crosses the Duwamish River near its confluence with Elliot Bay, presently carries the second highest volume of vehicular traffic in Washington.
- Design of permeable wave barrier at Garibaldi, Oregon, for U.S. Coast Guard.
- Wave and harbor research in Canada.

*Montana Highway Department (1960-1962)*

- Designed structures including continuous-plate girder bridges, prestressed concrete bridges, retaining walls, composite-girder bridges, interstate highway grade separations, and interchange structures.



*Montana State University*

- Graduate Assistant Instructor, taught courses in civil engineering.

References: Randy Romenesko, City of Nome, (907) 443-5242; Chris Hladick, City Manager, City of Unalaska, (907) 581-1251; Mike Swalling, Swalling Construction, (907) 272-3461; Cliff Olmsted, Wilder Construction, (907) 344-2593; Gov. Bill Sheffield, (907) 343-6200.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

**JOHN W. PICKERING, P.E.**  
Principal/Senior Engineer  
*Peratrovich, Nottingham & Drage, Inc.*

*Professional Engineer (CE 8986), Alaska, 1994*

*M.S. Environmental Quality Engineering, University of Alaska-Anchorage, thesis pending*  
*Masters in Business Administration, University of Oregon*  
*B.S. Forest Engineering, Oregon State University*  
*B.A. Mathematics & Physics, Willamette University*

*American Welding Society Certified Welding Inspector. 1994, #94061231*  
*Member, American Society of Civil Engineers*  
*Member, Society of American Military Engineers*  
*Member, NACE International - The Corrosion Society*  
*Member, American Welding Society*  
*Member, United States Section of the International Navigation Association (PLANIC)*  
*Member, American Wood-Preservers' Association*  
*Associate Member, Alaska Association of Harbormasters and Port Administrators*

Mr. Pickering has 25 years of construction, engineering, environmental, operations and international experience and has performed in the capacity of project manager, operations manager, design engineer and construction project engineer. His background includes a variety of marine facilities along with the associated uplands improvements, transportation systems development for undeveloped areas, and project management from initial site reconnaissance to final completion. He possesses the ability to understand plan and operational requirements as well as design intent, and has the field experience necessary to provide a cost effective solution in challenging situations.

Mr. Pickering is very skilled in working with multi-disciplinary teams on large complex projects to ensure seamless interfaces between disciplines as well as interfacing with local interests involved in smaller projects in ensuring that their needs are met. Among his other skills are conceptual engineering studies, developing special projects, working with small communities, project management, scheduling, planning, assembling complex budgetary estimates for cost estimating purposes and financial planning.

#### ALASKA TASK ASSIGNMENTS

*Peratrovich, Nottingham & Drage, Inc. (1990-Present)*

- Project Manager for the upgrade of the City of Homer's Deep Water Dock corrosion protection system. This project involved conducting current measurements in and around the dock area to ascertain the need for additional corrosion protection, evaluating alternative solutions, designing the selected alternative and construction inspection.
- Project Manager for the \$10 million Adak Small Boat Harbor Development. This project consists of developing concepts to completely revamp and enlarge the existing facility to accommodate fishing and supply vessels for the area's developing fisheries. PND has completed the geotechnical investigations, bathymetric and upland surveys, inspection of existing facilities, developing a funding document and proceeding in permitting to assist the City of Adak in obtaining the necessary funding for this project.
- PND Project Manager for BPXA's review of the slope protection for North Star Island located in Prudhoe Bay. This is a multi-disciplinary approach to review the adequacy of the existing slope protection and retaining walls and make recommendation, if appropriate, for improvements.
- Project Manager for investigation of an exposed pipeline located in the Cook Inlet. The exposed portion of the pipeline is located in the inter-tidal area and is subject to ice attack. We reviewed existing data, made recommendations for additional data gathering and produced a report on repair alternatives.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

- PND Project Manager for preliminary dock design for the development of the Point Thompson Project located in the Beaufort Sea. The dock has an 150' face with two mooring bollards and two additional mooring points and is designed to accommodate 100' x 400' barges, transit loads up to 5400 tons, and resist multi-year ice and storm events. As part of this project we also evaluated West Dock Causeway's Dock Position 2, also located in the Beaufort Sea, for transit loads up to 2.7 million pounds.
- Project Manager developing barge mooring concepts for a fish processing plant located in Akutan. These concepts were designed to accommodate the local tidal range, and minimize any interference with ongoing operations.
- Project Manager for City of Chignik's \$8 million Regional Cargo and Public Dock Facility Project. This project consisted of developing concepts to develop a 300-foot heavy capacity dock (-30 mllw dock face) along with 8 acres of new uplands which is to be used for business development; fuel storage and sales; boat storage and repair; container processing and storage area; ferry berthing and staging; and additional buildings as required. PND has completed the geotechnical investigations, inspected the existing facilities, permitted the project, developed preliminary plans and cost estimates, and developed a funding document to assist the City of Adak in obtaining the necessary funding for this project.
- Project Manager for City of Unalaska's Spit Dock Inspection and Evaluation. The work consisted of an above water inspection of a steel pile supported dock and a floating mooring dock. The docks were inspected for corrosion, damage and general deterioration and recommendations were made for remedial action.
- PND Project Manager for Conoco Phillips Alaska, Inc.'s NPRA Project which is the development of a previously undeveloped area of Alaska's North Slope Oil Field. PND is responsible for all of the civil work associated with developing the area's transportation system consisting of water access, barge docks, pipeline and vehicle bridges, roads, pads, hydrology, survey and material sources. We are utilizing orthorectified aerial photography, obtaining bathymetry of offshore areas and river channels, conducting on site reconnaissance, assisting in development of a material source exploratory plan, and developing design criteria to accomplish these tasks. Ultimately the project will consist of 20+ miles of roads, 3 development pads, and 8 vehicle bridges ranging in length from 40 feet to 1200+ feet.
- Project Manager for the condition inspection and evaluation of 56 bridges, 6 log transfer facilities and 1 floating dock for the U.S. Forest Service in South East Alaska. The bridge types varied and included log stringer, glu-lam girder, steel girder and concrete beams and ranged up to 130 feet long. These bridges were designed for heavy haul loads and were located in 4 different ranger districts on 3 islands. Two crews were utilized to conduct the inspections and the field work was completed in one week with the final report following several weeks later.
- Project Manager for City of Homer's Harbor Dock Structures Inspection and Evaluation. The work consisted of a below and above water inspection of two steel pile supported docks, one timber pile supported dock and a steel boat grid. The docks were inspected for corrosion, damage and general deterioration and recommendations were made for remedial action.
- Project Manager for the development of an Alaskan North Slope Marine Facility at various locations to provide safe mooring for oil spill response vessels sited on the North Slope. These facilities will also be utilized for loading and unloading oil response equipment as required. Several alternatives were developed and two are currently being further evaluated for construction. These marine facilities will be located in 6 feet of water and designed to resist winter ice forces and operate safely in summer storms which can raise the water level by up to 5 feet.
- PND Project Manager for Conoco Phillips Alaska, Inc.'s CD South Development Project which consists of a 3.5+ mile road, 40 foot vehicle bridge, connected drilling pad and associated pipelines. PND is providing conceptual design, final design, construction administration and permitting support for the road, bridge and pad construction portion. PND is also assisting in the geotechnical investigation for material site development and obtaining foundation information for the road, bridge and pad elements.
- PND Project Manager for Conoco Phillips Alaska, Inc.'s CD North Development Project which consists of a remote drilling pad, airplane strip, and associated pipelines. PND first developed a pipeline bridge report which surveys all of the applicable pipeline bridge designs, evaluates the various alternatives for



constructability, cost and applicability. PND will provide conceptual preliminary and final design for the selected bridge alternative, permitting assistance and construction administration support for the three proposed crossings. The bridges will range in length from 455 to 690 feet. PND also assisted in the geotechnical investigation for material site development and obtaining foundation information for the various proposed pipeline bridge crossings.

- Project Manager for Conoco Phillips Alaska, Inc.'s Kenai LNG Plant erosion control project. This facility is located in the Cook Inlet which is subject to 30 foot tides and high eroding cut banks. The erosion protection consisted of an 875 foot open cell sheet pile retaining wall configuration which was constructed in three phases over three years. Services provided included survey, geotechnical investigation, permitting, design and construction administration.
- Project Manager for a multidisciplinary team which expanded the City of Unalaska's Marine Center Dock complex to accommodate additional fishing vessels, trawlers, trampers, container vessels, factory trawlers, U.S. Coast Guard patrol vessels, and a State of Alaska patrol vessel. The \$9.5 million, 511 foot dock expansion consists of a combination open cell and pile supported dock structure; uplands development; fuel service; sewer, water, telephone, cable and electrical utilities, service buildings and lighting. PND performed bathymetry, survey, geotechnical, permitting, design, bid assistance, submittal review, fabrication inspection and field inspection services and provided as-builts and a O&M manual.
- Project Manager for the City of Homer's Small Boat Harbor Renovation and Expansion. The project consists of relocating and renovating 30,000 sq. ft. of existing timber floats and adding 33,000 sq. ft. of new timber and concrete vessel mooring float systems, upgrading utilities, rebuilding vessel service facilities, and rebuilding the existing timber boat grid. The following services were provided: participating in several public meetings, geotechnical investigations, bathymetric and uplands survey, permitting, design, construction administration, as-builts and a O&M manual.
- Project Manager for the development of a pipeline corridor down a steep 200-foot bluff across a mudflat to -15 feet MLLW water depth. The pipeline corridor through the bluff was in support of the Osprey offshore platform in upper Cook Inlet, Alaska. The scope of work required development of a safe concept plan to install the pipelines, discussion related to construction methods and restoration of the bluff, schedules for the work and a construction cost estimate.
- Project Manager various Cominco Alaska mine and port infrastructure projects including adding fuel tanks to existing tank farm, radio tower, weather tower, stream hydrology, marine outfall line, runoff retention basin, road upgrades, and pile foundations for various infrastructure elements. Design considerations included permafrost, arctic environment, short construction seasons (both winter & summer) and logistical problems.
- Project Manager for the City of Unalaska's Spit Light Cargo and Pot Dock. The project consists of two open-cell sheet pile docks with dolphins, mooring bollards, high mast lighting, site drainage, and road upgrade.
- PND Project Manager for Cominco Alaska's \$185 million Delong Mountain Terminal for the loading of ore concentrate to be built in the Chukchi Sea (Bering Sea). The project consists of an 2,700-ft. trestle which will support both a conveyor loading system and a heavy vehicle roadway extending to a deep water dock. The dock will have two radial arm loaders with fenders and mooring points for panamax sized vessels. The dock will be located in 32 feet of water with a channel, turning and mooring basin dredged to -55 MLLW for access. Both gravity and pile supported dock structures are being evaluated for suitability. Additionally, there will be associated uplands development to support the new loading terminal. This project is unique in addressing ice loads on pier and dock structures, rough water construction techniques, adapting construction schedule to accommodate 4-month ice free construction season, logistical considerations and utilizing construction off-of-ice techniques.
- PND Project Manager for BPXA's proposed \$650 million Liberty Island oil drilling and pumping island to be built in the Beaufort Sea. PND's portion of the project consists of an 150-ft. by 160-ft. open cell sheet pile cell dock with fenders capable of withstanding multi-year ice impacts and overtopping, site civil for grading & drainage, oil water separators, foundations for buildings and pipelines, and various structural elements.



- PND Project Manager and Coordinator for BPXA's \$950 million Northstar Island oil drilling and pumping island just constructed in the Beaufort Sea. PND's portion of the project consists of an 315-ft. by 140-ft. open cell sheet pile cell dock with fenders capable of withstanding multi-year ice impacts and overtopping, foundations for buildings and pipelines, and various structural elements.
- Project Manager/Inspector for inspecting 11 bridges on the Red Dog Mine Haul Road. The road is 54 miles long and provides access to a coastal shipping facility located in Northwestern Alaska. The bridges range in length from 40 to 200 feet and are subject to 24-hour/day heavy loads for 11 months/year. These bridges were originally designed by PND and built in 1986 and are currently inspected every 3 years. The bridges consist of steel box girders with concrete deck panels, fold down railing, and either sheet pile abutments or slopes protected by rip-rap. The inspections consist of inspecting all of the various bridge elements, channels, embankments, adjacent roadways and abutments.
- Project Manager for the City of Unalaska's Little South America Small Boat Harbor Development. PND is assisting the City and Corp of Engineers in developing small boat harbor concepts including light cargo docks, permeable wave barriers, breakwaters, boat moorage, access roads, utilities, and uplands development, dredging and permitting.
- Project Manager for expansion of City of Unalaska's small boat harbor. The project consisted of additional floats, extension of water and electrical services, dredging and permitting.
- Team leader for a multidisciplinary team to develop various dock concepts and provide an economic analysis for expanding the City of Unalaska's Spit Dock to accommodate additional fishing vessels.
- Assisted in development of design for the City of Unalaska's Dock Position 1 Refendering & New Dolphin. The project was necessary to upgrade an existing fendering system which was inadequate for the larger vessels the dock was servicing. Upgrade consisted of heavy duty fenders and associated dolphin.
- Provided civil design, administration, shop drawing and submittal review, and construction inspection for two multi-million dollar ADOT&PF dock and equipment facility projects in Prince William Sound. Both of these docks were designed as dual function (ferry and ship) facilities associated with an upland staging area. One of the docks was located at Chenega Village and the project consisted of an 1/3-mile-long access road, 1/2-acre staging area, 130-ft. ferry ramp, 270-ft. trestle dock and a 300-ft. main dock. The dock located at Tuttlek consisted of a 1/4-mile-long access road, 1.5 acre staging area, a 600-ft. trestle dock, a 210-ft. ferry dock and ramp; and a 513-ft. main dock. All of the dock structures were pile supported and required multiple rock anchors due to the shallow overburden over the bedrock. The main dock structures were fitted with fenders and bollards for ship tie-ups. Both of these projects were fast track and went from design to final completion in less than two years.
- Project manager to provide conceptual development alternatives for barge docks, bridges and road locations to access and supply a proposed mineral development in Western Alaska. The transportation concepts were routed over a 60-mile corridor to the Yukon River and a 20-mile corridor to the Kuskokwim River. Design considerations included permafrost, ice roads, and river transportation.
- Team member responsible for road, bridge and barge dock layout and design for a 60-mile road system in north-western Siberia, Russia. Initially obtained mapping and developed conceptual transportation system, then traveled to Russia to verify original layout and make adjustments as required. Also conducted on site pile load tests to establish load bearing capacity of local soils.
- Assisted the PND Project Manager for the proposed Denali Pipeline Project (MAPCO) from North Pole to Anchorage via Parks Highway Corridor. Project provided geotechnical assessment of the route, analysis of bridge crossings, route mapping, route selection and preliminary design concepts for an underwater crossing of Cook Inlet, property ownership maps, and concepts for routing pipeline through the complex Port of Anchorage facilities and buried utilities.
- Team leader for extending existing fuel system onto dock expansion in Dutch Harbor.
- Assisted in the design of ARCO West Dock Causeway (700-foot bridge combination) located on the Alaskan North Slope; provided cost estimates; conducted tension pile load tests on spin fin piles; and participated in construction inspection and administration services. This bridge was unique in addressing arctic, salt water construction considerations consisting of ice loads, scour and permafrost issues.
- Project Manager/Inspector for inspection of various bridges located on the North Slope of Alaska. These bridges represent a variety of bridge construction styles including timber glulam, Bailey bridge, and steel



box girder with concrete deck panels. These bridges are unique in addressing arctic, both salt and fresh water construction considerations consisting of ice loads, scour and permafrost issues. The inspection schedules vary with the major bridges being inspected every 2 years and the other bridges being inspected approximately every 4 years. The inspections consist of inspecting all of the various bridge elements, channels, low water crossings, embankments, adjacent roadways and abutments.

- Provided cost estimation services for constructing and operating an airport in Russia.
- Provided civil design, field construction engineering, inspection and surveying for the Unalaska Marine Center, Unalaska. 730 feet of cellular sheet pile bulkhead dock, support piles, fenders, mooring dolphins, concrete paving, grading, utilities, quarry, and drainage capable of servicing container vessels.

References: References: Craig Dotson, Conoco Phillips Alaska, Inc. (907) 265-1089; Carey Meyer, P.E., City of Homer, (907) 235-3170; Dave Kemp, P.E., City of Unalaska, (907) 581-1260.



**MAYNARD TAYLOR, P.L.S**  
**Senior Surveyor/ Field Survey Coordinator**  
*Peratrovich, Nottingham & Drage, Inc.*

*Registered Professional Land Surveyor, Alaska, 1988*  
*Hazardous Waste Operations and Emergency Response Certified*

*B.S., Political Science, 1973, University of Utah*  
*Post Baccalaureate Studies, Survey Technology, 1985, Anchorage Community College*

*Member, Alaska Society of Professional Land Surveyors*

Mr. Taylor has more than 30 years of surveying experience statewide. His experience encompasses project management, professional survey duties, large mapping projects, boundary surveys, Alaska Tideland Surveys, hydrographic surveys, photogrammetric control surveys, subdivision surveys, asbuilt and design surveys. He has extensive experience working in remote locations, as well as years of experience surveying in cities, towns and villages throughout Alaska.

He was lead surveyor on the Alaska Geographic Data Base contract with the Bureau of Land Management, helping to create a Land Information System covering the State of Alaska. He has experience in DOT/PF Highway construction surveys as well as construction inspection. He has a working knowledge of the newest survey technology, including electronic Theodolites with data collectors; GPS systems; depth sounders that allow positioning interface to be downloaded with depths via data collector; and the latest CAD software for producing a final product.

Mr. Taylor's experience in Valdez includes a predesign survey for the addition of a pool at Valdez High School; dock face bathymetry for Petro Star, Inc.; a Valdez Fisheries Development Association buoy survey; and surveys in conjunction with a Valdez Harbor Improvements project.

Mr. Taylor has served as party chief on numerous large subdivision projects in Anchorage, taking them from boundary control survey and design survey, into construction survey and finally to the setting of property corners. Examples include Concord Hills Subdivision, Bayshore Subdivision, Foxhall Subdivision, Tudor Centre and Fox Ridge Subdivision.

Additional key project experience includes a Municipality of Anchorage 4th and 3rd avenues design study, an Alaska DOT/PF Arctic Boulevard design survey and mapping project, numerous Alaska Tideland Surveys, and right-of-way Platting for the City of Unalaska. He has also been involved in survey work on subdivisions and replats throughout the state.

In the Mat-Su Borough, Mr. Taylor's assignments have included work on the Little Otter Subdivision Addition #1 (A&T Co.). He provided a boundary survey, subdivision design (lot configuration and road layout, to meet with Mat-Su Borough requirements), location and plotting of the 100-year flood hazard zone, setting property corners, and preliminary to final platting.

He assisted in surveys for the Port MacKenzie project, helping to create a large single-tract subdivision to use as a storage pad for the Port. PND surveyed surrounding lands to determine natural section boundaries and performed survey control for Aeromap, Inc. to generate photogrammetric mapping of the area. Because of the thick foliage and rough terrain, PND surveyors ran vertical verification checks beneath the tree canopy to verify aerial mapping.



**Peratrovich, Nottingham & Drage, Inc.**  
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Mr. Taylor also was instrumental in providing research, field surveys, note reduction, calculations, State platting coordination, and review for final ATS recording for Alaska Tidelands Survey #1312 at Point MacKenzie.

For the Sourdough Subdivision in Wasilla, Mr. Taylor assisted in surveying a parcel of approximately 53 acres just outside Wasilla. To aid in development costs, the entire parcel was designed and approved as a master plan with the Mat-Su Borough. Phase I design included 14 lots and one large tract.

Mr. Taylor also has been involved in many other types of projects statewide, including the Nome-Council Highway upgrade, the Wood River TikChik Hydro Project, the Kahiltna/Department of Natural Resources Alaska State Subdivision, and Kotzebue Airport Construction.

**References:** Gerald Jennings, DNR Division of Land Cadastral Surveys, (907) 269-8516; John Sharp, Alaska Department of Transportation and Public Facilities, (907) 269-0713; Robin Hall, City of Unalaska, (907) 581-3100.



**Peratrovich, Nottingham & Drage, Inc.**  
**Engineering Consultants**

**DEMPSEY S. THIEMAN, P.E.**  
**Senior Engineer**  
*Peratrovich, Nottingham & Drage, Inc.*

*Registered Civil Engineer (CE 9974), Alaska, 1999*  
*Certified Welding Inspector #9805002280*

*B.S., Civil Engineering, 1994, California Polytechnic State University*

During Mr. Thieman's tenure with PND, he has worked primarily in the areas of structural, civil, and marine design, contract administration and construction inspection. He has proven his knowledge of engineering design and construction on many successful projects.

Mr. Thieman has designed numerous marine mooring facilities and docks. Most recently, he designed a heavy duty travelift style sheet pile barge dock to be used for the construction of the new Oakland Bay Bridge in California. This 545 ton travelift will be used to load precast bridge segments weighing up to 800 Tons onto transportation barges. In addition, he recently designed the Alaska Marine Lines Barge Dock facility in Cordova, Alaska, constructed in 2002. He acted as one of the lead engineers for the \$3 million Westward Seafoods Dock, a pile supported "T" dock and dolphin system located in Dutch Harbor, Alaska. Mr. Thieman served as the designer for the city of Valdez small boat harbor (SBH) boat launch float replacement as well as the Valdez SBH gangway upgrade retrofit project. Mr. Thieman performed the design of the upgraded heavy-duty fendering system and the small boat float expansion for the SERVS dock in Valdez. He also designed the Allison Point and Dock Point DNR Marine Recreational Facilities also located in Valdez. He has assisted in the design of several barge mooring facilities in the Prince William Sound area for the Alyeska Pipeline Service Company. The Buoy "E" project, which earned a Lincoln Arc Welding Foundation Award for innovative structures, was designed as a single pile mooring system in over one hundred feet of water.

Mr. Thieman served as the lead designer for two highway bridges in Unalaska, Alaska, the Pyramid Creek Bridge and the Steward Road Bridge. He acted as one of the lead engineers in the design of two heavy duty (3 million lb. gross vehicle weight) drill rig bridges for the development of a new oilfield as well as two innovative heavy duty river channel crossings with submersible steel and concrete bridges on the North Slope of Alaska (this project earned). He also acted as designer and inspector for the Central Creek Bridge Decking project a heavy-duty drill rig bridge at Milne Pt, Alaska. He designed an avalanche diversion berm, a 900-ft long, 45-ft high earth structure located above the Alyeska terminal in the mountainous Valdez area.

Mr. Thieman's inspection experience includes general construction, welding, special inspection of buildings, condition and forensic inspection of existing structures. He has had his American Welding Society CAWI certification since 1997. He served as special inspector for the timber foundation reconstruction of four bridges along the Alyeska pipeline; and for construction of the \$28 million Goldenview Middle School in Anchorage, inspecting concrete reinforcing, structural steel bolted connections and structural steel fire-proofing. He served as field engineer/inspector for construction of the \$10 million Kuparuk River Channel Crossings, involving heavy structural welding, 1,000 cubic yards of winter-placed high-strength concrete, concrete reinforcing, earthwork, geotextile retaining walls and concrete slope protection. He also served as special inspector for the \$700,000 Solomon Gulch Fish Hatchery Shore Modification in Valdez, which included installation of a single open sheet pile cell, boat launch ramp, site grading, armor stone shore protection and concrete. Mr. Thieman inspected the Valdez Container Terminal floating dock, transfer bridges and trestle for its 15-year condition inspection.

**References:** Burt Rosenbluth, ConocoPhillips Alaska Inc, (907) 265-1052; Rod Dewalt, Alaska Marine Lines Inc., (360) 354-8858; Francis Engle, City of Unalaska, (907) 581-1260.



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