9/11/03

NATURAL GAS PIPELINE

Ballot Measure 3 - Initiative Petition

Gas Pipeline Development Authority

BALLOT LANGUAGE

This bill would create the Alaska Natural Gas Development Authority (Authority) as a public corporation of the State. The Authority would acquire and condition North Slope natural gas, and construct a pipeline to transport the gas. The Authority s powers would include buying property or taking it by eminent domain, and to issue state tax-exempt revenue bonds. The gasline route would be from Prudhoe Bay to tidewater on Prince William Sound and the spur line from Glennallen to the Southcentral gas distribution grid. The Authority would operate and maintain the gas pipeline, ship the gas, and market the gas.

SHOULD THIS INITIATIVE BECOME LAW?

YES ⬭

NO ⬭

BALLOT MEASURE SUMMARY
Prepared by the Legislative Affairs Agency

This measure proposes a new public corporation. It would be called the Alaska Natural Gas Development Authority. It would have a seven-member board of directors appointed by the governor. The board is required to design, construct, operate, and maintain a natural gas pipeline system. That system or project would transport North Slope natural gas. It would move the gas to Prince William Sound and to the Southcentral Alaska gas distribution system. The board could market and ship gas. It could acquire property by purchase or eminent domain. To meet project costs, the board could issue revenue bonds. To build the project, it would have to enter into project agreements with labor unions. It also must use Alaska contractors and suppliers to the greatest extent possible. The measure requires the board to prepare a development plan for the project within one year. It declares a goal of having the project operate by 2007.

FULL TEXT OF PROPOSED LAW

"(The All-Alaskan Gasline Initiative) An Act Establishing the Alaska Natural Gas Development Authority, to maximize revenues for Alaska and jobs and Gas for Alaskans."

BE IT ENACTED BY THE PEOPLE OF THE STATE OF ALASKA:

* **Section 1.** The uncodified law of the State of Alaska is amended by adding a new section to read:

FINDINGS AND INTENT. (a) The people find that
(1) The Phillips-Marathon liquefaction facility at Nikiski has been supplying Cook Inlet natural gas to Japan and Southcentral Alaska at great profit and without interruption since 1969;
(2) Cook Inlet gas supplies are dwindling rapidly with shortfalls anticipated as early as the winter of 2003;
(3) Alaska's North Slope contains vast proven reserves of natural gas that have been known for at least 25 years but have never been developed;
(4) these gas resources have never been offered for sale, because there has been no way to transport them to market;
(5) multiple markets in North America and Asia have recently expressed an interest in receiving a proposal from Alaska for the purchase of Alaska gas;
(6) if developed, these natural gas resources could represent substantial economic benefits to Alaskans in jobs, state revenue, and gas for Alaska citizens and businesses;
(7) the major North slope leaseholders have competing gas reserves in other parts of the world vying for the same markets, creating a conflict of interest for them in advancing the sales of Alaska gas;
(8) the North slope Producers agreed in 1991 to strand North Slope gas until at least 2005;
(9) given the producer's conflicts of interest and their historic refusal to make North Slope natural gas available it may be necessary to take the gas back;
(10) the permits necessary for an Alaskan gasline project have been pledged to the Alaska Natural Gas Development Authority, operating as a port authority, to facilitate the development of the project;
(11) there is sufficient gas for an all-Alaskan gasline project;
(12) the Alaska Natural Gas Development Authority offers substantial tax benefits that improve the economics of a gasline project;
(13) state ownership of the pipeline and associated facilities has the potential to provide substantial revenues to the state and the Alaska Permanent Fund; and
(14) Alaska's constitution requires that Alaska's resources are developed, utilized, and conserved for the maximum benefit of Alaska's people.
(15) an all-Alaskan gasline maximizes jobs for Alaskans, revenues for the Alaskan treasury, and access to gas for Alaskans.
(b) It is the intent of this Act to create the All-Alaskan Natural Gas Development Authority for the purpose of developing, constructing, managing, and operating a gas pipeline from the North Slope of Alaska and a spur line to the Southcentral Alaska natural gas distribution grid.

***Sec. 2.** AS 41 is amended by adding a new chapter to read:

The text of this bill is presented as submitted by the petition sponsors.

Ballot Measure 3 - Initiative Petition

Gas Pipeline Development Authority

Chapter 41. Alaskan Natural Gas Development Authority.

Article 1. Establishment of the Authority.

Sec. 41.41.010. Establishment of the authority. (a) There is established the Alaska Natural Gas Development Authority, the purpose of which is to provide one or more of the following services and functions in order to bring natural gas from the North Slope to market, including
(1) the acquisition and conditioning of North Slope natural gas;
(2) the design and construction of the pipeline system;
(3) the operation and maintenance of the pipeline system;
(4) the design, construction, operation, of other facilities necessary for delivering the gas to market and to Southcentral Alaska; and
(5) the acquisition of natural gas market share sufficient to ensure the long-term feasibility of the pipeline system project.

(b) The authority is a public corporation and an instrumentality of the state within the Department of Revenue.
(c) The authority has a legal existence independent of and separate from the state.
(d) The acquisition of natural gas from the North Slope and its delivery to tidewater for shipment to market by the authority is an essential government function of the state.
(e) The authority may not be terminated as long as it has bonds, notes, or other obligations outstanding.

Sec. 41.41.020. Authority governing body. (a) The authority shall be governed by a board of directors consisting of seven members from the general public appointed by the Governor and confirmed by the legislature.
(b) The board shall annually elect a chair, and may elect other officers, from among its members.

Sec. 41.41.030. Term of office. (a) The members of the board shall be appointed for terms of three years, and they may be reappointed.
(b) The terms of the members shall be staggered.

Sec. 41.41.040. Removal and vacancies. (a) The governor may remove a member of the board from office. A removal must be in writing and must state the reason for the removal. A member who is removed may not participate in board business and may not be counted for purposes of establishing a quorum after the member receives written notice of removal. A member who is removed is not entitled to honoraria, per diem, or travel expenses authorized under AS 41.41.060 for work performed after the member receives the written notice of removal.
(b) The governor shall promptly fill a vacancy on the board by appointment. An appointee to a vacancy shall hold office for the balance of the term for which the appointee's predecessor on the board was appointed.
(c) A vacancy on the board does not impair the authority of a quorum of the board to exercise all the powers and perform all the duties of the board.

Sec. 41.41.050. Quorum and voting. Four members of the board constitute a quorum for the transaction of business and the exercise of the powers and duties of the board. Action may be taken only upon the affirmative vote of a majority of the full membership of the board.

Sec. 41.41.060. Compensation of board members; per diem and travel expenses. Members of the board are entitled to per diem and travel expenses authorized for boards and commissions under AS 39.20.180.

Sec. 41.41.070. Authority staff. (a) The board may employ and determine the salary of a chief executive officer.
(b) The chief executive officer may, with the approval of the board, select and employ additional staff as necessary.
(c) An employee of the authority, including the chief executive officer, may not be a member of the board. The chief executive officer and the other employees of the board are in the exempt service under AS 39.25.110.
(d) In addition to its employees, the authority may contract for and engage the services of bond counsel, consultants, experts, and financial advisors the corporation considers necessary for the purpose of developing information, furnishing advice, or conducting studies, investigations, hearings, or other proceedings.

Sec. 41.41.080. Legal counsel. The attorney general
(1) is the legal counsel for the authority;
(2) shall advise the authority in legal matters; and
(3) shall represent the authority in legal actions.

Sec. 41.41.090. Conflicts of interest. (a) Members of the board and the chief executive officer of the authority are subject to the provisions of AS 39.50.
(b) If a member of the board or an employee of the authority acquires, owns, or controls an interest, direct or indirect, in an entity or project in which assets of the authority are invested, the member shall immediately disclose the interest to the board. The disclosure is a matter of public record and shall be included in the minutes of the first board meeting following the disclosure.

Sec. 41.41.100. Budget. The revenue earned by operations of the authority must be identified as the source of the operating budget of the authority in the state's operating budget under AS 37.07 (Executive Budget Act).

Sec. 41.41.110 Audits. The Legislative Budget and Audit

The text of this bill is presented as submitted by the petition sponsors.

Ballot Measure 3 - Initiative Petition

Gas Pipeline Development Authority

Committee may provide for an annual post audit and annual operational and performance evaluations of the authority's operations and budget.

Sec. 41.41.120. Reports and publications. (a) By September 30 of each year, the board shall publish a report of the authority for distribution to the governor and the public. The board shall notify the legislature that the report is available.
(b) The report must include financial statements audited by independent outside auditors and a statement of the amount of money received by the authority from its operations during the period covered.

Sec. 41.41.130. Tax exemption. The security instruments issued by the authority, the transfer of the security instruments, and the income on the security instruments are exempt from all taxes and assessments in the state.

Sec. 41.41.140 Political activities. The resources of the authority may not be used to finance or influence political activities.

Sec. 41.41.150. Public access to information.
(a) Information in the possession of the authority is a public record, except that information that discloses the particulars of the business or affairs of a private enterprise or investor is confidential and is not a public record for purposes of AS 40.25.110 - 40.25.140. Confidential information may be disclosed only for the purposes of an official law enforcement investigation or when its production is required in a court proceeding.
(b) The restrictions of (a) of this section do not prohibit the publication of statistics presented in a manner that prevents the identification of particular reports, items, persons, or enterprises.

Article 2. Powers of the Authority.

Sec. 4141.200. Powers of the authority. In furtherance of its corporate purposes, in addition to its other powers, the authority may
(1) sue and be sued;
(2) adopt a seal;
(3) adopt, amend, and repeal bylaws and regulations;
(4) make and execute contracts and other instruments;
(5) in its own name acquire property, lease, rent, convey, or acquire real and personal property; a project site or part of a project site may be acquired by eminent domain;
(6) acquire natural gas supplies;
(7) issue bonds and otherwise incur indebtedness in accordance with AS 41.41.300 - 41.41.410 in order to pay the cost of a project;
(8) accept gifts, grants, or loans from and enter into contracts or other transactions regarding gifts, grants, or loans with a federal agency or an agency or instrumentality of the state, a municipality, private organization, or other source;
(9) enter into contracts or agreements with a federal agency, agency or instrumentality of the state, municipality, or public or private individual or entity, with respect to the exercise of its powers;
(10) charge fees or other forms of remuneration for the use of authority properties and facilities;
(11) defend and indemnify a current or former member of the board or an employee or agent of the authority against the costs, expenses, judgments, and liabilities as a result of actions taken in good faith on behalf of the authority; and
(12) purchase insurance to protect its assets, services, and employees against liabilities that may arise from authority operations and activities.

Article 3. Revenue Bonds and Notes.

Sec. 41.41.300. Bonds and notes of the authority. (a) The authority, by resolution, may issue revenue bonds and bond anticipation notes in order to provide funds to carry out the purposes set out in AS 41.41.010(a).
(b) The principal and interest on the revenue bonds or notes authorized and issued under (a) of this section are payable from authority funds. Bond anticipation notes may be payable from the proceeds of the sale of bonds or from the proceeds of the sale of other bond anticipation notes or, in the event bond or bond anticipation note proceeds are not available, the notes may be paid from other funds or assets of the authority.
(c) Bonds or notes may be additionally secured by a pledge of a grant or contribution from the federal government, or a corporation, association, institution, or person, or a pledge of money, income, or revenues of the authority from any source.
(d) Bonds or bond anticipation notes of the authority may be issued in one or more series and shall be dated, bear interest at the rate or rates per year or within the maximum rate, be in the denomination, be in the form, either coupon or registered, carry the conversion or registration provisions, have the rank or priority, be executed in the manner and form, be payable at the times, from the sources, and in the medium of payment and place or places within or outside the state, be subject to authentication by a trustee or fiscal agent, and be subject to the terms of redemption with or without premium, as the resolution of the authority may provide. Bond anticipation notes shall mature at the time or times that are determined by the authority. Bonds shall mature at a time not exceeding a number of years from their date that is determined by the authority. Before the preparation of definitive bonds or bond anticipation notes, the authority may issue interim receipts or temporary bonds or bond anticipation notes, with or without coupons, exchangeable for bonds or bond anticipation notes when

The text of this bill is presented as submitted by the petition sponsors.

Ballot Measure 3 - Initiative Petition

Gas Pipeline Development Authority

these definitive bonds or bond anticipation notes have been executed and are available for delivery.
(e) Bonds or bond anticipation notes may be sold in the manner and on the terms the authority determines.
(f) If an officer whose signature or a facsimile of whose signature appears on a bond, note, or coupon attached to them ceases to be an officer before the delivery of the bond, note, or coupon, the signature or facsimile is valid to the same extent as if the officer had remained in office until delivery.

Sec. 41.41.310. Covenants. In a resolution of the authority authorizing or relating to the issuance of bonds or bond anticipation notes, the authority has power by provisions in the resolution that will constitute covenants of the authority and contracts with the holders of the bonds or bond anticipation notes to
(1) pledge to a payment or purpose all or a part of its revenues to which its right then exists or may thereafter come into existence, and the money derived from the revenues, and the proceeds of bonds or notes;
(2) covenant as to the use and disposition of payments of principal or interest received by the authority on loans or other investments held by the authority;
(3) covenant as to establishment of reserves or sinking funds and the making of provision for and the regulation and disposition of the reserves or sinking funds;
(4) covenant with respect to or against limitations on a right to sell or otherwise dispose of property of any kind;
(5) covenant as to bonds and notes to be issued, and their limitations, terms, and conditions, and as to the custody, application, and disposition of the proceeds of the bonds and notes;
(6) covenant as to the issuance of additional bonds or notes, or as to limitations on the issuance of additional bonds or notes and the incurring of other debts;
(7) covenant as to the payment of the principal of or interest on the bonds or notes, as to the sources and methods of the payment, as to the rank or priority of the bonds or notes with respect to a lien or security, or as to the acceleration of the maturity of the bonds or notes;
(8) for the replacement of lost, stolen, destroyed, or mutilated bonds or notes;
(9) covenant as to the redemption of bonds or notes and privileges of their exchange for other bonds or notes of the authority;
(10) covenant to create or authorize the creation of special funds of money to be held in pledge or otherwise for operating expenses, payment or redemption of bonds or notes, reserves, or other purposes;
(11) establish the procedure, if any, by which the terms of a contract or covenant with or for the benefit of the holders of bonds or notes may be amended or abrogated, the amount of bonds or notes the holders of which must consent to amendment or abrogation, and the manner in which the consent may be given;
(12) covenant as to the custody of property or investments, their safekeeping and insurance, and the use and disposition of insurance money;
(13) agree with a corporate trustee that may be a trust company or bank having the powers of a trust company within or outside the state as to the pledging or assigning of revenue or funds to which or in which the authority has rights or an interest; the agreement may further provide for other rights and remedies exercisable by the trustee as may be proper for the protection of the holders of a bond or note of the authority and not otherwise in violation of law and may provide for the restriction of the rights of an individual holder of bonds or notes of the authority;
(14) appoint and provide for the duties and obligations of a paying agent or paying agents or other fiduciaries as the resolution may provide within or outside the state;
(15) limit the rights of the holders of a bond or note to enforce a pledge or covenant securing the bonds or notes;
(16) make covenants other than and in addition to the covenants expressly authorized in this section of like or different character, and to make covenants to do or refrain from doing acts and things as may be necessary or convenient and desirable in order to better secure bonds or notes or that, in the absolute discretion of the authority, will tend to make bonds or notes more marketable, notwithstanding that the covenants, acts, or things may not be enumerated in this section.

Sec. 41.41.320 Limitations of issuance of bonds. (a) The authority may not issue bonds in an amount that exceeds the amount of bonds authorized to be issued by the legislature.
(b) This section does not apply to the issuance by the authority of refunding bonds or to the issuance by the authority of bonds the proceeds of which are intended to be used to refinance the loans held by the authority.

Sec. 41.41.330. Independent financial advisor. In negotiating the private sale of bonds or bond anticipation notes to an underwriter, the authority may retain a financial advisor. A financial advisor retained under this section must be independent from the underwriter.

Sec. 41.41.340 Validity of pledge. (a) The pledge of assets or revenue of the authority to the payment of the principal or interest on an obligation of the authority is valid and binding from the time the pledge is made, and the assets or revenue become immediately subject to the lien of the pledge without physical delivery or further act. The lien of a pledge is valid and binding against all parties having claims in tort, contract, or otherwise against the authority, irrespective of whether those parties have notice of the lien of the pledge.
(b) This section does not prohibit the authority from selling

The text of this bill is presented as submitted by the petition sponsors.

Ballot Measure 3 - Initiative Petition

Gas Pipeline Development Authority

assets subject to a pledge, except that a sale may be restricted by the trust agreement or resolution providing for the issuance of the obligations.

Sec. 41.41.350. Capital reserve funds. (a) For the purpose of securing one or more issues of its obligations, the authority may establish one or more special funds, called "capital reserve funds," and shall pay into those capital reserve funds (1) money appropriated and made available by the state for the purpose of those funds, (2) proceeds of the sale of its obligations, to the extent provided in the resolution or resolutions of the authority authorizing their issuance, and (3) other money that may be made available to the authority for the purposes of those funds from another source. All money held in a capital reserve fund, except as provided in this section, shall, subject to appropriation, be used as required solely for the payment of the principal of obligations or of the sinking fund payments with respect to those obligations; the purchase or redemption of obligations; the payment of interest on obligations; or the payment of a redemption premium required to be paid when those obligations are redeemed before maturity. However, money in a fund may not be withdrawn from that fund at any time in an amount that would reduce the amount of that fund to less than the capital reserve requirement set out in (b) of this section, except for the purpose of making, with respect to those obligations, payment, when due, of principal, interest, redemption premiums, and the sinking fund payments for the payment of which other money of the authority is not available. Income or interest earned by, or increment to, a capital reserve fund due to the investment of the fund or other amounts in it may be transferred by the authority to other funds or accounts of the authority to the extent that the transfer does not reduce the amount of the capital reserve fund below the capital reserve fund requirement.

(b) If the authority decides to issue obligations secured by a capital reserve fund, the obligations may not be issued if the amount in the capital reserve fund is less than a percent, not exceeding 10 percent, of the principal amount of all of those obligations secured by that capital reserve fund then to be issued and then outstanding in accordance with their terms, as may be established by resolution of the authority, called the "capital reserve fund requirement," unless the authority, at the time of issuance of the obligations, deposits in the capital reserve fund from the proceeds of the obligations to be issued or from other sources an amount that, together with the amount then in the fund, will not be less than the capital reserve fund requirement.

(c) In computing the amount of a capital reserve fund for the purpose of this section, securities in which all or a portion of the funds are invested shall be valued at par or, if purchased at less than par, at amortized costs as the term is defined by resolution of the authority authorizing the issue of the obligations or by some other reasonable method established by the authority by resolution. Valuation on a particular date must include the amount of interest earned or accrued to that date.

(d) To assure the continued operation and solvency of the authority for the carrying out of its corporate purposes, provision is made in (a) of this section for the accumulation in capital reserve funds of an amount equal to their capital reserve fund requirement.

(e) The chair of the authority shall annually, not later than January 2, make and deliver to the governor and chairs of the house and senate finance committees a certificate stating the sum, if any, required to restore a capital reserve fund to the capital reserve fund requirement. The legislature may appropriate that sum, and all sums appropriated during the current fiscal year by the legislature for the restoration shall be deposited by the authority in the appropriate capital reserve fund.

(f) This section does not create a debt or liability of the state.

Sec. 41.41.360. Remedies. A holder of obligations or coupons attached to them issued under the provisions of this chapter, and a trustee under a trust agreement or resolution authorizing the issuance of the obligations, except as restricted by a trust agreement or resolution, either at law or in equity, may enforce all rights granted hereunder or under the trust agreement or resolution, or under another contract executed by the authority under this chapter, and may enforce and compel the performance of all duties required by this chapter or by the trust agreement or resolution to be performed by the authority or by an officer of it.

Sec. 41.41.370 Negotiable Instruments. All obligations and interest coupons attached to them are negotiable instruments under the laws of this state, subject only to applicable provisions for registration.

Sec. 41.41.380 Obligations eligible for investment. Obligations issued under the provisions of this chapter are securities in which all public officers and public bodies of the state and its political subdivisions, all insurance companies, trust companies, banking associations, investment companies, executors, administrators, trustees, and other fiduciaries may properly and legally invest funds, including capital in their control or belonging to them. These obligations may be deposited with a state or municipal officer of an agency or political subdivision of the state for a purpose for which the deposit of bonds, notes, or obligations of the state is authorized by law.

Sec. 41.41.390. Refunding bonds. (a) The authority may provide for the issuance of refunding bonds for the purpose of refunding an obligation then outstanding that has been issued under the provisions of this chapter, including the payment of redemption premium on them and interest accrued or to

The text of this bill is presented as submitted by the petition sponsors.

Ballot Measure 3 - Initiative Petition

Gas Pipeline Development Authority

accrue to the date of redemption of the obligations. The issuance of the bonds, the maturities and other details of them, the rights of the holders of them, and the rights, duties, and obligations of the authority in respect of them are governed by the provisions of this chapter that relate to the issuance of obligations insofar as those provisions may be appropriate.

(b) Refunding bonds may be sold or exchanged for outstanding bonds issued under this chapter, and, if sold, the proceeds may be applied, subject to appropriation and in addition to another authorized purpose, to the purchase, redemption, or payment of the outstanding obligations. Pending the application of the proceeds of refunding bonds, with any other available funds, to the payment of the principal, accrued interest, and redemption premium on the obligations being refunded, and, if so provided or permitted in the resolution authorizing the issuance of the refunding bonds or in the trust agreement securing them, to the payment of any interest on the refunding bonds and expenses in connection with the refunding, the proceeds may be invested in direct obligations of, or obligations the principal of and the interest on which are unconditionally guaranteed by, the United States that mature or that will be subject to redemption, at the option of the holders of them, not later than the respective dates when the proceeds, together with the interest accruing on them, will be required for the purposes intended.

Sec. 41.41.400. Credit of state not pledged. (a) Obligations issued under the provisions of this chapter do not constitute a debt, liability, or obligation of the state or of a political subdivision of the state or a pledge of the faith and credit of the state or of a political subdivision of the state but are payable solely from the revenue or assets of the authority. Each obligation issued under this chapter must contain on its face a statement that the authority is not obligated to pay it or the interest on it except from the revenue or assets of the authority and that neither the faith and credit not the taxing power of the state or of a political subdivision of the state is pledged to the payment of the principal of or the interest on the obligation.

(b) Expenses incurred by the authority in carrying out the provisions of this chapter are payable from funds provided under this chapter, and liability may not be incurred by the authority in excess of these funds.

Sec. 41.41.410. Officers not liable. A member or other officer of the authority is not subject to personal liability or accountability by reason of having executed or issued an obligation

Article 4. Property of the Authority.

Sec. 41.41.450. Property of the authority. The authority may acquire, by purchase, lease, or gift, upon terms that it considers proper, land, structures, real or personal property rights, rights-of-way, franchises, easements, and other interests in land it considers necessary or convenient for the financing of the project or a part of the project.

Article 5. Project Construction.

Sec. 41.41.500. Contract terms relating to use of Alaska resources. (a) The authority shall enter into one or more prehire project term agreements with labor organizations that (1) contain no-strike clauses; and (2) secure timely completion of the project and maximum employment opportunities for state residents.

(b) To maximize the economic benefits of the project to Alaskan businesses, the authority shall use Alaska contractors and suppliers to the maximum extent possible to take advantage of the Alaska experience in Arctic engineering and construction.

Article 6. General Provisions.

Sec. 41.41.900. Tax exemption. All obligations issued under this chapter are declared to be issued by a body corporate and public of the state and for an essential public and governmental purpose, and the obligations, and the interest and income on and from the obligations, and all fees, charges, funds, revenues, income, and other money pledged or available to pay or secure the payment of the obligations, or interest on the obligations, are exempt from state taxation except for transfer, inheritance, and estate taxes.

Sec. 41.41.990. Definitions. In this chapter,

(1) "authority" means the Alaska Natural Gas Development Authority;

(2) "board" means the board of directors of the Alaska Natural Gas Development Authority;

(3) "project" means the gas transmission pipeline, together with all related property and facilities, to extend from the Prudhoe Bay area on the North Slope of Alaska to tidewater at a point on Prince William Sound and the spur line from Glennallen to the Southcentral gas distribution grid, and includes planning, design, and construction of the pipeline and facilities as described in AS 41.41.010(a)(1) - (5).

***Sec. 3.** AS 39.25.110(11) is amended by adding a new subparagraph to read:

(G) Alaska Natural Gas Development Authority;

***Sec. 4.** AS 39.50.200(b) is amended by adding a new paragraph to read:

(57) the board of directors and chief executive officer of the Alaska Natural Gas Development Authority (AS 41.41.020).

The text of this bill is presented as submitted by the petition sponsors.

Ballot Measure 3 - Initiative Petition

Gas Pipeline Development Authority

*Sec. 5. The uncodified law of the State of Alaska is amended by adding a new section to read:
DEVELOPMENT OF PROJECT PLAN. Not later than one year after the first meeting of the board of directors of the Alaska Natural Gas Development Authority, the board shall produce a development plan. The development plan must include
(1) estimates of construction costs and timelines;
(2) gas procurement prices;
(3) use of the state's royalty gas;
(4) estimates of revenue to the general fund and the Alaska permanent fund;
(5) a revenue sharing plan with municipal governments;
(6) a plan for delivery and pricing of natural gas to communities along the pipeline route and to Southcentral Alaska through a spur line;
(7) a plan for delivery and pricing of LNG to Yukon River and coastal communities;
(8) a payment schedule to companies providing permits or other valuable assets;
(9) a marketing plan to approach potential buyers;
(10) a plan to maximize Alaskan hire, including project labor agreements; and
(10) a plan to ensure meeting the highest environmental and safety standards, including a citizens advisory council.
(11) The goal of the authority is to have the Alaskan gas line in full production by 2007.

*Sec. 6. The uncodified law of the State of Alaska is amended by adding a new section to read:
INITIAL APPOINTMENTS OF MEMBERS OF ALASKA NATURAL GAS DEVELOPMENT AUTHORITY BOARD OF DIRECTORS. Of the members first appointed under AS 41.41.020(a), enacted by sec. 2 of this Act,
1. three members shall be appointed to three-year terms;
2. two members shall be appointed to two-year terms; and
3. two members shall be appointed to one-year terms.

STATEMENT IN SUPPORT

Last year more than 40,000 Alaskans signed an initiative petition to place the choice to develop Alaska's gas in the hands of the owners of the gas: Alaska's people. If adopted, this would establish the Alaska Gas Development Authority supporting a project to build a natural gas pipeline from Prudhoe Bay to Valdez, keeping it completely in Alaska and not going through Canada. It only makes sense to keep the jobs and revenues within Alaska and within America. In addition, the potential for value added processing of Alaskan gas into petrochemicals should also be within Alaska, not in Canada or Chicago.

Building the gasline to Valdez gives us the option to diversify our markets into Asia and our own U.S. West Coast. Equally important, an All-Alaska gas project will make it feasible to bring cheap, clean energy to Alaskans in other parts of the state including Southcentral, which is projected to start having gas shortages within the next 10 years.

Alaska's gas has been stranded on the North Slope for almost 30 years now and the oil companies seem no closer to building a gasline than ever. They all seem to have different worldwide agendas and can't seem to work together to develop Alaska's North Slope gas. If the oil companies won't do it, this initiative at least gives us the option to do it ourselves with the spirit that built Alaska in the first place.

The Authority this initiative would establish would be similar to the Alaska Permanent Fund Corporation with a governing board to set policy, a small administrative structure and the actual work to design and build the project contracted out by bid to private companies who are experts in their field and who are held strictly accountable.

The initiative is not a guarantee that the project would be built. It requires that, within a year, the permits that already exist for the All-Alaskan route would be acquired, gas supply contracts would be secured from the North Slope producers, and an economic model would be completed to take to the market to seek sales contracts. At least our gas would be presented for sale to the market, which has never been done before.

The section of the initiative entitled "Credit of state not pledged" (Sec. 41.41.400) was carefully written so that the project would stand alone based on this project's revenues. This is not another Delta barley project. Nothing will be built until markets for the gas are secured.

Development of Alaska's gas represents a major stake in the future of all Alaskans. As Alaska now faces an impending fiscal crisis in coming years, the marketing of its gas in the most prudent and lucrative manner is paramount. Wouldn't it be better to solve our fiscal problems through an in-state project such as this rather than taxing Alaskans or taking your Permanent Fund dividend? We think so. Please vote YES on ballot measure # 3.

Scott Heyworth
Mike Macy
Tyrone Neel

The statement printed on this page is the opinion of the authors and is presented as submitted to the Division of Elections.

Ballot Measure 3 - Initiative Petition

Gas Pipeline Development Authority

STATEMENT IN OPPOSITION

The All-Alaska Gasline Initiative will force the State of Alaska to create a new, inefficient government bureaucracy that will compete and interfere with private enterprise. By law, the state's first task would be to expend state funds restudying an expensive, risky project that has already been shown to not be feasible. Therefore, this initiative should be defeated.

A recent report commissioned by the Legislature and completed by the Administration states that The All-Alaska Gasline Initiative is not in the best interest of the State. The report found that - should the State undertake construction of such a project - the financial risks are substantial. Except for the Permanent Fund, there is no ready source of investment money. Given the scope of such a project the potential for permit and construction delays leading to cost overruns, Alaska's entire savings account could be jeopardized. The State's credit rating would be put at risk because of the reliance on debt, thus devaluing any bonds should they be issued to finance the project. In addition, it is unlikely that State ownership would automatically add value.

The argument that the State of Alaska should do more to discharge its constitutional obligation to develop natural resources for the benefit of all Alaskans rings hollow. The State has long discharged its obligations by regulating the extraction and use of gas consistent with its existing lease agreements. The State also realizes profits from ongoing production through taxes and royalties.

The Initiative is restricted to a pipeline and liquefied natural gas (LNG) project in Valdez. Industry studies show that this restriction proves less feasible in the foreseeable future due to inadequate markets and the financial demands of the project. The market for such a project will be oversupplied by almost a factor of 2 from cheaper sources through at least 2010. This oversupply recently resulted in the first downturn of LNG prices into Japan since the business began in the late 1960's. The All-Alaska Gasline Initiative specifies that the State can only consider the most expensive project. Current estimates indicate that capital costs of an Alaskan LNG project will be at least double that of competing new supplies.

The Government lacks the technical expertise and experience for this big, risky project, especially at a time when smaller, more efficient government is needed to strengthen Alaska's long-term economic health. Just the feasibility study of the project would cost the State $200 million. Since there is no assurance that it will be built, such a cost is likely a waste of money that the State can ill afford. It makes more sense for the State to support private industry efforts to commercialize North Slope Gas rather than create a bloated State-Owned project that could end up costing more to build and run than it would generate in revenue.

The Alaska Support Industry Alliance is a statewide non-profit trade association whose membership derives their livelihood from Alaska's Oil and Gas Industry.

Larry J. Houle
General Manager
Alaska Support Industry Alliance

The statement printed on this page is the opinion of the author and is presented as submitted to the Division of Elections.

Presentation Outline
Senate/House Finance Committee Hearing
September 11, 2003
9:00 AM time?

Outline of Presentation

I. State Priorities for Alaska's Stranded Gas, & why
II. ANGDA's funding request in light of State priority
III. ANGDA's appropriate role

I. State Priorities for Alaska's Stranded Gas

- Stranded Gas Development Act legislation and expectation of an application from Producers
  i. The SGDA was updated and passed this last session
  ii. The Administration is awaiting an application from the gas producers under the SGA for an Alaska Highway Route project. We have been preparing internally for negotiating a contract under the SGDA, as contemplated by the Legislature.
- Federal legislation working its way through Congress
  The U.S. Congress' Conference Committee has before it an energy bill that includes important provisions to which the State has been an active party. Such an energy bill, if passed, could pave the way for development of a natural gas pipeline that would take 4.5 BCF/day of Alaska's stranded gas to market. This Administration is committed to assisting passage of this bill, putting Alaska in a position to develop not only its existing gas reserves, but also any new discoveries that may be made.
- Why we support the Alaska Highway Route project as current priority and focus of our efforts
  i. Project maximizes the value of Alaska's gas because it is a 4.5 BCF project, potentially expanding to 5.5 BCF. The LNG project is for less than half of this volume. An Alaska Highway Route maximizes the timely use of all the known reserves and provides a pathway to use all future discoveries.
  ii. Producers control gas, this is their preferred project. The state is committed to work with the producers so long as they are actively pursuing the project. So long as the producers are actively pursuing their project the LNG project will not be able to contract for the purchase of gas.
  iii. Maximizes the wellhead price, thus greater return to State
  iv. Given current gas reserves, and recognizing the reserve requirements to underpin the Alaska Highway Route project, another project would be a secondary focus until further reserves are identified
  v. A spur line to tidewater would complement the gas pipeline project in the future as additional gas reserves are identified

II. ANGDA's funding request prior to knowing the results of the energy bill is premature for several reasons:

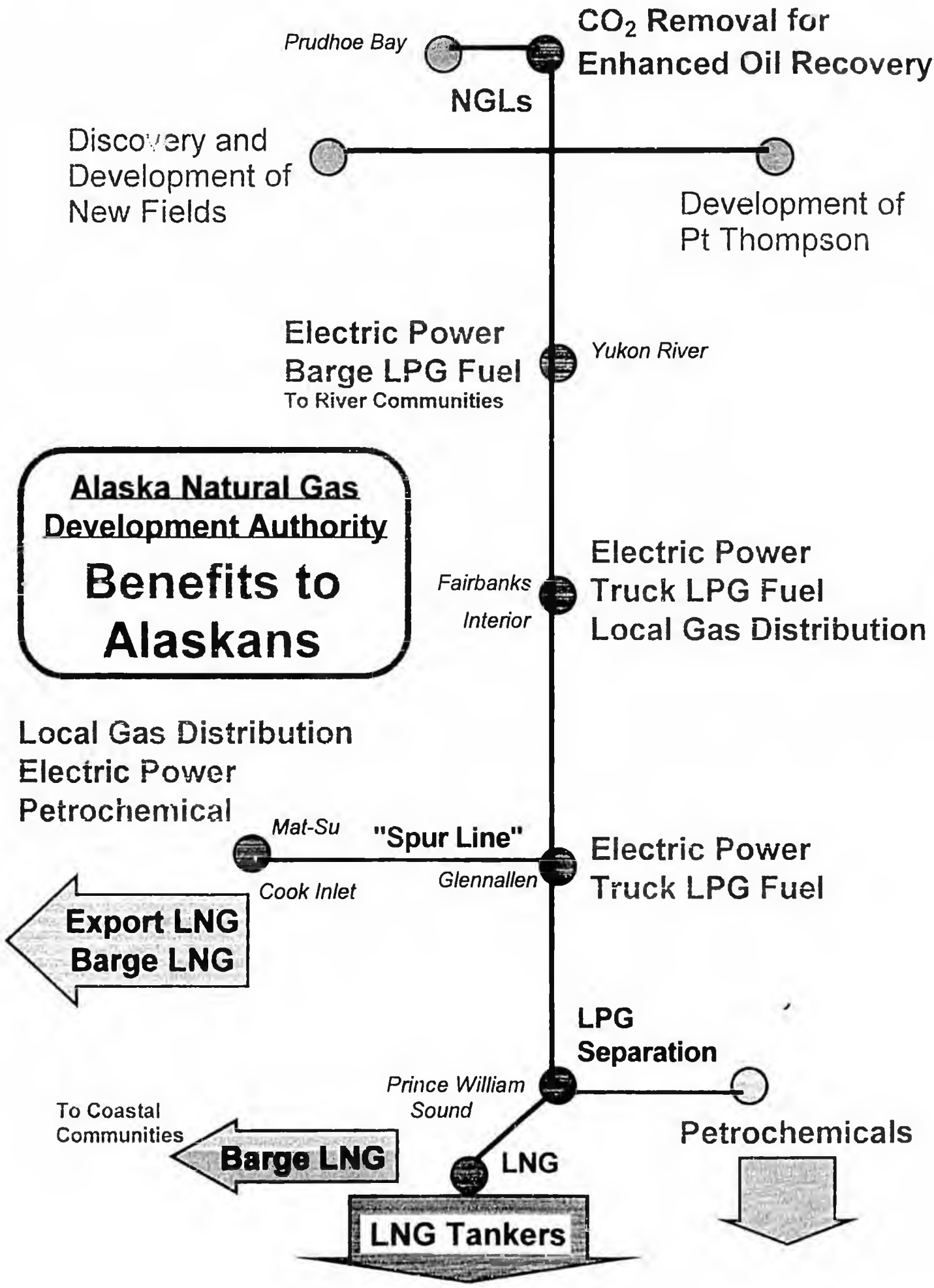
- The project is not defined at this point. Unit we know if there will be an Alaska Highway Route project, we will not know what an ANGDA project will look like.
- The legislature and the public have not had the opportunity to assess the risks associated with the project. The Administration feels that a thorough exploration & subsequent discussion of the benefits & risks of a state funded project need to occur before a major commitment is made. This conversation must involve the entire Legislature, the Executive Branch, the public and the ANGDA, and should precede a large budget request;
- We are in the process of developing the Administration's budget. Until the appropriate role for ANGDA is defined, we are uncertain what the appropriate request should be, where the funds should originate and what specific functions are appropriate;
- We do feel there are appropriate things ANGDA could be doing at this time (see Section III) and a smaller and more focused funding request may be appropriate, although such a request should be submitted as part of the normal budget process.

III. Though the funding request is premature, there are some activities which we believe would be appropriate for ANGDA:

- ANGDA has a statutory obligation to study bringing natural gas to market as LNG and we believe it is appropriate for them to do this in a fashion that complements the potential Alaska Highway Route project. Options for this include:
    i. A spur line to Valdez
    ii. A spur line to SC Alaska that could also provide natural gas to residents

- We believe ANGDA has a very appropriate role to assist the state in developing the best possible project for the state of Alaska. Specific issues that could be examined include:
    - Address questions of the role of the Alaska Railroad or the Port Authority in issuing tax exempt debt;
    - Explore financial issues surrounding the State's participation, such as
        a. Amount and source of equity;
        b. Cost of debt
        c. Affect on tariffs
        d. Tax questions
    - Investigate Jones Act legal and economic issues pertaining to LNG tankers
    - Identify benefits from in-state gas use

- We believe many of the above activities and studies can be done by using existing state and private resources. There is a substantial amount of research that could be done to compile and analyze existing data without requesting additional funds from the legislature or the Executive Branch at this time.


Prudhoe Bay
CO_2 Removal for Enhanced Oil Recovery
NGLs
Discovery and Development of New Fields
Development of Pt Thompson
Electric Power
Barge LPG Fuel
To River Communities
Yukon River
Alaska Natural Gas Development Authority
Benefits to Alaskans
Fairbanks
Interior
Electric Power
Truck LPG Fuel
Local Gas Distribution
Local Gas Distribution
Electric Power
Petrochemical
Mat-Su
"Spur Line"
Cook Inlet
Glennallen
Electric Power
Truck LPG Fuel
Export LNG
Barge LNG
LPG Separation
Prince William Sound
To Coastal Communities
Barge LNG
LNG
Petrochemicals
LNG Tankers

Alaska Natural Gas Development Authority

Harold Heinze

House Finance Committee
Senate Finance Committee
September 11, 2003

•The Alaska Natural Gas Development Authority (ANGDA) was created by a public initiative (BM # 3) and by law is

Benefit Driven

& A Doer

•Purpose of Today's Presentation is:

Explain business approach & project viability

Explain request for "grubstake" funding

ANGDA Business Concepts

- Public corporation run by Board
- Issue revenue bonds
- Administer State right-of-way
- Build & operate facilities in Alaska
- Buy & sell gas (more than Royalty gas)
- Invest at risk -- capture rewards
- Benefits driven (more than ROI)
- Contract for ships & marketing

ANGDA Benefits & LNG Project

- ANGDA focus is getting NS gas benefits to Alaska & Alaskans
- LNG export is integral to the economies of delivering gas within Alaska
- Alaskan LNG project is economically viable as infrastructure providing significant benefit values

West Coast LNG Situation

- There is a West Coast market opportunity now & the shorter shipping distance favors Alaska LNG
- Only 1 or 2 of the West Coast terminals will be open to Alaska LNG
- We may lose in the LNG market competition, but we have no chance if Alaska doesn't try NOW

ANGDA Project Concept & Cost

Project Elements	Size	Cost
Treatment	2 BCFPD share of plant	$ 2 B
Pipelines	54" & 36"	$ 4 B
Liquefaction	4 trains @ 4 M tn/yr	$ 4 B
Tankers	10 LNG @ $200M/ship	$ 2 B
Total Export	**16 M tn/yr**	**$ 12 B**

NOTIONAL Cost of Service

(For Different ANGDA Financial Assumptions)

	High ROR Commercial	Not Taxable	Benefit Driven Infrastructure
Pipeline	1.40	1.00	0.75
LNG	1.50	1.20	0.90
Total Cost of Service	**$2.90**	**$2.20**	**$1.65**

Does **NOT** Include Wellhead Purchase Price

ANGDA Approach to Project Risk Elements

Wellhead Price	Fixed Purchase Price
Construction	Overruns -- Tariff ?
Market Volume	Minimal -- Marketer
Market Price	Basket of Prices
Fiscal Changes	Not Applicable

Why is ANGDA Getting into Gas Business ?

- Authority will work out commercial terms with a producer-led highway pipeline for gas delivery to maximum Alaska benefit
- LNG based all-Alaskan project is economic and competitive for non-taxable Authority
- Alaska's portfolio of other gas or LNG projects is limited
- Alaska doesn't have multiple shots at a dynamic Pacific Rim market

High-Level ANGDA Strategy

- Support producer-led highway gas line (prefer their investment at risk) & define compatible Alaska benefit projects
- Keep wellhead price of gas high (lower cost of service) to encourage development of new reserves and higher current revenues
- Use margin to support public purposes

ANGDA Funding Request

- ANGDA Board respectfully requests accelerated funding of up to $ 3 million now to finish conceptual design, cost estimate, schedule, benefits analysis, and marketing by Jan '04
- Demonstrated Legislative support to fund this request when session reconvenes would allow ANGDA to "borrow" the money now ($2.5 million)

Accelerated Funding Request

- Satisfy statutory requirements in January instead of June next year
- Design funding is focused on new concepts and increased Alaska benefits
- Closes engineering gap with recent highway gasline design of producers
- Significant work value contributed (free)
- Contractors & spending focused in Alaska

ANGDA Conceptual Design Work

- Have developed work scope and cost estimates with contractors
  - ASRC Energy Services
  - VECO
  - Peratrovich, Nottingham & Drage (PND)
  - Wood Mackenzie
  - Northern Economics
- Intend to sole-source contracts (majority will be fixed-price)

New Design Elements

- Spur line from Glennallen to Cook Inlet area
- Barge mounted LNG plant & LNG storage tanks
- LNG plant & loading berth at old Valdez townsite
- LNG thermos barges

ANGDA Design & Benefits Study

• Design & Execution Plan	
– Pipelines	$500 k
– LNG	$900 k
– Marine	$400 k
• In-State Uses & Benefit Analysis	$150 k
• Marketing / Competitor Analysis	$200 k
• Specialized Legal Opinions	$150 k
• Staff & Administrative	$200 k
TOTAL	**$2,500 k**

ANGDA Design & Benefits Study

- **Contributed Studies** (Donated Information)
  - Yukon Pacific
  - Alaska Gasline Port Authority
  - Tanker Design & Cost
  - Training in Alaska & Alaska Hire
  - Gas Compositions & Conservation
- **State In-House Expert Consulting**
  - Revenue Projection & Tariff Modeling
  - Social & Environmental Responsibility
  - Permitting & Land Use / Planning

Benefits in Design Concept

- Spur line to Cook Inlet provides future residential & industrial gas supply in area
- Study of barge mounted LNG plant would allow multi-$B fabrication in Cook Inlet
- LNG thermos bottle barges can supply coastal communities
- Expanded Kenai LNG & urea plant options
- Propane content in gas line key to Yukon River supply and petrochemical plants

Benefit of New Design Elements

- "Spur line" provides abundant supply of gas to majority of residential, commercial, and industrial gas users in Alaska at current average price ($ billions)
- "Barge mounted LNG plant" can be constructed at existing fabrication sites in Cook Inlet area and utilize existing resident craft labor ($ billion)

Benefit of New Design Elements

- LNG plant & berthing location in existing industrial area of Valdez will significantly improve petrochemical and value-added business opportunities ($100 million)
- Barge mounted cryogenic storage tanks can be used to supply large & small coastal communities of Alaska with clean and affordable energy ($100 millions)

Why Proceed Now
to Finish Project Concept Design??

- Market Pull – a complete conceptual design essential to being considered a "real" project by LNG buyers
- Producer Decisions – discussion with producers needs to be based on the value ANGDA adds to their project by satisfying a completely defined set of Alaska's needs

Why Proceed Now
to Finish Project Concept Design??

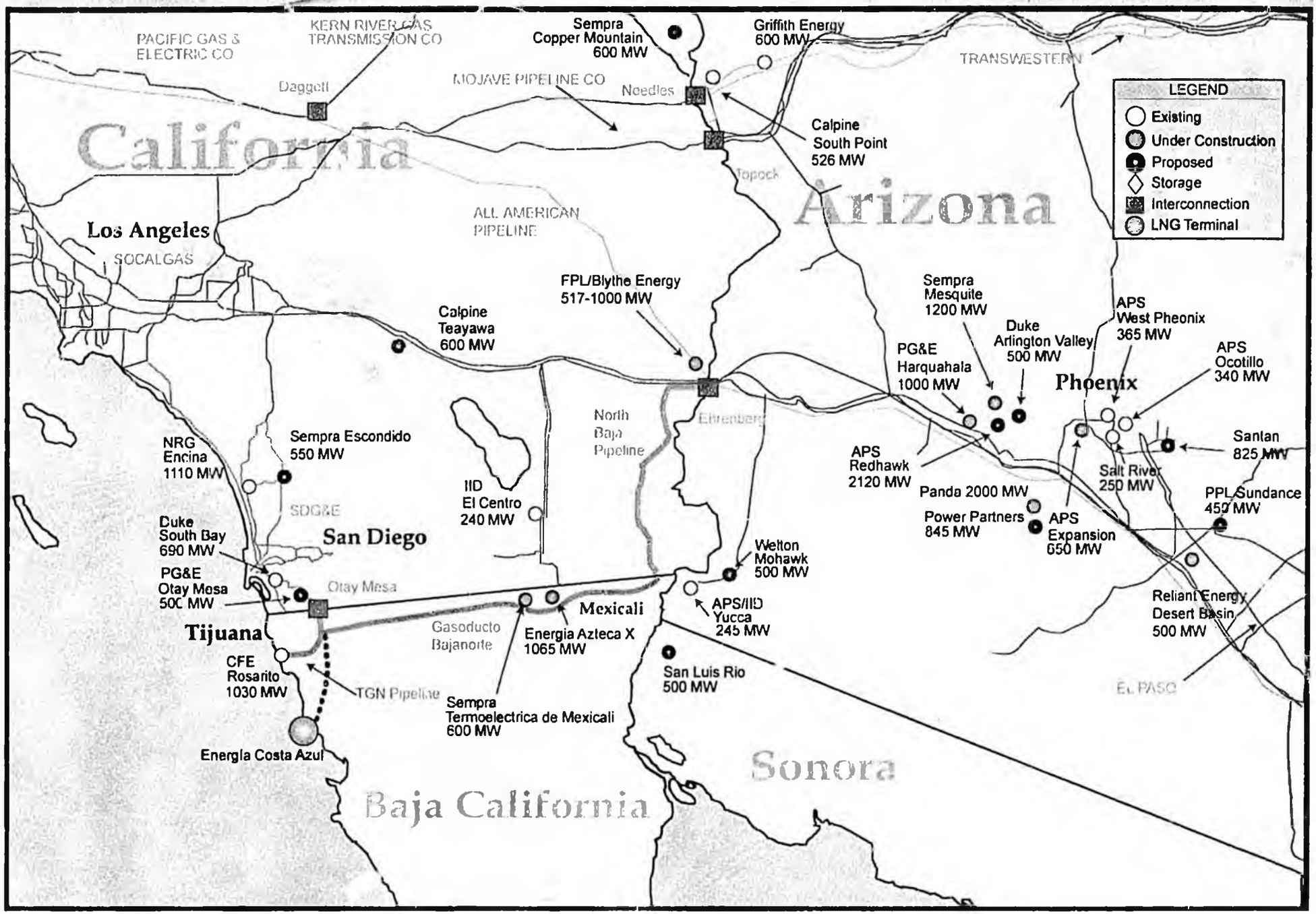
- Project Management – timely closure on critical design elements will allow focus on business decisions
- Energy in Alaska - Major energy decisions & commitments are being made without this project's options & alternatives included in the framework

Alaska Natural Gas
Development Authority

411 W. 4th Ave, Anchorage 99508

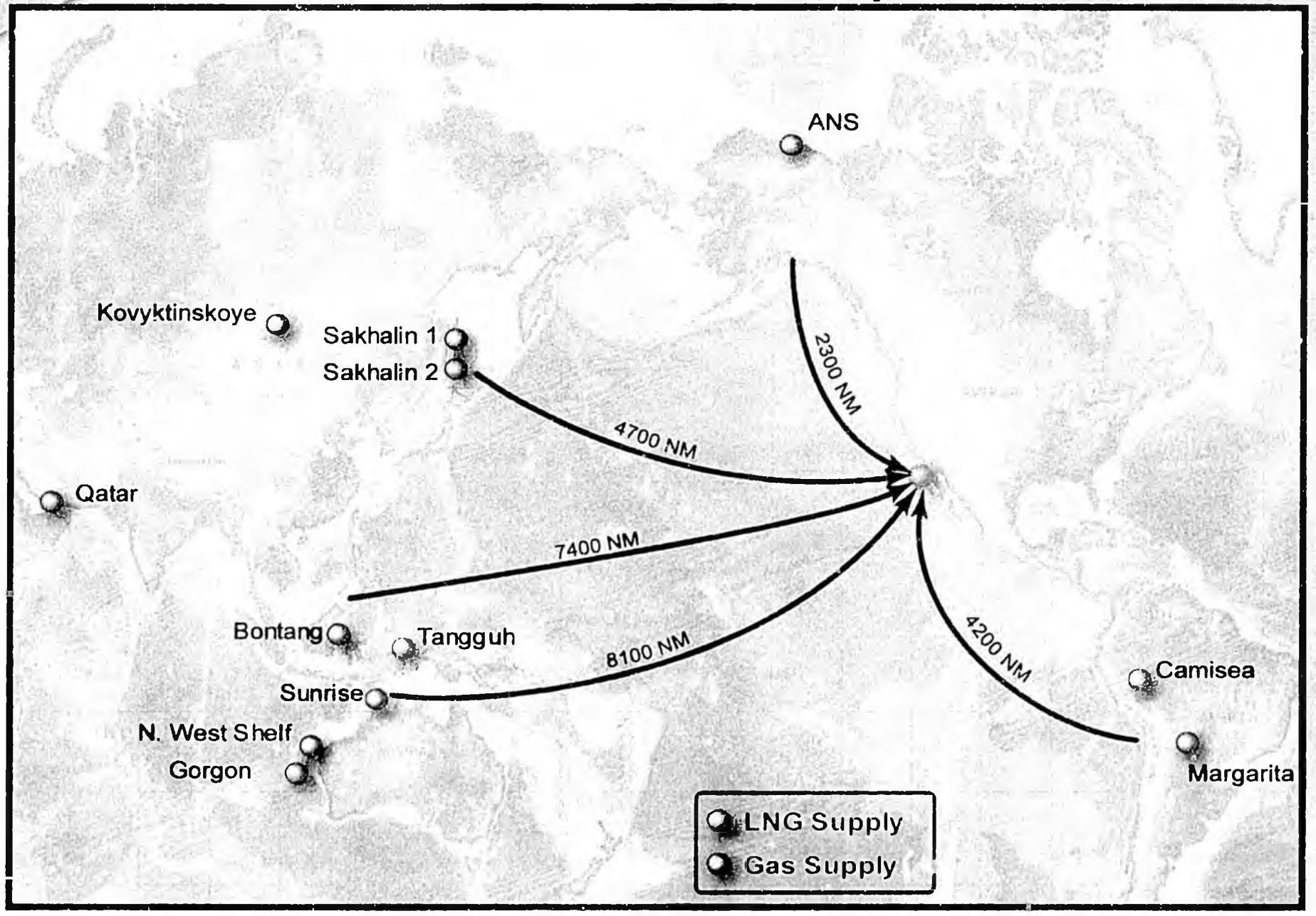
(907) 257 – 1347
hheinze@jpo.doi.gov

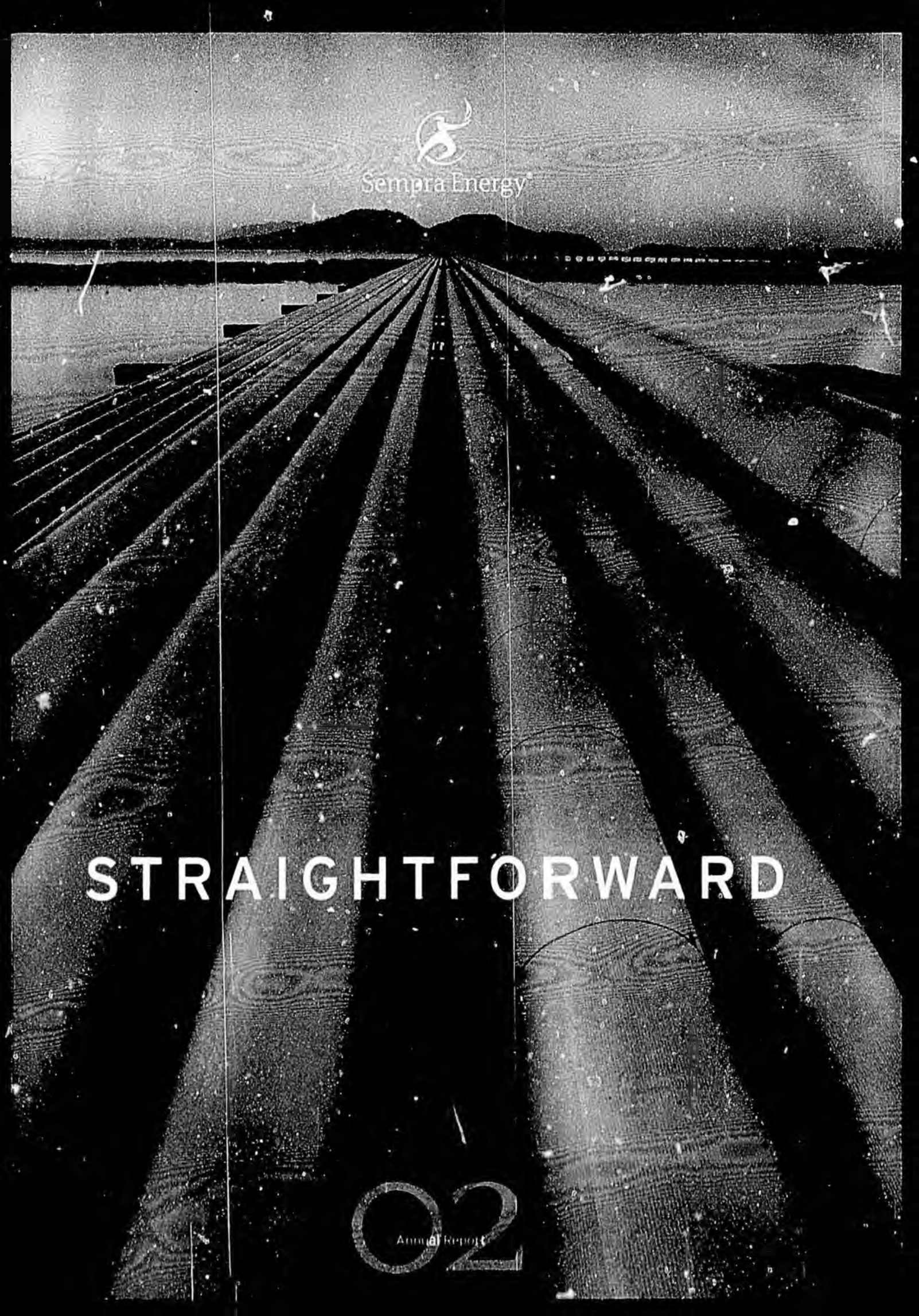
Sempra Energy



Sempra Energy

Pacific Basin Gas Competition

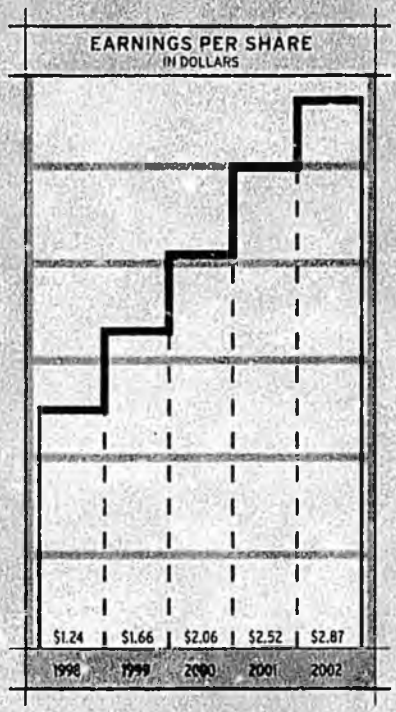



Sempra Energy
STRAIGHTFORWARD
02
Annual Report


Based in San Diego, Sempra Energy is a Fortune 500 energy services corporation. Its utilities serve the largest customer base of any energy utility in the United States. With 12,000 employees worldwide, the Sempra Energy companies provide energy-related products and services to more than 9 million customers in the United States, Europe, Canada, Mexico, South America and Asia. Sempra Energy common shares trade on the New York Stock Exchange (NYSE) under the symbol "SRE." Additional information is available on the Web at www.sempra.com.
WE DO WHAT WE SAY

SEMPRA ENERGY'S STRENGTHS DIFFERENTIATE US FROM OTHERS IN OUR INDUSTRY.

- WE ARE FINANCIALLY STRONG.
- WE EXECUTE.
- WE MANAGE RISK.



WE DELIVER RESULTS

14%

INCREASE IN EARNIN

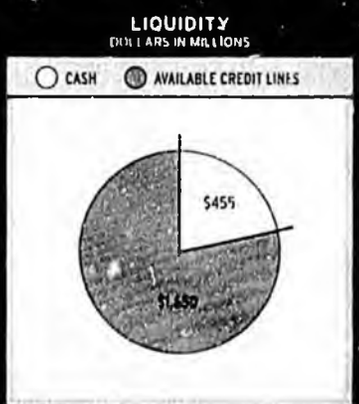
Sempra Energy continues to deliver solid financial results despite difficult conditions in the energy sector. In 2002, we generated earnings growth of 14 percent. Since the formation of Sempra Energy in 1998, we have increased our earnings per share by an average of 23 percent per year. In a challenging stock market in 2002, Sempra Energy's total return outperformed the major stock indexes and our industry peer group.

WE HAVE STRONG CASH FLOW AND LIQUIDITY.

Financial strength remains a key differentiator for Sempra Energy. We have a solid balance sheet and sufficient liquidity and cash flow to meet all of our planned operating needs.

$2.1 billion

IN LIQUIDITY

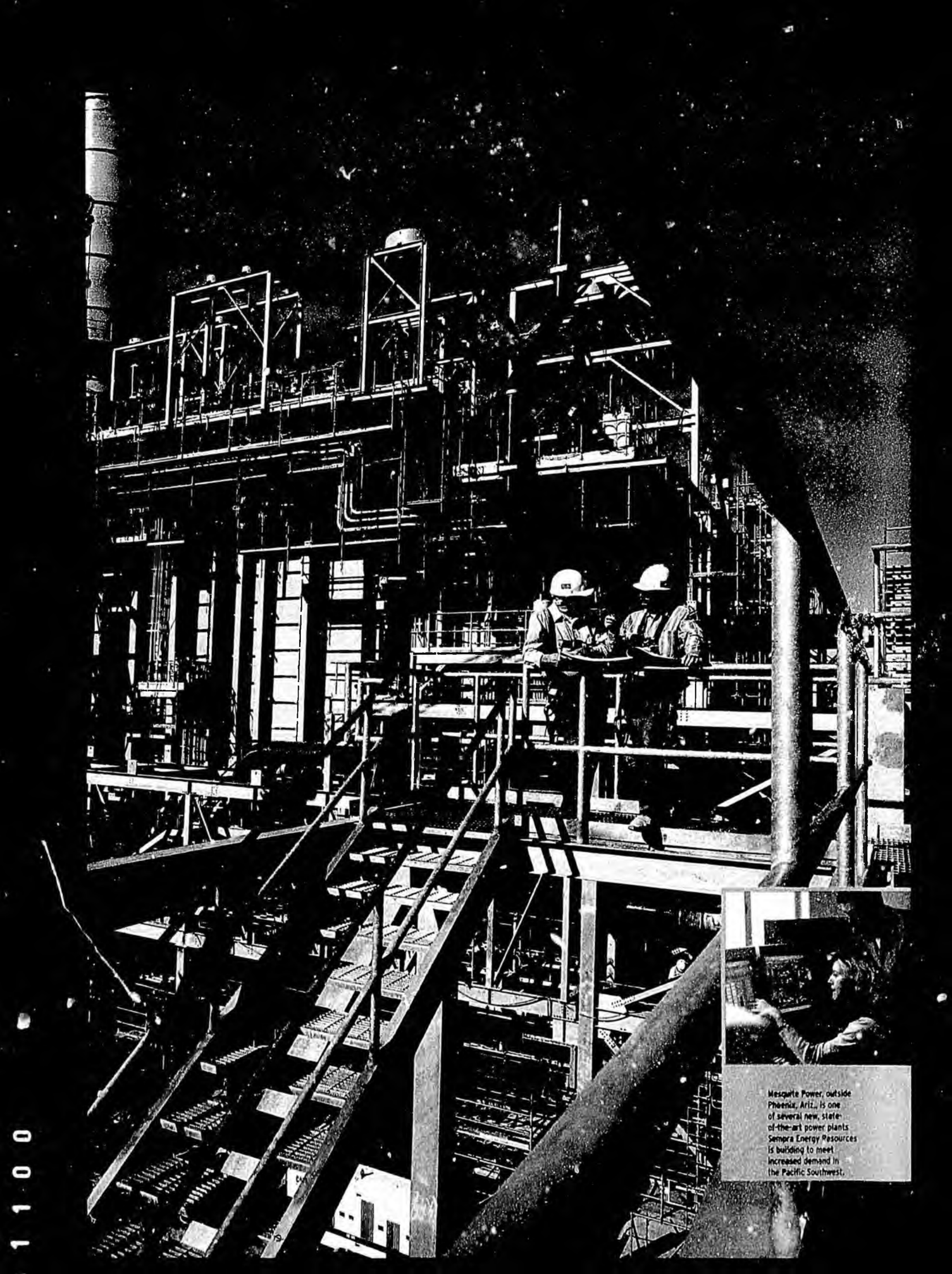


DESPITE SIGNIFICANT CHALLENGES IN OUR INDUSTRY, WE ARE EXECUTING OUR STRATEGY SUCCESSFULLY.

WE EXECUTE

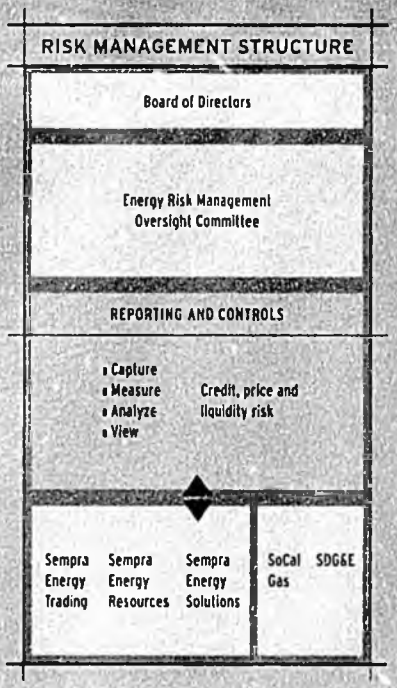
We do not alter our strategy to suit the "flavor of the month."

- We said we would maintain a solid financial foundation. In 2002, we posted record earnings for the fourth consecutive year.
- We said we would manage our California utilities efficiently. Southern California Gas Company and San Diego Gas & Electric both exceeded their authorized return on equity in 2002.
- We said we would expand our energy footprint in markets we know best. In 2002, we began operating a major new natural gas transmission pipeline in Northern Mexico and neared completion of three state-of-the-art power plants in the Western region. Our wholesale trading and retail energy marketing businesses are profitable and are industry leaders.



Mesquite Power, outside Phoenix, Ariz., is one of several new, state-of-the-art power plants Sempra Energy Resources is building to meet increased demand in the Pacific Southwest.

1100



WE MANAGE RISK

WE HAVE PERSEVERED BECAUSE WE MANAGE OUR BUSINESS PRUDENTLY.

Risk management is an integral part of our culture. We make business decisions based on careful analysis and financial discipline.

This expertise at managing risk helped us navigate the energy crisis of 2000-2001 and enables us to operate a profitable energy-trading business while others have failed. Our team-based risk-management structure allows us to manage our business to generate more stable and predictable profits.

WE ARE COMMITTED TO MAINTAINING STRONG INVESTMENT-GRADE CREDIT RATINGS.

Sempra Energy holds stable outlooks from all three credit-ratings agencies. Maintaining strong investment-grade credit ratings is critical to our customers and suppliers, as well as to the equity and credit markets. Our access to the capital markets enhances our ability to grow our business and take advantage of opportunities in the marketplace.

SEMPRA ENERGY UNSECURED DEBT

A- A Baa1

S&P FITCH MOODY'S

CREDIT RATINGS			
As of January 31, 2003	S&P	Fitch	Moody's
Sempra Energy			
Unsecured Debt	A-	A	Baa1
Commercial Paper	A-2	F1	P-2
Trust Preferred Securities	BBB	A-	Baa2
SDG&E			
Secured Debt	A+	AA	A1
Unsecured Debt	A	AA-	A2
Preferred Stock	A-	A+	Baa1
Commercial Paper	A-1	F1+	P-1
SoCalGas			
Secured Debt	A+	AA	A1
Unsecured Debt	A	AA-	A2
Preferred Stock	A-	A+	Baa1
Commercial Paper	A-1	F1+	P-1

FINANCIAL HIGHLIGHTS

At December 31 or for the years then ended (Dollars in millions, except per-share amounts)	2002	2001	Percent change
CONSOLIDATED FINANCIAL DATA			
Operating Revenues	$ 6,020	$ 7,730	-22.1%
Net Income	$ 591	$ 518	14.1
Net Income Per Share of Common Stock:			
Basic	$ 2.88	$ 2.54	13.4
Diluted	$ 2.87	$ 2.52	13.9
Weighted Average Number of Common Shares Outstanding (diluted, in millions)	206.1	205.3	0.4
Total Assets	$ 17,757	$ 15,080	17.8
Common Dividends Declared Per Share	$ 1.00	$ 1.00	0.0
Debt to Total Capitalization	60.4%	59.5%	1.5
Book Value Per Share	$ 13.79	$ 13.16	4.8
Capital Expenditures	$ 1,214	$ 1,068	13.7
STATISTICS			
Natural Gas Throughput[1] (in billions of cubic feet)	982	1,131	-13.2
Electric Energy On-System Sales[1] (in billions of kilowatt hours)	17.7	17.5	1.1
Number of Customers[1] (in millions of meters served)			
Natural Gas	6.1	6.1	0.0
Electricity	1.3	1.3	0.0
Return on Common Equity			
Sempra Energy	21.4%	19.5%	9.7
SoCalGas	16.2%	16.0%	1.3
SDG&E	18.2%	16.5%	10.3
Number of Employees	12,197	11,511	6.0

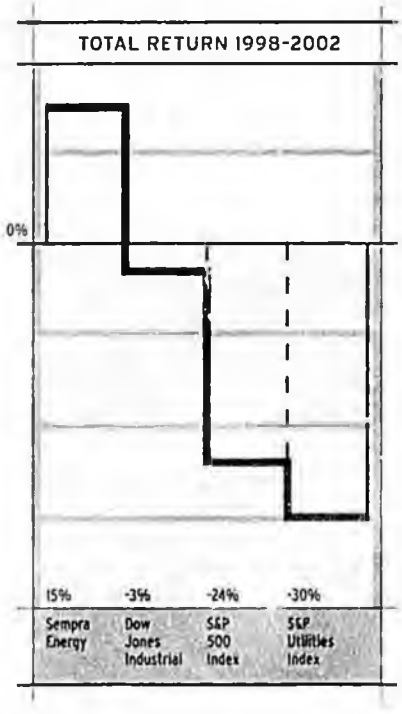
[1] California utilities

[2] Excludes contract and part-time employees

FELLOW SHAREHOLDERS

WE HAVE A FOCUSED AND DISCIPLINED STRATEGY FOR GROWING OUR BUSINESS.

Over the past year, Sempra Energy has distinguished itself in a number of important ways. First, we've performed when others in our industry have not. Our company posted strong financial and operating results in 2002. Earnings were $591 million, up from $518 millior .001. Earnings per diluted share were $2.87, a 14-percent increas over last year. In fact, since 1998, Sempra Energy's earnings per share have grown, on average, by 23 percent annually. In a challenging stock market, our total return to investors was better than the major stock indexes and our industry peer group in 2002.



When we formed Sempra Energy in 1998, we combined two companies with century-long histories of financial stability, excellent customer service and corporate responsibility. Our name – from the Latin word that means "always" – reflects our commitment to manage and grow a business that is straightforward, reliable and well-grounded.

Delivering results

Sempra Energy continues to deliver excellent financial results, despite difficult conditions in the energy sector. We maintain a balanced portfolio of businesses with a solid balance sheet and strong investment-grade credit ratings.

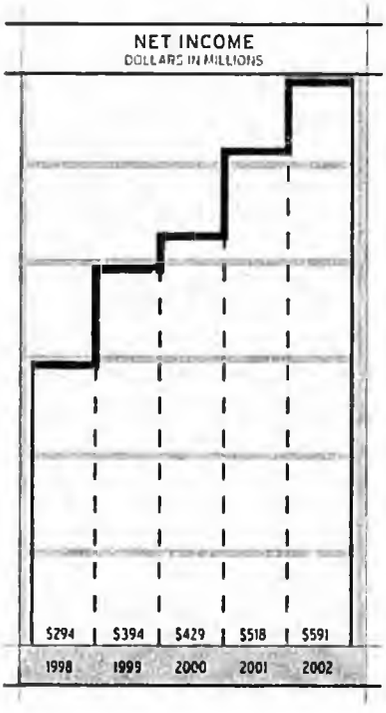
This financial performance has enabled us to return reliable dividends to our shareholders and to produce earnings growth.

Our focus on risk management has caused us to succeed in difficult times. This focus distinguishes us from others in our industry.

Sempra Energy Utilities contributes to shareholder value by providing strong and predictable earnings and cash flow – the bedrock for Sempra Energy's growth. Southern California Gas Company and San Diego Gas & Electric performed well in 2002, exceeding their authorized return on equity.

At the end of 2002, SDG&E and SoCalGas filed with the California Public Utilities Commission a rate application that will determine their cost and rate structures beginning in 2004. We expect the CPUC to issue a decision by the end of 2003.

To accommodate customer growth and improve the reliability of our utility systems, our California utilities continue to invest in infrastructure improvements. In 2002, we invested approximately $731 million in utility capital expenditures, upgrading their gas and electric delivery networks.



A prudent growth strategy

While the past year has been disastrous for many wholesale and retail energy providers, Sempra Energy Global Enterprises has prospered.

The market exit by some competitors has created new opportunities. A good example is the liquefied natural gas (LNG) project in Hackberry, La., our new Sempra Energy LNG Corp. unit agreed to acquire in February 2003. After final regulatory approvals, the LNG receiving terminal being developed there could begin commercial operation by 2007 with daily processing capacity of up to 1.5 billion cubic feet of gas. With natural gas supplies tightening in North America, we believe that LNG will be a critical part of the supply mix over the next decade.

Also, in October 2002, Sempra Energy Resources acquired a 305-megawatt coal-fired Texas power plant, which we have renamed "Twin Oaks Power." As natural gas prices rise, this plant has the potential to become more valuable in the deregulated Texas power market, especially in comparison to gas-fired power plants there.

23% average annual growth

IN EARNINGS PER SHARE
SINCE SEMPRA ENERGY
WAS FORMED IN 1998.

Sempra Energy Resources has three state-of-the-art gas-fired power plants under construction – near Bakersfield, Calif., Phoenix, Ariz., and Mexicali, Mexico – that will begin operating by the summer of 2003. These will be among the cleanest power plants in North America, meeting some of the most stringent environmental standards. More than 80 percent of the peak-generating capacity of Sempra Energy Resources' fleet of power plants is hedged or under contract. This strategy to build or acquire power plants only when we have a predictable market for their output is designed to mitigate our risks.

Underlying the development of the three power plants in the Pacific Southwest is a long-term energy-supply agreement Sempra Energy Resources signed with the California Department of Water Resources in May 2001. California agencies have challenged our and other suppliers' agreements at the Federal Energy Regulatory Commission (FERC) and in state court, even though these contracts have brought stability to California's energy market. We expect the validity of our contract to be upheld in all venues.

The recently acquired Twin Oaks power plant provides Sempra Energy Resources with fuel diversity and entry into the Texas power market.

In a tough market, Sempra Energy Trading recorded another profitable year, operating a low-risk business with products and services to mitigate large wholesale energy customers' exposure to market volatility. Our trading business differs from others because we manage our price and credit risk carefully, while keeping our transactions relatively short in term. More than half our unrealized marked-to-market earnings become cash within 12 months and, more than 85 percent, within three years.

In April 2002, Sempra Energy Trading enhanced its earnings and their consistency through the acquisition of Enron's base metals trading and warehousing businesses.

Sempra Energy International's pipeline, Gasoducto Bajanorte, began operations in September 2002 with a capacity of approximately 500 million cubic feet per day of natural gas and full subscription

for more than 20 years. We have engineered the pipeline to more than double its capacity for the future transportation of natural gas produced from LNG landed on the coast of Baja California, Mexico.

Development continues on our Costa Azul LNG terminal in Baja California. The facility is in the permitting stages and should be operational by 2006.

Finally, Sempra Energy Solutions has been successful where others have failed – providing energy-management solutions and outsourcing options to large commercial, industrial and institutional customers. I am particularly proud that Sempra Energy Solutions increased its net income to $21 million in 2002 from $1 million in 2001.

Looking ahead

In the wake of the many scandals in corporate America over the past year, I am frequently asked by investors and others: "How is Sempra Energy guarding against similar problems?" With the exception of myself, no other member of our board of directors is a current or former employee of Sempra Energy. We have an internal audit function that reports directly to our board's Audit Committee. Ethical business conduct is a key element in our company's ongoing success. We have a strict business code of conduct and affiliate-compliance rules in place, as well as rigorous employee training programs in both areas.

Furthermore, we are committed to producing clear, accurate and timely financial statements for our investors and other key stakeholders. Like many other CEOs, in August 2002, I submitted my personal certification to the Securities and Exchange Commission as to the accuracy and completeness of our financial reports. This certification process continues on a quarterly basis.

CORPORATE GOVERNANCE & ETHICS

Measures to ensure good corporate governance and ethical conduct at Sempra Energy:

- No current or former employees on the board of directors, except for the CEO.
- An internal audit function reporting directly to the board of directors.
- Adherence to strict affiliate-compliance rules separating the activities of the California utilities from the growth businesses.
- Establishment of a Chief Ethics Officer, as well as an ethics "helpline" for employees.
- Regular training for employees on compliance with the business-conduct code and affiliate rules.

#2 best company

ON *FORTUNE'S* LIST OF AMERICA'S BEST COMPANIES FOR MINORITIES IN 2002.

"Straightforward" not only accurately describes how we govern and operate our company, but also how we approach our workforce. We are proud that, across the Sempra Energy companies, we have employees who – from top to bottom – reflect the diversity of the markets we serve. Creative problem solving and more thoughtful decision-making often are the result of a diverse workforce. We were pleased when – for the fifth consecutive year – *Fortune* magazine heralded Sempra Energy as one of America's best companies for minorities. We earned the No. 2 ranking in 2002 and have been recognized among *Fortune's* top five companies each year since the magazine began publishing its list in 1998.

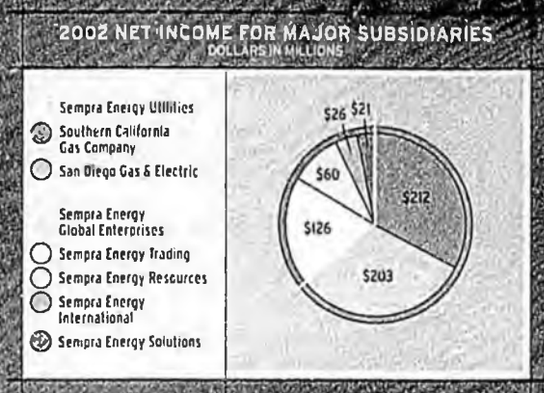
Sempra Energy remains a vital part of communities in which we operate. In 2002, Sempra Energy and its employees contributed more than $9 million and 30,000 hours of volunteer time to worthy causes.

We have a sound strategic plan in place to deliver solid financial results. We accept only those risks we can fully understand and manage. These factors will continue to differentiate us in the market and reward our value-focused investors. On behalf of all of us at Sempra Energy, thank you for your continued support and confidence.

Sincerely,

Stephen L. Baum
Chairman, President and Chief Executive Officer

In August 2002, SDG&E workers battled difficult conditions to replace power poles and other equipment damaged in a fire that burned more than 60,000 acres in eastern San Diego County.



A BALANCED BUSINESS PORTFOLIO

SEMPRA ENERGY'S FORMULA FOR SUCCESS IS BASED ON THE SOLID FOUNDATION OF ITS CALIFORNIA UTILITIES AND THE FOCUSED GROWTH OF ITS OTHER BUSINESSES.

Sempra Energy Utilities

Southern California Gas Company

The nation's largest natural gas distribution utility serves 18.9 million consumers through 5.3 million meters. Service territory encompasses 23,000 square miles.

San Diego Gas & Electric

Serves 3.1 million consumers through 1.3 million electric meters and more than 780,000 natural gas meters. Service area spans 4,100 square miles.

Sempra Energy Global Enterprises

Sempra Energy Trading

Provides marketing and risk-management services to customers that require natural gas, power, petroleum products and base metals, worldwide.

Sempra Energy Resources

Acquires, develops and operates power plants and energy infrastructure for the competitive market.

Sempra Energy International

Develops, owns and operates energy projects in international markets. The company currently is involved in joint or solo ventures that provide natural gas and electricity service to more than 2.6 million customers.

Sempra Energy Solutions

Provides commercial and industrial businesses throughout the United States with energy-management and consulting services.

The new Sylmar compressor station is part of an aggressive expansion program at SoCalGas that increased capacity and supply of natural gas into Southern California by 11 percent in 2002.

Edwin A. Guiles
Group President

Sempra Energy Utilities

A SOLID FOUNDATION

IN 2002, SEMPRA ENERGY UTILITIES CONTINUED TO PERFORM, PROVIDING SOLID EARNINGS, STRONG CASH FLOW AND EXCELLENT CUSTOMER SERVICE.

2002 SEMPRA ENERGY UTILITIES PROFILE	
Assets	$9.2 billion
Operating revenues[a]	$4.5 billion
Employees	10,360
Service territory	27,100 sq. miles
Population served (millions)	21.9
Gas	
Meters (millions)	6.1
Pipes (miles)	108,104
Throughput[a]	982 billion cu. ft.
Storage capacity	118.1 billion cu. ft.
Electric	
Meters (millions)	1.3
Wires (miles)	22,897
Power delivery[a]	17.7 billion kWh

[a] Excludes intercompany sales.

Southern California Gas Company
San Diego Gas & Electric

In 2002, Southern California Gas Co. (SoCalGas) and San Diego Gas & Electric (SDG&E) successfully completed the integration and streamlining of their management. For the year, the two utilities exceeded their authorized return on equity and continued to invest for the future.

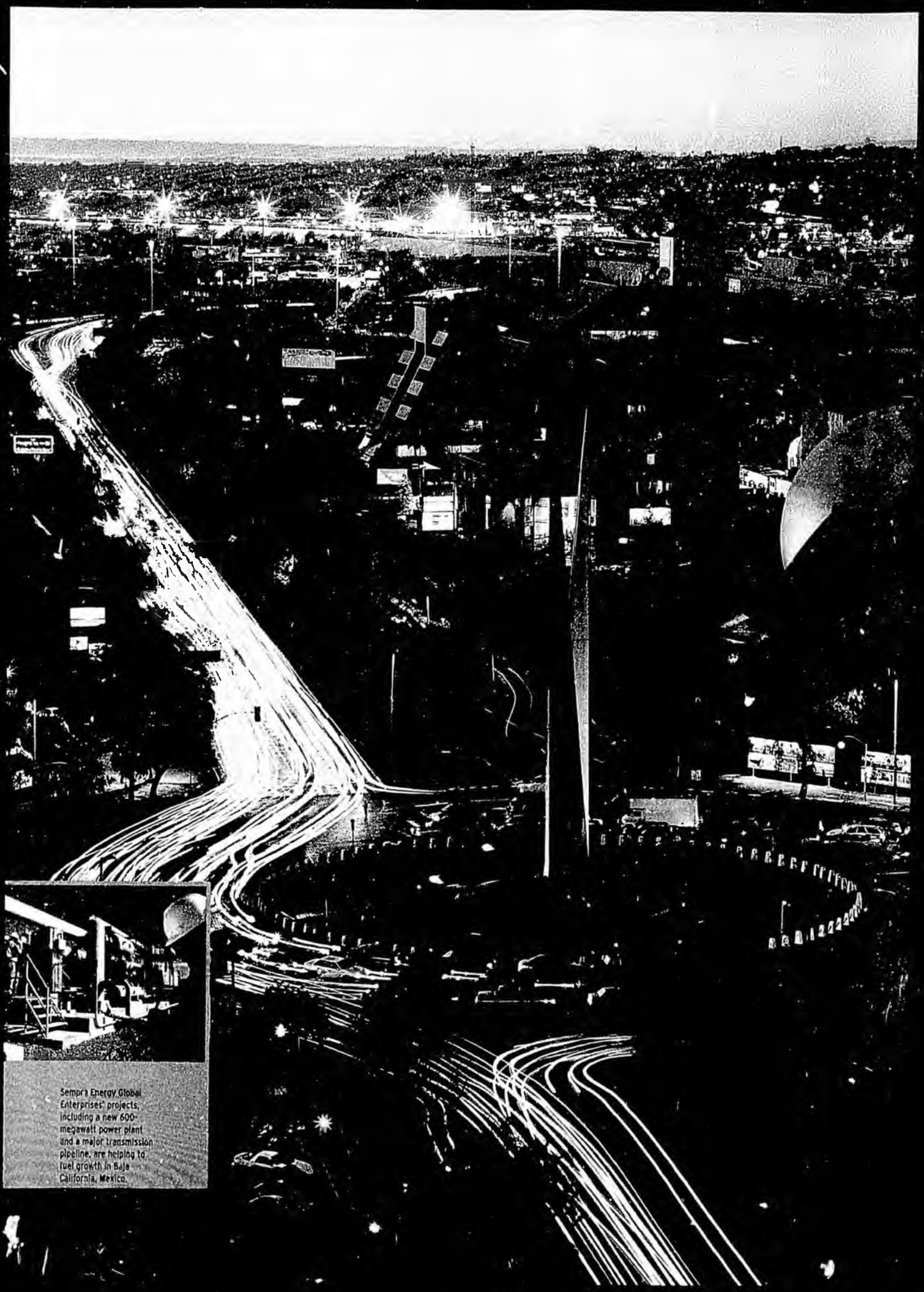
Sempra Energy Utilities invested $731 million in capital expenditures for upgrades in gas and electric delivery networks, including additions to serve the utilities' expanding customer base. SoCalGas completed four major expansion projects to its gas transmission system, increasing capacity and supply of natural gas into Southern California by 11 percent, or 375 million cubic feet per day. This new capacity is enough to fuel the equivalent of more than five new power plants, producing electricity to light about 2.8 million homes. SoCalGas added 61,000 customers in 2002, bringing its total metered customer base to 5.3 million.

SDG&E invested in new electricity substations and expansion of existing ones, and replaced 80 miles of electric distribution cable. These improvements translated into improved electric system reliability. SDG&E extended service to some 14,000 new gas and 20,000 new electric customers in 2002, resulting in a total of 1.3 million metered electric and 789,000 gas customers.

SDG&E's balance of undercollected power costs from California's energy crisis in 2000 and 2001 was reduced to $215 million at year-end. The balance, which peaked at $747 million in March 2001, is expected to be completely recovered by 2005. The company remains on solid financial footing and, beginning in 2003, is returning to its role as a power purchaser to cover the amount of electricity not being provided through state energy contracts.

As has been their tradition for more than a century, SoCalGas and SDG&E continued to provide exceptional customer service. SoCalGas earned the highest customer satisfaction ranking for residential gas utility service in the Western United States in the 2002 J.D. Power and Associates study.

The expansion of SDG&E's Talega substation in San Clemente, Calif., in 2002 added state-of-the-art equipment to improve the overall reliability of service to the utility's 1.3 million electricity customers.



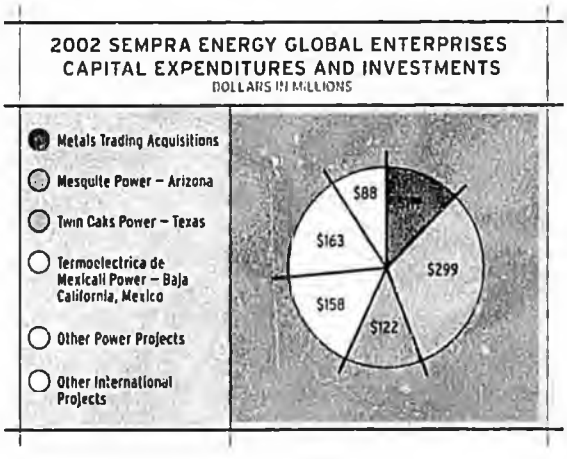
Sempra Energy Global Enterprises' projects, including a new 600-megawatt power plant and a major transmission pipeline, are helping to fuel growth in Baja California, Mexico.

Donald E. Felsinger
Group President

Sempra Energy Global Enterprises

GROWTH BUSINESSES

THE SEMPRA ENERGY GLOBAL ENTERPRISES GROUP OF BUSINESSES SUCCESSFULLY NAVIGATED THE DIFFICULTIES OF THE ENERGY INDUSTRY IN 2002 AND PRODUCED SOLID RESULTS.



Sempra Energy Global Enterprises is implementing a critical part of Sempra Energy's strategy: to develop a broad energy footprint in key markets, with power plants, natural gas transmission pipelines, supply facilities, and energy products and services.

Sempra Energy Trading

Prospering through tight risk co ols and geographic and product diver. ty

In a year when many energy companies eliminated or significantly reduced their energy-trading operations because of financial or regulatory problems, Sempra Energy Trading maintained a consistently profitable operation and charted a stable course for the future.

A leader in energy trading, the company gained additional market share as competitors exited the business.

In 2002, Sempra Energy Trading completed the acquisition of London-based Enron Metals Limited, the leading metals trader on the London Metal Exchange, as well as associated metals concentrates and warehousing businesses. The group of acquired companies has been renamed Sempra Metals Group Ltd.

Sempra Energy Trading differs from its industry peers by carefully managing its price and credit risk, and concentrating on shorter-dated transactions that convert into cash relatively quickly in a competitive market.

The majority of Sempra Energy Trading's business originates from large wholesale energy customers that require risk-management services. The company has further stabilized its earnings base by cultivating a diverse product mix, including natural gas, power, oil and base metals. With business in 20 countries, Sempra Energy Trading also benefits from geographic diversity.

Sempra Energy Resources

Supplying clean, efficient, reliable power for North American markets

Sempra Energy Resources is building natural gas-fired power plants near Phoenix, Ariz., Bakersfield, Calif., and Mexicali, Mexico. All are on schedule to begin operations in the summer of 2003.

In October 2002, Sempra Energy Resources acquired the 305-megawatt, coal-fired Twin Oaks power plant in Bremond, Texas, from Texas-New Mexico Power Company. The facility, which utilizes "clean coal" technology, diversifies the fuel mix for Sempra Energy Resources' fleet of power plants.

By the end of 2003, Sempra Energy Resources will have invested more than $1.5 billion in generating facilities, producing 2,660 megawatts. More than 80 percent of the peak-generating capability of these facilities already is hedged or under contract, providing more stable and predictable earnings and cash flow.

33%

OF 2002 TOTAL NET INCOME CONTRIBUTED BY SEMPRA ENERGY GLOBAL ENTERPRISES.

THE SEMPRA ENERGY GLOBAL ENTERPRISES GROUP BRINGS BALANCE AND GROWTH POTENTIAL TO SEMPRA ENERGY'S BUSINESS PORTFOLIO.

Sempra Energy Trading recorded another profitable year by continuing to employ a low-risk business model and by helping customers mitigate exposure to market volatility.

Sempra Energy International

Developing new energy infrastructure to increase economic growth and improve quality of life in Latin America

Sempra Energy International is pursuing new projects in Northern Mexico that will increase energy supplies on both sides of the U.S.-Mexico border.

The company's Gasoducto Bajanorte pipeline began operations in September 2002. The 145-mile natural gas transportation pipeline, which originates at the U.S.-Mexico border and crosses Baja California, Mexico, has a capacity of approximately 500 million cubic feet per day of natural gas to serve power plants and industrial customers. The pipeline is fully subscribed for the next 20 years.

Sempra Energy International also continued development of a liquefied natural gas (LNG) terminal in northwest Mexico. The company has purchased a site for the facility and has filed an application with Mexican regulators. If the application is approved, the facility could be operational by 2006 and help diversify the energy-supply mix in the region.

Sempra Energy International also has partnerships in gas and electric utilities in Chile, Peru and Argentina.

Sempra Energy Solutions

Helping large customers optimize their energy management

Sempra Energy Solutions provides an integrated mix of energy services that helps large commercial, industrial and institutional customers manage risks and reduce costs.

With several of its competitors exiting the retail energy market, Sempra Energy Solutions has employed an expansion strategy to become a market leader. The company generated net income of $21 million in 2002, up significantly from $1 million in 2001.

As one of the few major national players focusing on the large commercial and industrial marketplace, Sempra Energy Solutions provides customers with a broad range of energy services. These include commodity procurement, risk management and optimization, energy-efficiency consulting and facilities management.

The London-based Sempra Metals Group was acquired in 2002, enhancing earnings of Sempra Energy Trading.

SENIOR MANAGEMENT TEAM

Sempra Energy Corporate

Stephen L. Baum
Chairman, President and
Chief Executive Officer

Michael W. Allman
Vice President, Audit Services

Dennis V. Arriola
Vice President,
Investor Relations

Frank H. Ault
Senior Vice President
and Controller

Diana L. Day
Vice President and
Associate General Counsel

Joseph A. Householder
Vice President, Corporate Tax

Frederick E. John
Senior Vice President, External
Affairs and Communications

John R. Light
Executive Vice President
and General Counsel

Charles A. McMonagle
Vice President and Treasurer

Randall B. Peterson
Vice President,
Human Capital Services

Mark D. Randle
Vice President,
Energy Risk Management

G. Joyce Rowland
Senior Vice President,
Human Resources

Thomas C. Sanger
Corporate Secretary

Thomas S. Sayles
Vice President, Governmental
and Community Affairs

Neal E. Schmale
Executive Vice President
and Chief Financial Officer

Richard S. Shapiro
Vice President and
Associate General Counsel

W. Davis Smith
Vice President and
Associate General Counsel

Sempra Energy Utilities

Edwin A. Guiles
Group President

Debra L. Reed
President and
Chief Financial Officer

James P. Avery
Senior Vice President,
Electric Transmission

J. Chris Baker
Vice President,
Chief Information
Technology Officer

Steven D. Davis
Senior Vice President,
Customer Service and
External Relations

Pamela J. Fair
Vice President,
Customer Operations

Terry M. Fleskes
Vice President and Controller

Margot A. Kyd
Senior Vice President,
Business Solutions

Richard M. Morrow
Vice President, Customer
Services, Major Markets

Roy M. Rawlings
Senior Vice President,
Distribution Operations

William L. Reed
Senior Vice President,
Regulatory Affairs

Lee Schavrien
Vice President,
Regulatory Affairs

Anne S. Smith
Vice President, Customer
Services, Mass Markets

Lee M. Stewart
Senior Vice President,
Gas Transmission

**Sempra Energy
Global Enterprises**

Donald E. Felsinger
Group President

Robert N. Dickerman
President,
Sempra Energy Solutions

Darcel L. Hulse
President,
Sempra Energy International

Michael R. Niggli
President,
Sempra Energy Resources

Steven J. Prince
Chairman and
Chief Executive Officer,
Sempra Energy Trading

David A. Messer
President,
Sempra Energy Trading

Mark A. Snell
Chief Financial Officer

BOARD OF DIRECTORS

Stephen L. Baum
Chairman of the Board,
President and
Chief Executive Officer,
Sempra Energy
San Diego, California

Hyla H. Bertea
Community Leader
Co- na del Mar, California

James G. Brocksmith Jr.
Former Deputy Chairman
and Chief Operating Officer,
U.S. Operations, KPMG Peat
Marwick LLP
Naples, Florida

Herbert L. Carter, DPA
Executive Vice Chancellor
Emeritus and Trustee,
Professor of Public
Administration, California
State University System
Long Beach, California

Richard A. Collato
President and Chief
Executive Officer, YMCA
of San Diego County
San Diego, California

Wilford D. Godbold Jr.
Former President and
Chief Executive Officer,
Zero Corporation
Los Angeles, California

William D. Jones
President, Chief Executive
Officer and Director, CityLink
Investment Corporation
San Diego, California

Richard G. Newman
Chairman and
Chief Executive Officer,
AECOM Technology Corp.
Los Angeles, California

Ralph R. Ocampo, M.D.
Physician and Surgeon
San Diego, California

William G. Ouchi, Ph.D.
Sanford and Betty Sigoloff
Professor in Corporate Renewal,
Anderson Graduate School
of Management, University
of California, Los Angeles
Los Angeles, California

William C. Rusnack
Former President and Chief
Executive Officer, Premcor Inc.
St. Louis, Missouri

William P. Rutledge
Chairman, Communications
and Power Industries
Palo Alto, California

Thomas C. Sickel
Chairman, Chief Executive
Officer and Founder, University
Ventures Network and Virtual
Capital of California LLC
San Diego, California

Diana L. Walker
Partner and General Counsel,
O'Melveny & Myers LLP
Los Angeles, California

CORPORATE INFORMATION

Transfer Agent

EquiServe Trust Company, N.A.
P.O. Box 43069
Providence, RI 02940-3069
Telephone: 877-773-6772
Hearing Impaired (TDD):
1-800-952-9245
Internet:
http://www.equiserve.com

Shareholder Services

Investors with general questions regarding Sempra Energy, San Diego Gas & Electric, Southern California Gas Co. or Pacific Enterprises securities should contact the company at:
Sempra Energy
Shareholder Services
101 Ash Street
San Diego, C. 92101
Telephone: 877-736-7727
Fax: 619-696-2374
E-mail: investor@sempra.com
Internet:
http://ww..sempra.com

News and Information

To hear corporate news reports and stock updates or to request materials, call 877-773-6397. Sempra Energy's annual report to the Securities and Exchange Commission (Form 10-K) is available to shareholders at no charge by writing to Shareholder Services.

Information also is available on the company's Web site at http://ww. .sempra.com.

Investor Relations

Security analysts, portfolio managers and other members of the financial community should contact:
Dennis Arriola
Vice President,
Investor Relations
Telephone: 619-696-2901
Fax: 619-696-2374

Stock Exchange Listing

Sempra Energy Common Stock:
Ticker Symbol: SRE
New York Stock Exchange
Pacific Stock Exchange

Sempra Energy Trust
Preferred Securities:
New York Stock Exchange

Sempra Energy Income
Equity Units:
New York Stock Exchange

Pacific Enterprises
Preferred Stock:
American Stock Exchange
Pacific Stock Exchange

Southern California Gas
Preferred Stock:
Pacific Stock Exchange

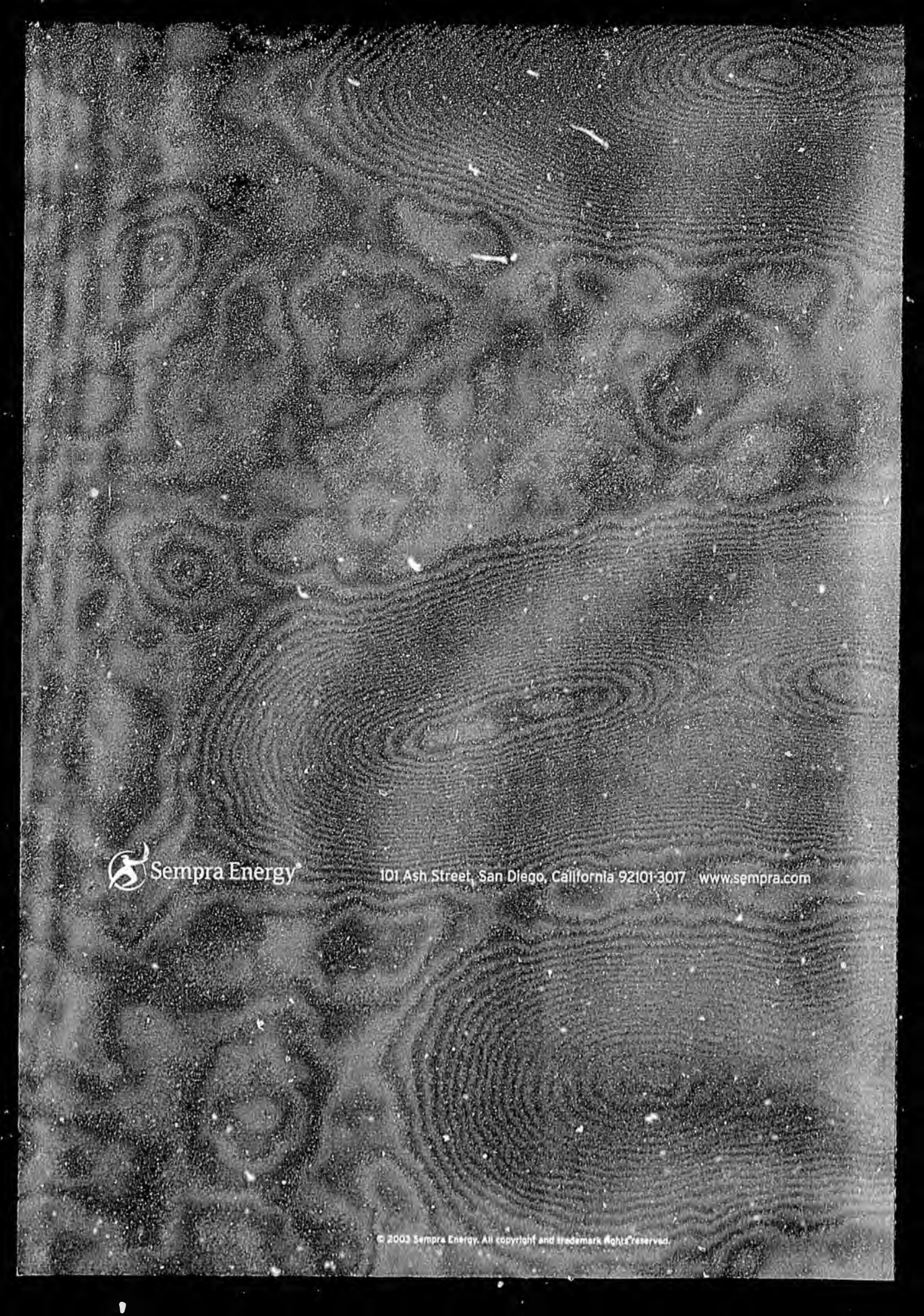
San Diego Gas & Electric
Preferred Stock:
American Stock Exchange

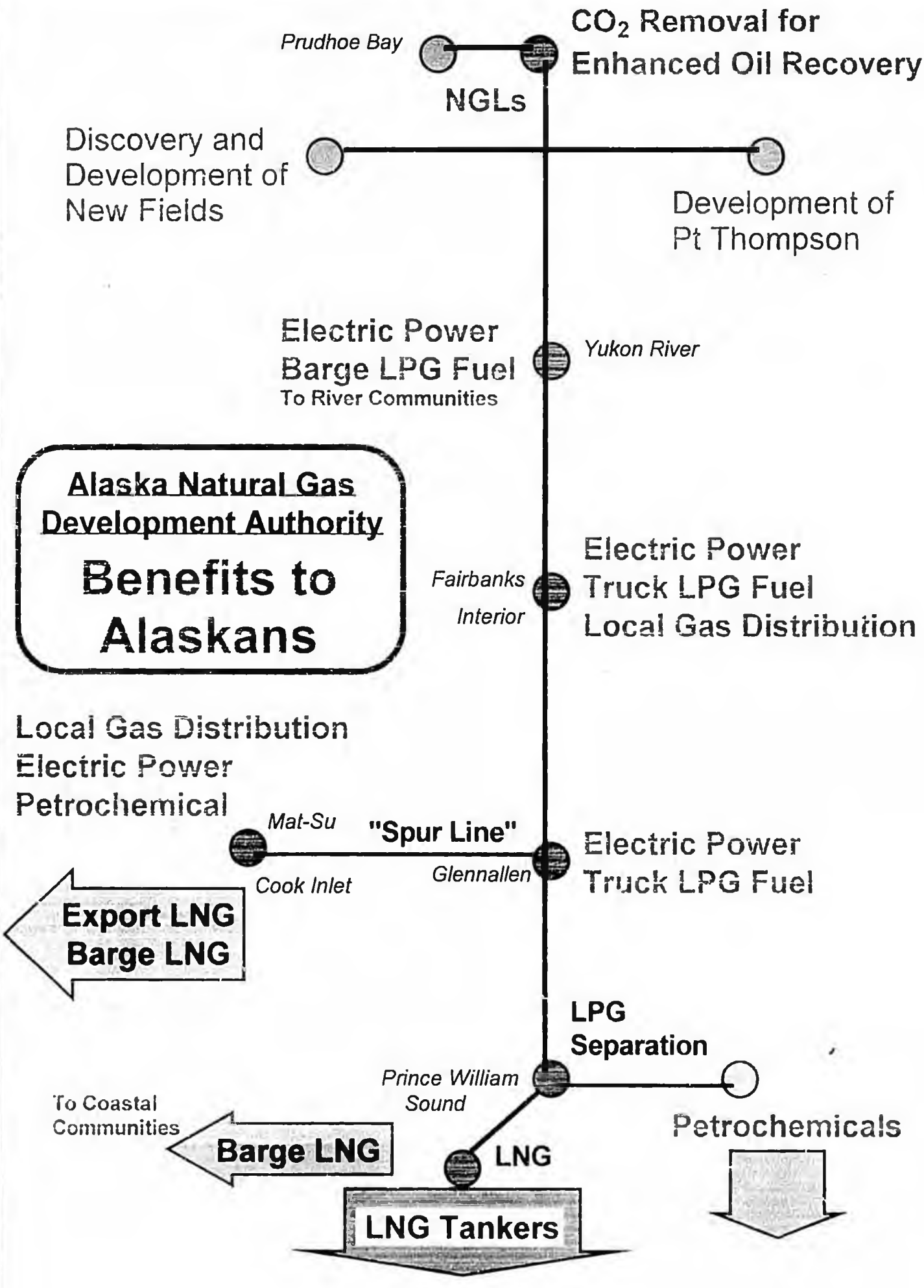
Direct Common Stock Investment Plan

Sempra Energy offers a Direct Common Stock Investment Plan as a simple, convenient and affordable way to invest in the company. Cash dividends from a participant's account can be reinvested automatically in full or in part to purchase additional shares, or participants may choose to receive all or a portion of their cash dividends electronically or by check. Participation in the Plan requires an initial investment of as little as $500. The Plan allows optional cash investments of as little as $25 up to a maximum of $150,000 per calendar year. Nonshareholders pay a $15 fee for the initial cash investment in Sempra Energy. Brokerage commissions incurred in the purchase of shares will be paid by Sempra Energy. The Plan is offered only by the means of a prospectus, which can be obtained by calling the Plan Administrator, EquiServe Trust Company, N.A., at 877-773-6772, or through the Internet at http://www.equiserve.com.

Additional news and updated investor relations information pertaining to Sempra Energy is available on the Web.

WWW.SEMPRA.COM




Prudhoe Bay
CO_2 Removal for Enhanced Oil Recovery
NGLs
Discovery and Development of New Fields
Development of Pt Thompson
Electric Power
Barge LPG Fuel
To River Communities
Yukon River
Alaska Natural Gas Development Authority
Benefits to Alaskans
Fairbanks
Interior
Electric Power
Truck LPG Fuel
Local Gas Distribution
Local Gas Distribution
Electric Power
Petrochemical
Mat-Su
"Spur Line"
Cook Inlet
Glennallen
Electric Power
Truck LPG Fuel
Export LNG
Barge LNG
LPG Separation
Prince William Sound
To Coastal Communities
Barge LNG
LNG
Petrochemicals
LNG Tankers

STATE OF ALASKA

FRANK H. MURKOWSKI, GOVERNOR

ALASKA NATURAL GAS DEVELOPMENT AUTHORITY

411 WEST 4TH AVENUE
ANCHORAGE, ALASKA 99501
TELEPHONE: (907) 257-1347
FACSIMILE: (907) 646-5005

Senator Scott Ogan, Senator Lyda Green, Senator Gary Wilken, and Representative John Harris
Joint Senate/House Finance Committee
Legislative Information Office
716 W 4th Avenue
Anchorage, AK 99501

September 10, 2003

SUBJECT: Proposal to Conduct Conceptual Study

Dear Legislators:

This letter and attachments contains a proposal to conduct a conceptual study for the Alaska Natural Gas Pipeline from Prudhoe Bay to Valdez.

The contents of the proposal will be presented at hearings before the Senate Natural Resources Committee on September 10, 2003 and the Senate Finance Committee on September 11, 2003.

The proposal states the reasons for conducting the conceptual study, the costs of preparation, how the study will be conducted, and the benefits to the State of Alaska. It is planned to present the results of the conceptual study to the Governor and the Legislature when the Legislature convenes in January 2004 and will indicate the costs for proceeding to the next phase of the project.

This study will be conducted by a team of experienced Alaska contractors or internationally recognized experts familiar with Alaska conditions who have been assigned elements of the project as follows:

- Pipelines, Compressor Stations and Spur Line—VECO Alaska, Inc.
- LNG Plant—ASRC Energy Services.
- Marine Facilities at Valdez—Peratrovich, Nottingham & Drage, Inc.
- In-State Uses & Benefit Analys--Northern Economics, Inc.
- Marketing/Competitor Analysis—Wood Mackenzie

The proposals from the team members for conducting their part of the study are included as attachments to this letter.

The cost of developing the conceptual study is estimated at $2.5 million for which we are requesting funding. A breakdown of the conceptual study costs appears as an Attachment. We will proceed with the study immediately upon approval of the funding and will complete the work by January 7, 2004.

Please call me at 257-1347 with any questions you may have.

Sincerely,

Harold C. Heinze, Chief Executive Officer

ATTACHMENTS:

- PowerPoint Presentation
- Summary Contractor Cost and Scope Proposals
- Proposal from VECO Alaska. Inc. for Pipelines and Compressor Stations
- Proposal from ASRC Energy Services for LNG Facilities
- Proposal from Peratrovich, Nottingham & Drage for Marine Facilities
- Proposal from Northern Economics for In-State Uses & Benefit Analysis
- Proposal from Wood Mackenzie for Marketing/Competitor Analysis
- Project Synopsis and Task Analysis of Project Components
- Letters to Yukon Pacific Corporation and Alaska Gasline Port Authority requesting permission to use data

Accelerated Funding Request

- Satisfy statutory requirements in January instead of June next year
- Design funding is focused on new concepts and increased Alaska benefits
- Closes engineering gap with recent highway gasline design of producers
- Significant work value contributed (free)
- Contractors & spending focused in Alaska

ANGDA Design & Benefits Study

• Design & Execution Plan	
– Pipelines	$500 k
– LNG	$900 k
– Marine	$400 k
• In-State Uses & Benefit Analysis	$150 k
• Marketing / Competitor Analysis	$200 k
• Specialized Legal Opinions	$150 k
• Staff & Administrative	$200 k
TOTAL	**$2,500 k**

ANGDA Design & Benefits Study

- **Contributed Studies** (Donated Information)
  - Yukon Pacific
  - Alaska Gasline Port Authority
  - Tanker Design & Cost
  - Training in Alaska & Alaska Hire
  - Gas Compositions & Conservation
- **State In-House Expert Consulting**
  - Revenue Projection & Tariff Modeling
  - Social & Environmental Responsibility
  - Permitting & Land Use / Planning

Benefits in Design Concept

- Spur line to Cook Inlet provides future residential & industrial gas supply in area
- Study of barge mounted LNG plant would allow multi-$B fabrication in Cook Inlet
- LNG thermos bottle barges can supply coastal communities
- Expanded Kenai LNG & urea plant options
- Propane content in gas line key to Yukon River supply and petrochemical plants

ANGDA Funding Request

- ANGDA Board respectfully requests accelerated funding of up to $ 3 million now to finish conceptual design, cost estimate, schedule, benefits analysis, and marketing by Jan '04
- Demonstrated Legislative support to fund this request when session reconvenes would allow ANGDA to "borrow" the money now ($2.5 million)

ANGDA Project Concept & Cost

Project Elements	Size	Cost
Treatment	2 BCFPD share of plant	$ 2 B
Pipelines	54" & 36"	$ 4 B
Liquefaction	4 trains @ 4 M tn/yr	$ 4 B
Tankers	10 LNG @ $200M/ship	$ 2 B
Total Export	**16 M tn/yr**	**$ 12 B**

NOTIONAL Cost of Service

(For Different ANGDA Financial Assumptions)

	High ROR Commercial	Not Taxable	Benefit Driven Infrastructure
Pipeline	1.40	1.00	0.75
LNG	1.50	1.20	0.90
Total Cost of Service	**$2.90**	**$2.20**	**$1.65**

Does **NOT** Include Wellhead Purchase Price

ANGDA Approach to Project Risk Elements

Wellhead Price	Fixed Purchase Price
Construction	Overruns -- Tariff ?
Market Volume	Minimal -- Marketer
Market Price	Basket of Prices
Fiscal Changes	Not Applicable

High-Level ANGDA Strategy

- Support producer-led highway gas line (prefer their investment at risk) & define compatible Alaska benefit projects
- Keep wellhead price of gas high (lower cost of service) to encourage development of new reserves and higher current revenues
- Use margin to support public purposes

Why is ANGDA Getting into Gas Business ?

- Authority will work out commercial terms with a producer-led highway pipeline for gas delivery to maximum Alaska benefit
- LNG based all-Alaskan project is economic and competitive for non-taxable Authority
- Alaska's portfolio of other gas or LNG projects is limited
- Alaska doesn't have multiple shots at a dynamic Pacific Rim market

ALASKA NATURAL GAS AUTHORITY
CONCEPTUAL STUDY

SUMMARY CONTRACTOR COST & SCOPE PROPOSALS

COMPONENT	MAN HOURS	LABOR COST	OTHER COSTS	TOTAL $
Pipelines (VECO Alaska, Inc.)	2,317	$286,925	$39,675	$326,600
Spur Line Glennallen to Anchorage (VECO Alaska, Inc.)	773	$99,725	$13,225	$112,950
LNG (ASRC Energy Services)	7,630	$858,000	$123,000	$981,000
Marine (Peratrovich, Nottingham & Drage)	3,493	$326,455	$173,210	$499,665
LNG Tankers				Contributed
In-State Uses & Benefit Analysis (Northern Economics)	1,480	$151,100	$500	$151,600
Marketing/Competitor Analysis (Wood Mackenzie)	Unkown	$120,000		$120,000
Specialized Legal Opinions	Unkown	$150,000		$150,000
Staff & Administrative (ANGPA)	2,260	$157,400	$42,600	$200,000
TOTAL STUDY COSTS	**17,953**	**$2,202,505**	**$392,210**	**$2,594,715**

Proposal for Engineering Services:

Pipeline and Compressor Stations

Submitted to:

Alaska Natural Gas Development Authority

September 8, 2003

TABLE OF CONTENTS

Letter of Introduction

8 September 2003

Alaska Natural Gas Development Authority
411 West 4th Avenue,
Anchorage, AK 99501

Attention: Harold Heinze, CEO

Subject: Proposal for Engineering Services: Pipeline and Compressor Stations

Gentlemen:

Based upon our meeting of August 26, we are pleased to respond to your request for a proposal to review, analyze, validate, and update the Yukon Pacific TAGS model for an LNG Export Project.

We understand you are breaking the project into several large pieces for engineering review:

1. North Slope Gas Treatment Facility
2. LNG Export Pipeline and Compressor Stations
3. South Central Natural Gas Spur Pipeline System
4. LNG Plant
5. Tankers

VECO Alaska is well qualified to assist with both the Pipeline/Compressor Station System and the North Slope Gas Treatment Facility. We also can be of assistance to an LNG Plant designer in the capacity of advisor for modularization of that facility.

The attached proposal is limited to Item Nos. 2 and 3, the LNG Export Pipeline and Compressor Stations and the South Central Natural Gas Spur Pipeline System. We have completed three similar studies in the past two years, one for the Alaska Gas Producers Pipeline Team for whom we analyzed and estimated costs for a dense phase system delivering 4+ BCFD along two separate routes to move North Slope Gas from Prudhoe Bay to the Edmonton, Alberta area; and two separate studies for the Mackenzie Delta Explorers Group for whom we analyzed and estimated costs for one route and three separate cases where the variables were throughput volume, product phase, and hydraulic pressure.

Our recent experience in this type engineering study and analysis is unmatched, as is our ability to dedicate the time of the same key individuals who produced the recent studies cited above. We look forward to answering any questions you may have and are available to meet at your convenience.

Very truly yours,
VECO Alaska, Inc.

for Wesley P. Nason

Section 1 Executive Summary

VECO Alaska, Inc. has assembled an experienced Team of in-house experts and third party consultants for the purpose of reviewing, updating, and reporting on the design criteria, capital cost estimates, and operating cost estimates for an LNG Export Pipeline System running from a gas treatment plant at Prudhoe Bay to a gas liquefaction plant near Valdez. The results of this study will provide the Alaska Natural Gas Development Authority with a basis for analyzing project economics using updated estimates based on 2003 costs.

The study will also provide independent review and verification of concepts and assumptions made by other conceptual studies of the Alaska LNG Export Project.

In addition to reviewing and updating the Alaska LNG Export Project, the study will provide a conceptual design and cost estimate for designing, building, and operating a spur pipeline from the vicinity of Glennallen to a tie-in point on the Cook Inlet natural gas pipeline grid. In conjunction with estimating costs for transferring natural gas from the Export Pipeline to the Cook Inlet gas distribution grid, the study will look at options for local uses of the natural gas liquids which are contained in the dense flow stream of the Export Pipeline.

Section 2 Study Objectives and Deliverables

We have reviewed your verbal request for proposal and confirm our understanding of the study objectives and deliverables as stated below:

i) Study Objectives

Key objectives of this study are to determine the cost and constructability of a pipeline system that:

- Provides an economic solution for delivering Alaska North Slope gas to Pacific Rim customers by providing an identifiable rate of return on investment to the State of Alaska, an identifiable net back price to the suppliers of natural gas throughput, and quantifiable revenues to the State of Alaska.
- Maximizes jobs for Alaskans and access to gas for Alaskans.
- Provides lowest total-cost-of-ownership solution i.e. sensible CAPEX-OPEX tradeoffs.
- Economically accommodates initial volumes.
- Is easily/economically expanded i.e. optimizes the system's long-term expansion capability.
- Delivers spec gas to market.
- Is operationally sound and provides industry-standard sparing philosophies and reliability.
- Satisfies Alaska's unique environmental requirements.

The scope of the proposed study as outlined in the proposal is to:

- Review and comment on hydraulic pipeline design.
- Review the State's current projections for gas sales and if substantially different from the Yukon Pacific Model, re-run the hydraulics and re-size the line and compressors based on the new throughput and operating pressure variables.
- Review and comment on design assumptions with respect to geotechnical and thermal conditions.
- Review geothermal analysis and civil design of pipeline and compressor stations.
- Review and validate assumptions of Yukon Pacific Corporation's (YPC) pipeline and compressor station construction cost estimate, and if necessary, update cost components and construction variables based on a new throughput scenario.
- Update estimated Capital Expenditure (CAPEX) for pipeline and compressor stations based on current year (2003) cost elements for labor, equipment, and other identifiable variables.
- Assess potential for utilization of unmanned compressor station facilities.
- Update estimated Operating Expenditure (OPEX) for pipeline and compressor stations based on current year (2003) cost elements and for remote, semi-attended or unattended operation.
- Identify long lead items and validate project schedule, including the feasibility/practicality of a two-year construction schedule.
- Research potential for using Alaskan resources to the fullest extent possible.

- Develop conceptual design and cost estimate, including hydraulic analysis, preliminary routing, route characterization, system descriptions for pipeline and compressors, and CAPEX estimate for a small diameter spur line from Glenallen to the south central Alaskan distribution grid.
- Analyze the options for extracting natural gas liquids from the spur line throughput and either re-inject them into the main export line, or capture them for local use at either Glennallen or Palmer.

ii) Deliverables

VECO's Team will provide analysis and validation of the YPC Export Pipeline Model and for the South Central Spur Pipeline, including suggested improvements and alternatives, including:

- System descriptions for all systems, initial and expanded. This will include the following items: pipeline diameters, wall thickness, material selection, and reasons for choices e.g. location of compressor stations.
- Conceptual illustration of all systems overlaid on top of a map of Alaska.
- Block Flow Diagrams of transmission system (pipeline and compression).
- Process Flow Diagram of a typical compressor station.
- Pipeline profiles. Distance vs. elevation, liquids holdup, temperature, pressure etc.
- Capital cost estimate for engineering, procurement, construction and installation of new equipment to +/-30% accuracy or better. Crewed-up cost estimates for pipeline construction and ICARUS facility cost estimates for compressor stations.
- OPEX estimate for all pipeline systems including basis for calculations.
- Pipeline compression horsepower and fuel gas consumption estimates, initial and expanded.
- High-level project schedule and expenditure profile.
- Recommendation of best overall system to meet the objectives.
- Per Client request, Toll Estimates will not be required as part of this study.
- Draft study report and summary presentation (hard copies and electronic format).
- Final study report and summary presentation (hard copies and electronic format).

Section 3 Execution Plan

VECO Engineering brings specific expertise applicable to the scale and complexity of this study from:

- Recent front-end definition and feasibility study experience on two similar arctic gas pipeline projects.
- Recent front-end definition, route selection, and cost estimate for South Western Alaska Power Project, including a 325 mile, small diameter, spur pipeline from Cook Inlet to Donlin Creek.
- Monetization studies, tolls and tariffs analysis, execution planning and project management for multi-party execution of multi-billion dollar scale projects.
- Unparalleled construction / constructability and fabrication experience in Alaska's Northern/Arctic environment.
- Logistics capability for major scale projects in Arctic environments.
- Pipeline hydraulics optimization and design expertise, including applications on major global pipelines.
- Geotechnical and route characterization skills and personnel spanning thirty years of arctic projects.
- Industry leading cost estimating and toll modeling capabilities that are already in place and proven.

The pipeline hydraulics and process engineering form a major part of the subject study and we have taken this opportunity to describe below in detail the strengths we have in this area and the approach we will adopt.

i) Execution

Step 1 – Scope Definition

The first step will be to meet with the Alaska Natural Gas Development Authority (the Client) to determine the gas sales/pipeline throughput case upon which to base the Export Pipeline Study. We will also need to establish throughput needs for the South Central Spur Pipeline Study. We will need to obtain relevant data from the Port Authority Study and YPC's past work, including proposed route alignments, gas analyses, the phase behavior for the range of gas compositions involved, including critical pressure, critical temperature, cricondetherm and cricondebar pressure values, in order to determine the conditions under which liquid formation will occur.

Preliminary hydraulics will then be run to understand the potential variability in line size for the desired throughput.

Step 2 – Facility Design

The second step will be to review the individual blocks that make up the alternatives arrived at in Step 1.

For the Export Pipeline this will include:

- Review and validation of the final YPC Route alignment.
- Review of all YPC plans including alignment sheets.
- Review and verification of YPC's design to ensure that current codes and practices in Northern regions are met.
- Review and recap of YPC's route characterization from a topographical, geological, and geotechnical perspective.
- Review and validation of YPC's proposed construction modes for the pipeline right-of-way and ditch. Examples of Typical modes are shown in Figures 1 and 2.
- Review of YPC's mile by mile design to validate that the proposed construction modes conform to topography and soil conditions.
- Review and verification of YPC's estimated construction quantities.

For the Export Pipeline compressor stations VECO's tasks will include:

Review and validation of YPC's process flow diagrams (PFD's). If needed, VECO will prepare or revise the diagrams.

- Review and verification of YPC's proposed size for major equipment, utilities, offsites and support infrastructure.
- Review of all YPC plans including preliminary plot plans.

For the South Central Spur Pipeline this will include:

- Review and summarize route topographic, geotechnical, and seismic data available in the public domain for the terrain between Glennallen and Palmer.
- Establish preferred route taking into account land ownership, geotechnical criteria, and thermal design.
- Establish design criteria using current codes and practices in Northern regions are met.
- Summarize route characterization from a topographical, geological, and geotechnical perspective.
- Establish Construction Execution Plan including construction seasons, number of spreads, and proposed construction modes for the pipeline right-of-way and ditch.
- Summarize estimated construction quantities.

For the South Central NGL Processing Facility this will include:

- Evaluate design criteria for gas liquids extraction and disposition and for compressor station, based on the following:
  - Processing requirement for Anchorage and South Central Railbelt population.
  - Dense phase gas composition
  - Desirable products from the South Central processing facility - C1, C2/C3, NGL's etc.
  - Dense Phase pipeline operating pressure and temperature
  - Dense Phase pipeline capacity
  - South Central Sales Gas Delivery pressure
  - South Central Sales Gas Specifications

- Assumed Facilities:
  - Inlet separation and liquid handling facility
  - Dehydration Facility
  - Deep Cut Facility - probably Turbo Expander Unit capable of making a C1 product
  - Recompression Facilities to boost pressure of Gas to suitable sales gas pressure.
  - NGL storage facilities on site
  - NGL pumps to transfer product back into the Dense Phase line or to a dedicated NGL line
  - Inlet liquids metering facilities
  - Sales Gas and NGL metering facilities

- The Glennallen or South Central processing facility would see the gas dehydrated. The gas stream would then be separated by cryogenic distillation into a methane-rich stream for sales into the existing South Central domestic gas distribution system. The NGL stream could either be transported to an end user directly as NGL or reinjected back into the dense phase pipeline for transportation to the next location and further processing/transportation.

Snow / Ice Pad

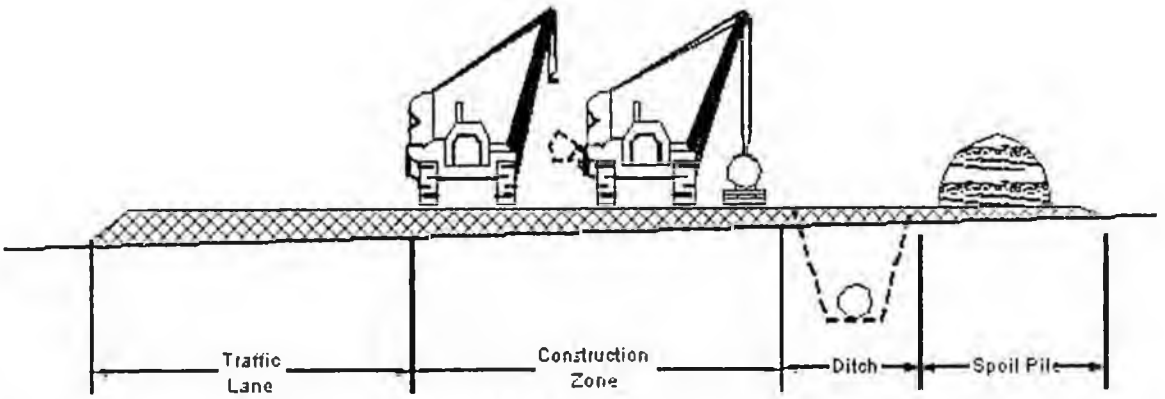


Figure 1 - Typical Work Pad Construction Mode

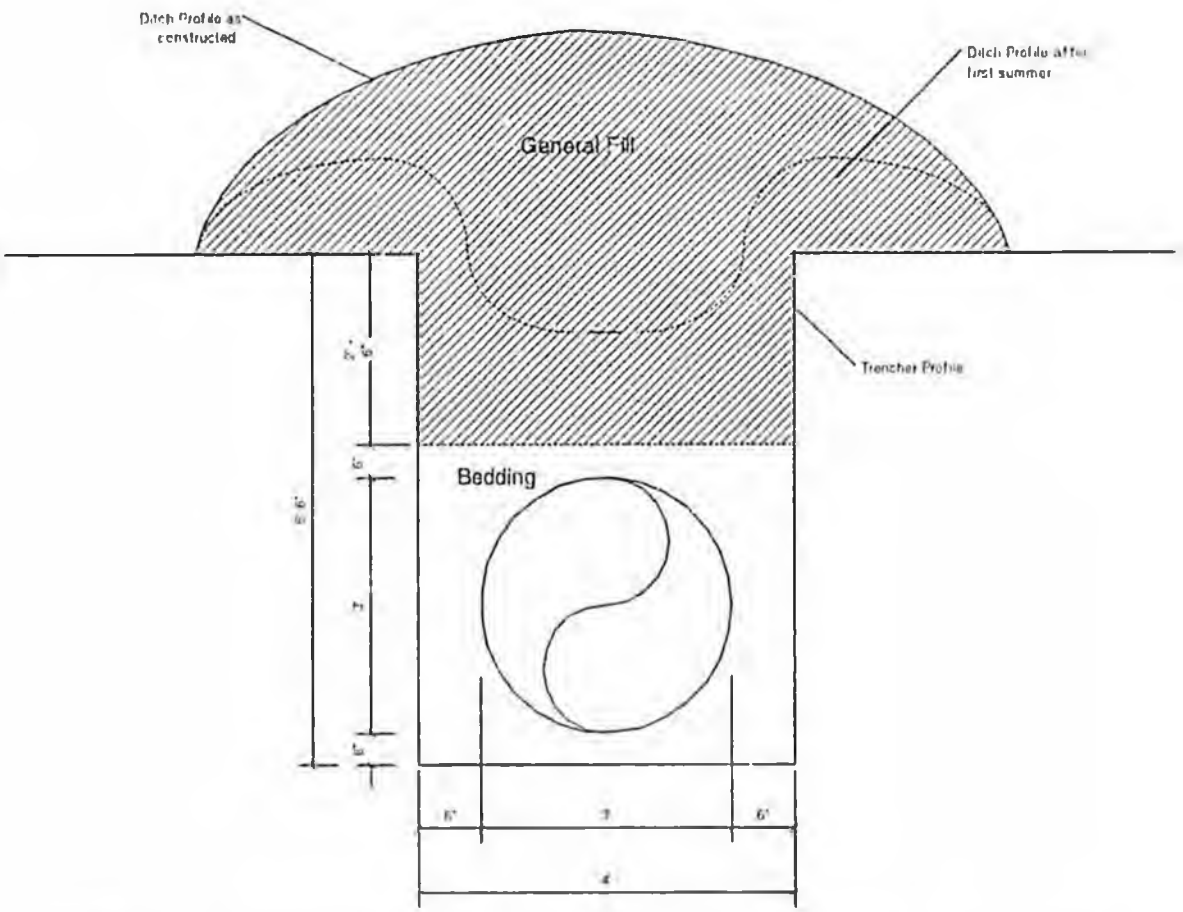


Figure 2 - Typical Ditch Mode: Continuously Excavated with Chain Trencher in Cold Permafrost

Step 3 – Export Pipeline and Compressor Station and Spur Line Cost

The third step will be to review and verify YPC's costs for the various building blocks that make up the alternatives defined in Step 1.

For the Export Pipeline, VECO will:

- Review and validate YPC's estimate for the equipment and manpower required to construct the line along with appropriate unit costs.
- Review and validate YPC's estimate of the crews required to build the pipeline.
- Review and validate YPC's estimate of construction crews from a manpower and equipment standpoint. A typical example is shown in Table 1.
- Review and validate through industry benchmarking, YPC's estimated crew productivities based on terrain, subsurface, and weather factors.
- Review and validate YPC's estimate of the duration of construction seasons along the route.
- Review and revise as necessary, YPC's Construction Execution Plan (CEP) along with associated support and logistics requirements. A typical example is shown in Table 2.
- Prepare a crewed up cost estimate using YPC's input (as revised) and the North of 60 Pipeline Estimating Model. An example of a typical pipeline section is shown in Table 3.
- Evaluate and estimate utilization of Alaska resources.

For the Export compressor facilities VECO will:

- Obtain budgetary quotes for major equipment and compare with YPC estimates and update as required.
- Review and revise as needed, YPC's Construction Execution Plan and assess opportunities for modularization.
- Develop a factored construction estimate using VECO's ICARUS Estimating Model, based on equipment cost.
- Evaluate potential for utilizing Alaskan resources wherever possible.

For the South Central Spur Pipeline, VECO will:

- Establish unit costs for labor, equipment, and other cost components.
- Establish construction crew size, composition, and productivity required to build the pipeline, through industry benchmarking, terrain, subsurface, and weather factors.
- Establish the duration of construction seasons along the route.
- Build Construction Execution Plan (CEP) along with associated support and logistics requirements.
- Prepare a crewed up cost estimate using the North of 60 Pipeline Estimating Model.
- Evaluate and estimate utilization of Alaska resources.

Pipeline Operation **Grade ROW**
Pipe Diameter 30 inch
Pipe Wall Thickness .656 inches

Manpower Requirements	Mainline Production	Mini Crew
Operator Foreman	1	1
Operator 1	6	6
Operator 4	1	1
Laborer 1	6	6
Laborer 2		3
Total Craft Personnel	14	17

Equipment Requirements	Mainline Production	Mini Crew
Pick-up, 4x4	3	3
Flatbed, 3 Ton	1	1
Bus, 26 Passenger	1	1
Bus, 45 Passenger		
Backhoe, 235	1	2
Backhoe, 235 w/ Hammer		
Dozer, D10 w/ Ripper		1
Dozer, D9 w/ Ripper	1	1
Dozer, D8 w/ Winch	1	2
Dozer, D6 LGP	3	
Motor Grader 14G		1
Light Plant	2	
Mobile Radio	5	5
Winch 100 Ton		1
John Henry Drill		1
Total Equipment Pieces	18	19

Table 1 – Typical Crew Makeup Sheet

Spread	Section	Milepost	Length	Season	Camp Location & Size	
A	6	MP 0 - 76	76	W1	MP 50	Swimming Point
	7	MP 76 - 143	67	W2	MP 76	Inuvik
B	8	MP 143 - 211	68	W2	MP 176	Travailiant Lake
	9	MP 211 - 281	70	W1	MP 223	Little Chicago
C	10	MP 281 - 346	65	W1	MP 301	Fort Good Hope
	11	MP 346 - 411	65	W2	MP 391	Norman Wells
D	12	MP 411 - 476	65	W2	MP 441	Fort Norman
	13	MP 476 - 541	65	W1	MP 516	Blackwater River
E	14	MP 541 - 606	65	W1	MP 576	Wrigley
	15	MP 606 - 671	65	W2	MP 636	No Name
F	16	MP 671 - 731	60	W2	MP 696	Fort Simpson
	17	MP 731 - 786	55	W1	MP 746	Mackenzie Hwy
G	18	MP 786 - 841	55	W1	MP 811	Trainor Lake
	19	MP 841 - 896	55	W2	MP 876	North Zama
H	20	MP 896 - 951	55	W2	MP 951	Highway 58
	21	MP 951 - 1006	55	W1	MP 951	Highway 58
I	22A	MP 1006 - 1056	50	W1	MP 1056	Notikewin River
	22B	MP 1056 - 1106	50	W2	MP 1056	Notikewin River
	23	MP 1106 - 1156	50	S2		None
			1,156			

Table 2 – Typical Construction Execution Plan Spread Summary

SPREAD:	A1
Route:	xyz
Pipeline Diameter (inches)	30
Wall Thickness (inches)	0.65
Labor Hours Per Shift	10
Equipment Hours Per Shift	10

											Operational Costs			
Description	Direct / Indirect	Equipment Weight (tons)	Start Date	End Date	Duration (days)	Labourers	Man-days	Operational Quantity	Units	Labour	Equipment	Tool & Supplies	Subcontracts Distribution	Materials Distribution
Survey ROW Centerline	D	6.45	1-Jun-2004	24-Mar-2005	274	5	1,220	237,600	FT	566,746	118,520	35,206	0	0
Pipe Haul to ROW Stockpiles	D	0.00	15-Nov-2004	15-Dec-2004	30	0	0	237,600	FT	0	0	0	3,430,276	0
Material Haul to Onsite Warehouse	D	0.00	15-Nov-2004	15-Dec-2004	30	0	0	2	EA	0	0	0	3,900	0
ROW Clearing - Light Timber	D	223.00	7-Jun-2004	13-Jun-2004	6	28	168	32,260	FT	83,095	47,034	4,986	0	0
Snow Fence Installation	D	27.20	15-Nov-2004	29-Nov-2004	14	11	154	28,155	FT	71,112	20,742	4,267	0	0
Snow/Ice Pad Construction	D	442.25	1-Dec-2004	2-Mar-2005	91	35	3,185	187,968	FT	1,575,383	1,662,768	94,523	0	0
Gravel Pad Road Construction	D	805.85	1-Dec-2004	13-Mar-2005	102	41	8,323	608,561	CY	4,197,350	6,957,827	251,841	0	0
Ditch Excavation - Trencher	D	1,464.20	22-Jan-2005	19-Mar-2005	56	43	2,408	227,040	FT	1,199,920	2,939,962	71,815	0	0
Ditch Excavation - Backhoe	D	1,125.90	22-Jan-2005	19-Mar-2005	56	34	102	10,560	FT	51,000	89,977	3,060	0	0
Ditch Excavation - Drill & Shoot	D	668.75	22-Jan-2005	19-Mar-2005	56	38	114	10,560	FT	56,402	45,583	3,384	0	0
Load, Haul, & String Pipe	D	906.40	15-Jan-2005	24-Mar-2005	46	31	1,564	237,600	FT	763,889	723,002	45,833	0	0
Bend & Set-up Pipe	D	184.05	17-Jan-2005	4-Mar-2005	46	16	736	237,600	FT	367,567	372,044	21,454	0	0
Rig-up Automatic Welding	D	63.40	1-Dec-2004	5-Jan-2005	35	36	1,260	1	LOT	663,873	238,648	39,832	0	0
Pipe Line-up & Root Pass	D	322.40	20-Jan-2005	7-Mar-2005	46	55	2,530	3,211	WELD	1,304,574	844,328	78,274	0	0
Fill Welding & Weld Repair	D	430.55	20-Jan-2005	7-Mar-2005	46	76	3,496	3,211	WELD	2,071,562	825,063	124,294	0	0
Bedding & Padding	D	859.30	25-Jan-2005	12-Mar-2005	46	39	1,794	237,600	FT	900,652	1,926,121	54,039	0	0
Field Coat Pipe Welds	D	100.20	22-Jan-2005	9-Mar-2005	46	22	1,012	3,372	WELD	488,110	230,402	29,287	0	0
Lower-in Pipe	D	575.65	24-Jan-2005	11-Mar-2005	46	33	1,518	237,600	FT	759,746	610,283	45,585	0	0
Pipe Tie-ins	D	959.60	24-Jan-2005	11-Mar-2005	46	56	3,128	237,600	FT	1,633,467	1,091,839	98,008	0	0
Set-on Pipe Weights	D	85.90	24-Jan-2005	7-Feb-2005	14	12	168	1,000	EA	79,273	40,694	4,756	0	0
Backfill & ROW Clean-up	D	616.25	26-Jan-2005	13-Mar-2005	46	40	1,840	237,600	FT	888,082	802,305	53,285	0	0
Rig-up Cleaning & Testing Crew	D	118.70	1-Mar-2005	15-Mar-2005	14	18	252	1	LOT	137,963	35,765	8,278	0	0
Clean, Test, & Dry Line	D	574.60	15-Mar-2005	4-Apr-2005	20	45	900	4	SECTION	520,856	520,718	31,251	500,000	0
Pipe Spool Fabrication (Valve Sta.)	D	77.20	1-Dec-2004	10-Dec-2004	9	16	144	900	DI	86,496	18,188	5,190	0	0
Install Block Valves & Spools	D	247.35	12-Feb-2005	18-Feb-2005	6	24	144	2	VALVE	75,222	39,621	4,513	0	0
Valve Vault Foundation Concrete	D	98.40	1-Feb-2005	5-Feb-2005	4	13	52	2	VALVE	24,916	14,765	1,495	0	0
Valve Vault Building Installation	D	154.55	16-Feb-2005	2-Mar-2005	12	19	228	2	VALVE	114,328	52,067	6,860	0	0
Restore ROW & Access Roads	D	332.10	27-Jan-2005	14-Mar-2005	46	32	1,472	237,600	FT	774,045	535,621	43,443	0	0
Weld NDE Inspection	D	11.15	20-Jan-2005	11-Mar-2005	50	8	400	237,600	FT	155,172	25,080	9,310	0	0
As-Built Survey	D	17.45	1-Jul-2004	13-Mar-2005	255	19	3,953	237,600	FT	1,557,032	141,559	93,422	0	0
Special Civil Construction	D	0.00	27-Jan-2005	14-Mar-2005	46	0	0	237,600	FT	0	0	0	1,663,200	0
Gravel Pit Development Close-out	D	415.00	1-Jun-2004	21-Oct-2004	142	20	900	3	LOT	442,859	654,709	26,572	0	0
Mine Process Gravel Material	D	628.65	10-Jun-2004	15-Oct-2004	127	33	21,252	3,216,355	CY	10,560,312	16,832,453	633,619	0	3,216,355
Work Pad Maintenance	I	213.60	10-Jan-2005	15-Mar-2005	54	16	1,024	237,600	FT	514,015	609,850	30,841	0	0
Construction Support	I	568.00	15-Jan-2005	15-Mar-2005	59	66	3,935	237,600	FT	2,153,433	1,700,913	129,206	0	0
Construction Support	I	368.40	1-Jun-2004	30-Oct-2004	151	42	6,342	237,600	FT	3,549,257	2,067,960	212,955	0	0
Environmental Support	I	12.30	15-Jan-2005	15-Mar-2005	59	6	354	237,600	FT	163,572	45,844	9,814	0	0
Pipeline Testing Support	I	196.10	15-Mar-2005	4-Apr-2005	20	14	280	237,600	FT	154,973	110,716	9,298	0	0
Move-On & Move Off	I	315.90	15-May-2004	11-Apr-2005	331	40	2,240	1	LOT	1,104,858	564,672	66,291	0	0
Safety Orientation and Drug Testing	I	0.00	15-May-2004	18-Apr-2005	336	0	0	1	LOT	0	0	0	0	0
Craft Non-Hourly Wages (Bonuses)	I	0.00	15-May-2004	18-Apr-2005	336	0	0	1	LOT	0	0	0	0	0
Construction Supervision	I	47.20	1-Nov-2004	18-Apr-2005	168	25	4,200	168	DAYS	1,866,640	376,493	0	0	0
Construction Supervision (PSI)	I	40.10	15-May-2004	1-Nov-2004	170	21	3,570	170	DAYS	1,598,000	321,452	0	0	0
Camp Mobilization	I	332.10	1-May-2004	31-May-2004	30	33	990	1	LOT	494,031	270,380	29,642	0	0
Camp Operations	I	261.10	15-May-2004	18-Apr-2005	336	31	10,478	1	LOT	4,933,661	3,985,522	296,019	0	0
Contractor Onsite Facilities	I	153.05	15-May-2004	18-Apr-2005	336	3	1,014	336	DAYS	563,074	613,143	33,784	0	0
Contractor Offsite/Home Office Facilities	I													
Air Freight Support	I													
Camp Rent	I													
Camp Catering	I													
Equipment Mobilization	I													
Equipment Demobilization	I													
Personnel Airfare (Mob/Demob/R&R)	I													
Contractor Overhead	I													
		15,550.20	1-May-2004	18-Apr-2005	352	1,279	130,377			66,516,314	73,270,002	3,723,160		

Table 3 – Typical Pipeline Estimating Model Section Cost Summary

Step 4 - Alternative Assessment

Export Pipeline System
Once the YPC Model design and cost estimates have been reviewed, validated and updated, the Team will then assess other potential options defined and mutually agreed upon with ANGDA in Step 1, establishing the pros and cons based on cost, tariff and future expandability. The results any such analysis, along with recommendations, will be reviewed with the Client. Having reviewed the alternatives, the Team and Client will decide to either keep YPC's base case or to select one alternative for further optimization.

South Central Spur Pipeline System
Once the Spur Pipeline Model design criteria and cost estimates have been agreed upon, the Team will then assess other potential options defined and mutually agreed upon with ANGDA to establish the pros and cons for natural gas liquids extraction/disposition and future expandability. The results any such alternative analysis, along with recommendations, will be reviewed with the Client. Having reviewed the alternatives, the Team and Client will decide to either keep the base case or to select one alternative for further optimization.

Step 5 – Optimization

Export Pipeline System
If a system alternative other than the YPC base case is selected in Step 4, it will then be optimized. Three or potentially four variables will be considered in the optimization analysis:

- Throughput
- Line Size
- Operating Pressure
- Compressor Station Driver Horsepower

Various permutations and combinations of the alternate system will be analyzed. The proposed methodology and results are shown in Figure 5.

South Central Spur Pipeline and NGL Processing System
If a system alternative other than the base case is selected in Step 4, it will then be optimized. Five variables will be considered in the optimization analysis:

- Point of NGL extraction
- Throughput
- Line Size
- Operating Pressure
- Compressor Station Driver Horsepower

Various permutations and combinations of the alternate system will be analyzed. The proposed methodology and results are shown in Figure 5.

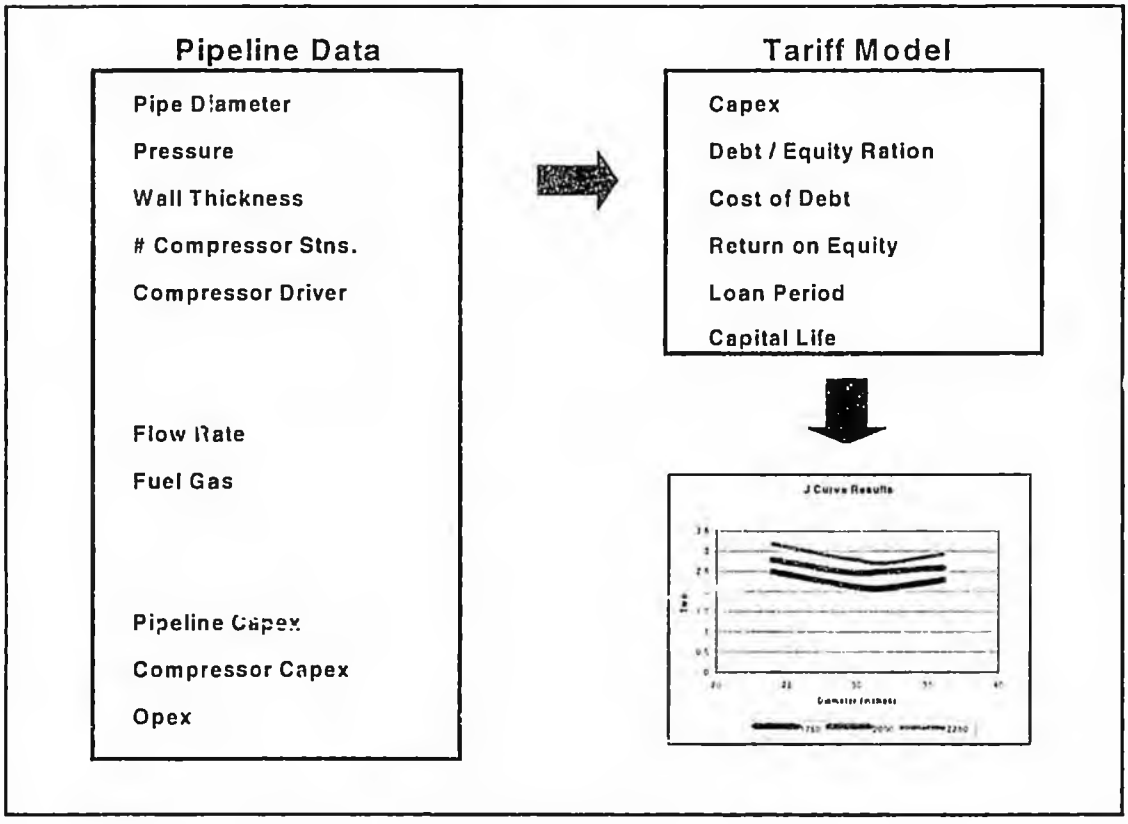


Figure 5 - System Optimization

Step 6 - Documentation

Having completed the optimization work, the final step in the study will be to document and present the results to the Client. Documentation will include:

- A final report summarizing the methodology and the results of the Export Pipeline System Study.
- A final report summarizing the methodology and the results of the South Central Spur Pipeline System
- An overview presentation.

The VECO Team will provide documentation in both paper and electronic form.

ii) Systems and Tools

We will utilize proven systems directly applicable to the scale and complexity of the project:

- Integrated Project Management Systems.
- Use of proven estimating tools suitable for a multi-billion dollar scale project.
- Proprietary computer modeling software for design and operational analysis of single and multi-phase gas systems. This software can be used to quickly develop detailed steady state and dynamic simulations of complete systems containing centrifugal and reciprocating compressors with appropriate drivers, piping, heat exchangers, control valves, etc. It was recently used to optimize the pipeline systems being evaluated by the Alaska Gas Producers and the Mackenzie Delta Explorers.

iii) Offices

The VECO Team presents an Alaskan based solution. with a Team that will execute the work primarily from VECO's Anchorage office.

Three work stations complete with computer, phone and network connections to VECO's server will be provided for client use and are included in the cost.

Support activities, as needed, will be provided John Wolflik from Las Cruces, NM for hydraulics, North of 60 Engineering out of Calgary, AB for programming and cost estimating support, and the VECO, Calgary office for compressor station design verification and cost estimating.

iv) Conclusion

Our Team proposal is based on:

- A world-class project team comprised of the very best personnel who bring key expertise, direct knowledge and experience gained from Northern pipeline projects.
- Our use of proven models for northern pipeline design, cost estimating and optimization.
- Our expertise in hydraulic modeling and facilities design.
- Our focus on HSE and pacesetter project performance.

We are:

- Particularly well qualified to undertake this study through relevant Northern experience.
- Able to start work immediately with a Team that has this specific relevant experience.
- Committed to providing high quality results that are fit for purpose and meet the Client's needs in all respects, including schedule and budget.

Section 4 Study Schedule

The following project execution schedule indicates preliminary results available by the middle of November with issuance of the final reports by January 15th, 2004.

The following are the key milestones identified in the project execution schedule:

Project Award	September 15, 2003
Kick Off Meeting	September 18, 2003
Scope Review Meeting	September 25, 2003
Optimization Review	October 1, 2003
Preliminary Compression Estimate Review Meeting	October 16, 2003
Preliminary Pipeline Estimate Review Meeting	November 13, 2003
Draft Report Issued	December 18, 2003
Final Report Issued	January 15, 2004

Section 5 Study Cost

i) Cost by Discipline

SUMMARY ESTIMATE	$US
LNG EXPORT PIPELINE & FACILITIES	
Project Management	$ 39,500
Process Engineering	47,300
Export Pipeline Engineering	74,500
Export Facilities Engineering	25,000
Constructability	29,500
Route Characterization	24,750
Environmental	14,500
Estimating	52,050
Drafting	5,000
Project Controls, admin assistance Document control, accounting	14,500
SUB-TOTAL LNG EXPORT SYSTEM	$326,600
SOUTHCENTRAL SPUR PIPELINE & FACILITIES	
Process Engineering	43,200
Pipeline Engineering	15,000
Constructability	10,000
Estimating	20,000
Route Characterization	24,750
SUB-TOTAL SPUR LINE SYSTEM	$112,950
Two work stations/one office rental with phone, computer and network access (Four months)	14,400
Reproductions	15,000
Software	3,500
Travel expenses	20,000
SUB-TOTAL MISC & UNALLOCABLE COSTS	$ 38,500
TOTAL	$492,450

ii) Cost by Deliverables

SUMMARY ESTIMATE	$US
LNG EXPORT PIPELINE & FACILITIES	
Systems descriptions for all systems, initial and ultimate flows	$ 16,800
Conceptual illustration of all systems, map overlay	5,000
PFD's for the pipeline, compressor stations, and plants	14,300
Pipeline profiles and hydraulic output	25,100
Capex cost estimate	114,700
Opex cost estimate	20,100
Horsepower & fuel consumption estimates, initial and ultimate	5,600
Project schedule and expenditure profile	20,700
Recommendation of best overall system	23,000
Draft study report	51,500
Final study report	29,800
Sub-Total	$326,600
SOUTHCENTRL SPUR PIPELINE & FACILITIES	
Systems descriptions for all systems, initial and ultimate flows	4,800
Conceptual illustration of all systems, map overlay	2,000
PFD's for the pipeline, compressor stations, and plants	4,000
Pipeline profiles and hydraulic output	11,950
Capex cost estimate	39,700
Opex cost estimate	8,000
Project schedule and expenditure profile	7,200
Recommendation of best overall system	7,500
Draft study report	17,800
Final study report	10,000
Sub-Total	$112,950
Two work stations/one office rental with phone, computer and network access (Four months)	14,400
Software	3,500
Reproductions	15,000
Travel expenses	20,000
Grand Total	$492,450

iii) Fee Schedule

Rates and estimated hours for key individuals ($US/MH)

	Rates	Est. MH's
Wes Nason	$130	350
Chris McArthur	$110	250
Bill Ediger	$110	250
Jim McDougall	$140	350
Kurt Stangl	$120	350
Jeff Sherman	$120	350
John Wolflick	$250	100
William Tetz	$110	40
Gulshan Dua	$100	200
John Hutchings	$100	350
Gene Kulawik	$150	100
Dale Morris	$150	100
Route Characterization Specialist	$165	300

Note: Individual charge out rates are all-inclusive with the exception of reproduction costs and travel expenses if required. Reproductions will be reimbursed at cost ($US).

Section 6 Experience

i) Engineering Capabilities

Our Team also brings significant northern and Arctic engineering experience. "THE TEAM" has been providing engineering, construction and operation/maintenance services to the North Slope of Alaska as well as to the Mackenzie Delta and Northern Canada for over 25 years, and brings the required northern engineering expertise for the study.

"THE TEAM" has a combined staff in Alaska which exceeds 1000 personnel and has available the necessary highly skilled engineering, estimating, process; financial, construction, environment and regulatory planning resources to undertake this study. Our recent experience demonstrates our ability to provide conceptual and front-end engineering services on projects of this nature.

We have also been instrumental in planning, design, approval, construction and start-up of gas development and production in the Fort Liard area. Fort Liard is currently the largest gas-producing field in the Northwest Territories, and we have been integrally involved in its development.

Lessons learned from these projects will be readily accessible to our Team, thus bringing the best current and global technical and execution expertise into the study.

ii) Project Team

Key project personnel include:

Wes Nason – Construction Manager brings more than 25 years of successfully completed Arctic pipeline and facility construction projects. His Arctic construction expertise will drive construction-focused cost estimating and execution planning to capitalize on opportunities related to "beginning with the end in mind".

Chris McArthur – Compressor Station Manager Chris is a highly experienced technical manager with current experience as Compression Station Manager. Chris brings engineering and owner experience for gathering and transmission pipelines and facilities in Northern Canada. He is highly regarded in the industry as a leader, as shown by his current role as President of the Canadian Gas Processors Suppliers' Association.

Bill Ediger – Pipeline Design Lead Bill brings experience in engineering and owner roles for large diameter Canadian Pipelines & Facilities. He brings expertise on all aspects of pipeline design including working knowledge and experience in integration of design, regulatory and execution priorities.

Jeff Sherman – Construction Lead brings over 25 years of successfully completed Arctic pipeline and Lower 48 mainline pipeline big-inch construction projects. Jeff's comprehensive experience with construction management, quality control, and environmental science brings a unique and comprehensive perspective to the analysis of building pipelines in Alaska and Arctic/sub arctic regions.

Kurt Stangl – Geotechnical Lead brings more than 25 years of participation and successfully completed Arctic pipeline and oilfield projects and studies. He has had direct technical involvement with pipeline frost heave studies, arctic pipeline trenching trials, mechanical trenching feasibility studies along potential pipeline routes to Valdez and arctic terrain analysis.

Gulshan Dua – Gulshan is the Manager of Process Engineering at VECO and has over 30 years worldwide experience on oil and gas projects. This includes arctic experience in the area of gas pipelines and facilities.

Gene Kulawik – Civil Construction Lead – Over 40 years experience in heavy civil and arctic construction, Gene has participated in most major Alaska pipeline studies over the past 30 years and has personal experience with and knowledge of granular resources along the pipeline route.

Dale Morris – Pipeline Labor & Equipment Resources – Over 40 years experience in mainline pipeline construction and arctic pipelines, Dale also has a depth of experience with labor, equipment, and contractor capacity issues which will be a valuable addition to the analysis provided during the constructability study.

John Hutchings– Compressor Stations Estimator – Over 20 year's domestic and international experience in project controls and estimating covering a broad range of industries including, oil production facilities (wellsites, gathering, batteries, pumping, and pipelines – domestic & international, including Arctic), and gas production facilities (wellsites, gathering, metering, dewpoint control, compression, complete gas plant facilities, and pipelines – domestic & international, including Arctic)

Jim McDougall – North of 60's Principal has over 25 years engineering experience in the North. While with Imperial Oil Limited he was directly involved in their earlier efforts to develop Mackenzie Delta Gas and participated in the early design of the Norman Wells to Zama pipeline. He has participated in numerous studies to assess the feasibility of marketing Alaska and Mackenzie Delta Gas utilizing pipeline systems that have varied from 24 to 52 inches in diameter. He was the Chief Engineer and Project Manager for the Inuvik Gas Project, which included the development of the Ikhil Gas Field, associated production facilities and a 50 km pipeline to deliver the gas to the Town of Inuvik. The project received the 2000 Professional Award of Merit from The Association of Professional Engineers, Geologists and Geophysicists of the Northwest Territories.

John Wolflick – John has more than 32 years experience in the oil and gas industry. He offers a senior level perspective in the conceptual and detail design of gas systems. His experience with Allison Division of General Motors, El Paso Natural Gas Company (EPNG), Standard Oil of Ohio (SOHIO), and Atlantic Richfield Company (ARCO) has given him a broad exposure to the business. During his 12 years with EPNG, John supervised the Compressor Station Design, Pipeline Design, and Cryogenic (LNG) Groups. During his 18 years with SOHIO and ARCO, John was leader of the conceptual engineering teams for all gas production, gathering, processing, and re-injection expansions at the Prudhoe Bay oil field in Alaska.

Section 7 Relevant Projects

Mackenzie Delta Explorers Group Pipeline Study and Optimization - 2002
Reviewed two cases including hydraulic analysis, CAPEX, and OPEX for 1 BCFD to 2.2 BCFD pipeline system, dense phase flow and separate lines for gas and gas liquids.

Mackenzie Delta Explorers Group Pipeline Study and Optimization - 2003
Further optimized the 2002 study as Case 3, including hydraulic analysis, CAPEX, and OPEX for 1 BCFD pipeline system to 2.2 BCFD pipeline system, dense phase flow and separate lines for gas and gas liquids.

Alaska Gas Producers Pipeline Team Pipeline Study and Optimization – 2001 – 02
Studied two pipeline routes:

- the Northern Route from Prudhoe Bay to the Mackenzie River Delta up the Mackenzie River Valley to Alberta, and on to Edmonton.
- the Southern or Highway Route from Prudhoe Bay to the Edmonton area paralleling the TAPS to Delta Junction, then paralleling the Alcan and other Highways to the Edmonton area.

Both route cases included many engineering and construction studies and included hydraulic analysis, CAPEX, and OPEX for a 4+ BCFD pipeline system, dense phase flow.

South West Alaska Power Project – 2002 – 03
Conceptual Study for utilizing Cook Inlet natural gas delivered via pipeline to a gas-fired power plant near the Donlin Creek Mine Project. Studied three line size/line pressure scenarios and multiple pipeline routes including:

- the Northern Route from Beluga through Rainy Pass to McGrath, then to Donlin along the Tintina Mineral Belt
- the Souther Route from Beluga to Lookout Hill via Rainy Pass, then to Crooked Creek via Stony River

Section 8 Resumes

Wes Nason

Manager of Pipeline Construction

Qualifications Overview

Mr. Nason has twenty-nine years experience managing construction and maintenance of pipelines, oil field facilities, and infrastructure development in Alaska. Specific areas of experience include project management, field supervision, field engineering, estimating, project controls, and inspection.

Active in resource development advocacy groups including the Alaska Support Industry Alliance, Alaska Miners Association, and the Resource Development Council.

Highlights

VECO ALASKA, INC.

2001 - Present

Manager of Pipeline Construction. Responsible for pipeline business development, estimating, and construction input on pipeline studies. Built a team of pipeline construction professionals to determine cost and feasibility of two alternate routes for a 2,100 mile, 52" diameter, high pressure pipeline system from Prudhoe Bay, Alaska to Edmonton, Alberta. Organized and oversaw studies and workshops which resulted in professional reports on Construction Industry Capability; Skilled Labor Availability and Training Requirements; Specialized Equipment Availability, Gap Analysis, and Manufacturing Lead Time, Pipeline Technology Studies on Ice Road Construction, Pipe Bending, Automatic Pipe Welding, Ultrasonic Testing of Pipe Girth Welds, and Real Time Radiographic Examination of Girth Welds, among others.

1998 - 2001

AHTNA MINERALS COMPANY

President. Contributed to the establishment of corporate position with National Park Service with regard to their stewardship of Ahtna-selected lands within the NPS boundaries. Startup of industrial mineral export project to Mid East. Formed joint ventures with mining companies to explore Ahtna's 1.8 million acres. Formed joint ventures for drilling and mine development with Canadian firms.

1980 - 1998

H.C. PRICE CO.

Vice President/ General Manager. Responsible for business management of a major construction and maintenance firm in Alaska and of the Price/Ahtna JV, specializing in pipeline, process facility, and power plant construction. He reviewed, signed, and was responsible for contractual performance with all clients.

Responsibilities were in the areas of budgeting, cost management, marketing, administrative, contractual, labor relations, risk management, legal and oversight of major projects. Marketing efforts included establishing and maintaining contacts in resource development firms with special emphasis on oil, gas, pipeline, and mining establishments. Administrative duties included establishing staff compensation packages, establishing and managing annual G&A budgets for the Alaska Division, establishing employee review procedures, and approving staff hire rates and merit salary increases.

1975 – 1977 **BECHTEL**

and 1979-1980; Control Engineer. Worked on teams with engineers to walk down and as-built piping and pipe support systems at a nuclear power plant during a plant outage. Obtained security clearance and worked in radioactive contaminated areas.

Team leader on the TAPS, Section 3 weld record reconciliation and as-built survey to verify accurate records of work performed. Coordinated with the surveyor contractor to establish weld locations and field verified by internal inspection when required. Team leader on verification and turnover of project quality control records to Alyeska operations.

Education

B.S., Mining Engineering, Colorado School of Mines, 1971

Affiliations

The Alaska Support Industry Alliance, Board Member (1987-94), President (1993-94),

North Slope Contractors Association, President (1986-1993), Labor Co-Chairman (1989-1998)

Trans-Alaska Pipeline System Contractors Association, President (1989), Labor Co-Chairman (1989-1998)

Resource Development Council, Board (1995-2001
Knowles/Ulmer National Resources Policy Transition Team (1994-95)

Papers

"Arctic Pipeline Constructibility and Cost Trends"

ASME Energy Sources Technology Conference & Exhibition, 1987

- Details development of Arctic above ground pipeline design & construction
- Provides comparison of winter and summer construction techniques and costs

"Sliding Royalty Incentives for Alaska Marginal Field Development"

Governor Knowles Natural Resource Transition Team Position Paper, 1994

Provided model for legislation later passed to encourage development of North Star Project and Heavy Oil Development at Milne Point

Chris McArthur, P.Eng.

Manager – Gas Pipeline Systems

Qualifications Overview

Twenty-five years of professional engineering experience in the development, design, project management, and construction of natural gas and crude oil gathering, transmission, and distribution related facilities in British Columbia, Alberta, Yukon, Northwest Territories, and Alaska.

Relevant achievements include:

- project management of a variety of industrial programs including compressor stations, meter stations, process plant, and pipeline facilities;
- twenty-one (21) unit addition/grass roots compressor station projects installing over 300,000 horsepower;
- sixty-four (64) grass roots natural gas custody transfer stations including twenty-two (22) pressure reduction and metering stations for the Vancouver Island Pipeline Project and thirty-four (34) meter stations for the Alliance Pipeline Project;
- managed various EPC consultants providing project services for various gas gathering/transmission projects;
- experienced with system hydraulics and economic models for pipeline design;
- technical engineering design and operations support for mechanical/ electrical/civil systems including reciprocating and gas turbine engine compressor/generator sets;
- regulatory experience with the National Energy Board, FERC, Transportation Safety Board of Canada, Alberta Energy and Utilities Board, Alberta Boilers Branch, B.C. Gas Safety Branch;
- worked with clients and customers to ensure their business objectives were met through supply of competitively engineered products and services.

Highlights

- Alaska Gas Pipeline Project – Compressor Station and Calgary Project Office Manager for the Alaska Gas Producers Pipeline Project for the Prudhoe Bay, Alaska to Ft. Saskatchewan, Alberta segment including over $1.5 billion U.S. in facilities.
- Mackenzie Delta Explorer Group – Project Manager for a series of conceptual engineering studies of alternative gas transmission and processing scenarios to deliver gas from the Mackenzie Delta to Alberta;
- Foothills Pipe Lines - Project Manager for preliminary engineering and cost estimate development for the ANGTS Alaska Compressor Stations;
- Alliance Pipeline – Project Manager for the Laterals Facilities Project supplying project control, engineering, procurement services, and construction and commissioning assistance for 7 compressor stations, 34 custody transfer meter stations, 50

pipeline barrel assemblies, 8 automated line break pipeline valves, and 18 automated mainline pipeline tie-in valves.

- Trans Canada Pipelines Ltd. - Engineering Manager for detailed engineering and design drafting for four (4) 28 MW RB211 compressor packages and four (4) major gas after coolers;
- Alliance Pipeline - basic engineering for 29 lateral compression and 42 metering stations including NEB application support;
- Provided detailed planning and selection of facilities through use of various hydraulic and economic computer models. Projects included various LNG pipeline proposals to Kitimat and Prince Rupert, B.C., expansions to the Foothills (ANGTS) pipeline system, Vancouver Island pipeline system, and pipeline and compression expansions/additions to the Westcoast system.

Education

- B.A.Sc., Mechanical Engineering, U. of British Columbia (1978)
- Certificate, Executive Development, U. of Calgary (1994)

Affiliations

- Association of Professional Engineers and Geoscientists of British Columbia
- Association of Professional Engineers, Geologists, and Geophysicists of Alberta
- Canadian Standards Association, Subcommittee on Materials
- Pipeline Research Committee, Compressor Research Supervisory Committee, American Gas Association (1995 -1997)
- Past President, Board of Directors, Canadian Gas Processors Suppliers Association (1999 - 2003)
- APPEGA Enforcement Committee Member (2003 – 2006)

F. William (Bill) Ediger, P.Eng.

Director, Arctic Gas Projects, Pipelines & Terminals

Qualifications Overview

Twenty-five years of professional experience in the engineering and construction of facilities, of which 22 years are focused on the development, design, project management and construction of large diameter pipeline facilities.

Highlights

VECO **2000 - Present**

Director, Arctic Gas Projects, Pipelines and Terminals

- Alaska Gas Producers Pipeline Team

  VECO, in a joint venture with Fluor, was the engineering contractor for the Alaska Highway and Mackenzie Valley pipeline feasibility study, Alaska to Alberta portion. As Canadian Pipeline Coordinator responsibilities included:
  - Interface with technical personnel in Client and Contractor offices in Calgary, Houston and Anchorage;
  - Management of pipeline staff in Calgary office;
  - Management of sub-contractors and subject matter experts;
  - Participation in the multi-disciplinary evaluation and justification of route alternatives;
  - Development of technical deliverables including pipeline project plan, scope, conceptual engineering and pipeline design methodologies, HDD feasibility, commissioning plans and cost estimates;
  - Development of supporting technical documentation for potential regulatory applications to the F.E.R.C. and the N.E.B.

- Mackenzie Delta Explorer Group

  Engineering Manager for the Mackenzie Delta Explorer Group Study. The project scope is to provide sufficient preliminary engineering to deliver +/- 30% confidence level Capex/Opex Estimates, associated tolls, and other specified deliverables for gas transmission, gas-liquids extraction, and gas-liquids transmission alternatives for the Mackenzie Delta region.

- Terasen Pipelines

  Project Engineer for various studies investigating expansion proposals for the Express Pipeline crude oil system

- Anadarko Canada

  Project Engineer for various studies and projects including Netla and Arrowhead Sour Gas Gathering System near Ft. Liard, NWT, P-16 Wellsite development near Ft. Liard, NWT, and the Saddle Hills to Progress sour gas pipeline project in Alberta

- Abu Dhabi Company for Onshore Oil Operations (ADCO)

  VECO is providing project management consultancy services to ADCO North East Abu Dhabi (NEAD) Phase 1 development. The project consists of new processing facilities to handle oil, gas and water production from two fields near Abu Dhabi, U.A.E., increasing production to 110 MBOPD.

TRANSCANADA PIPELINES LTD. 1990 - 2000

- Increasing levels of management responsibility for the engineering and construction of pipeline and measurement facilities leading to the senior position of Director, Pipeline and Measurement Projects.
- Responsible for the engineering and construction of all pipeline and measurement capacity and maintenance projects for the Transmission business unit.
- Managed annual capital programs, averaging between $400-$500 million, from concept stage to commissioning.
- Major accomplishments included the successful installation of over 3500 km of large diameter pipeline facilities (primarily NPS 42 and NPS 48) valued at approximately $5 billion while managing significant staff turnover in order to support the demands for project management skills in other areas of the Company, rebuilding the majority of the Department in 1990 during head office relocation from Toronto to Calgary and integrating the former TCPL Pipeline and the Nova Mainline Departments into the Pipeline Projects Department in 1998.
- In Measurement and Valve Integrity responsible for effectively managing the societal and business risks of all gas measurement and valve facilities, all at the lowest life cycle cost.
- Scope included Measurement Facilities. Gas Quality, Valves, Data Integrity, Regional Integrity and Lab Services.

TRANSCANADA PIPELINES LTD. 1981 to 1990

- Project Leader on multiple multimiilion-dollar pipeline construction projects across the system including expansion, upgrading and maintenance projects.
- Responsible for all aspects of projects including preliminary and final design, obtaining surveys, materials, land and drawings, overseeing consultants, preparing contracts, price schedules and directing and monitoring construction activities.

Education

Bachelor of Applied Science, Civil Engineering, U. of Waterloo, 1978

Affiliations

The Association of Professional Engineers, Geologists and Geophysicists of Alberta

The Association of Professional Engineers of Ontario

Papers

Pipeline Recoating, Oil & Gas Journal, October 1988

Northern Pipelines Tutorial Co-presenter, International Pipeline Conference, September 2002

Jeffrey Sherman

Qualifications Overview

Over 25 years of pipeline construction experience including 23 years in arctic Alaska. Extensive pipeline project management experience on a wide variety of projects since 1985. Selected to manage some of the largest and most difficult hard dollar pipeline projects. Ability to plan and coordinate all aspects of pipeline construction including:

- Project Planning and Scheduling
- Material Procurement
- Logistics for Construction in Alaska
- Assessment of Equipment Requirements
- Design of Special Equipment or Tools
- Hiring of Staff and Key Craft Personnel
- Implementation of Cost Controls and Reporting
- Subcontractor Administration
- Client and Agency Relations
- Effective Supervision of Project Personnel

Highlights

- **Project Manager** for H.C. Price on Alyeska's Atigun Mainline Replacement Project; 1990-1991. Replaced 8.5 miles of the Trans Alaska Pipeline in the Atigun River with 48" diameter, concrete coated pipe during the winter. Personally designed specialized preheat ducts, forms and insulation blankets for applying concrete to field joints in winter conditions. This saved time, labor and fuel for curing the concrete field joints, achieving 3,000 PSI in three hours. Also developed a system for internally heating the buried pipe to meet Alyeska's stringent tie-in temperature requirement. H.C. Price was responsible for the logistical support of the entire project and building, maintaining and operating a 600 man camp complete with office complex, fuel farm, shop buildings and water/sewer treatment plant. This $43 million lump sum project was completed on schedule and under budget and Alyeska was presented the Project Management Institute's Project of the Year award.

- **Project Manager** for H.C. Price on PGT-PG&E Pipeline Expansion Project; 1992-1993. Laid 167 miles of 42" diameter gas line in Northern California. Two-thirds of the new line was in solid basalt requiring careful attention to blasting technique and allocation of ditching equipment to maintain production rate. Worked with multiple agencies (FERC, CPUC, USFS, CDFG, etc.) with overlapping jurisdictions. This $110 million, unit price/lump sum project was completed under budget.

- **Project Manager** for Conam on ARCO's Central Gas Facility Flare Replacement Project; 1988. The existing primary emergency flares did not have enough capacity and therefore required replacement. The original construction of the flares had taken three months. The replacement of the old flare systems with a new, much larger flare field was scheduled for a 28-day

shutdown. Personally designed special rigging that allowed the up to 600-foot long new flares to be preassembled and set in place as complete units. This project was completed in 16 days, saving ARCO 12 days of gas liquids production.

- **Project Manager** for Conam on the Endicott Breach Bridge Scour Protection Project – Phase II; 1987. This project was notable, as it required wintertime placement of thousands of yards of riprap in a causeway breach in the Arctic Ocean. This lump sum project was completed both under budget and ahead of schedule.

- **Project Manager** for Conam on the North Slope Borough Water/Sewer Project at Point Hope, Alaska; 1996-1999. In addition to construction, this $54 million project included procurement of all materials for 35 miles of buried and insulated water, sewer and glycol lines plus state of the art water and sewer treatment facilities. Application of pipeline construction techniques to this utility project cut a year off the construction schedule. A majority of the workforce was locally hired and trained Alaska Natives.

Education

1973; BA in Environmental Biology, University of Colorado

Kurt Stangl

Arctic Engineer

Qualifications Overview

Mr. Stangl has over twenty-eight years of experience in conducting and managing arctic engineering projects. He has provided senior direction to numerous field investigation and design projects for northern facilities, arctic pipelines, offshore gravel islands and drilling structures, and northern mining developments.

Highlights

Northern Pipeline Projects

- Lead Arctic Engineer for a gas pipeline feasibility study for both southern and northern routes from Prudhoe Bay to Edmonton, Alberta.
- Project Manager for a mechanical trenching feasibility study for several natural gas pipeline routes from Prudhoe Bay to tidewater in southern Alaska.
- Senior Geotechnical engineer responsible for preliminary route evaluation of the onshore Sakhalin oil pipeline in eastern Siberia.
- Conducted numerous geotechnical exploration programs for natural gas pipelines along the Alaska Highway in the Yukon and various locations in the Mackenzie Delta. Supervised several borrow materials investigations and evaluations in the area of potential petroleum development and along pipeline corridors.
- Supervised a number of major airborne geotechnical drilling and reconnaissance programs along several thousand miles of proposed pipeline routes in the high arctic. Work included terrain mapping, airphoto interpretation, and ground truthing. Projects were carried out over a period of eight years.
- Directed the geotechnical evaluation of full scale mechanical trenching tests for a buried natural gas pipeline in extremely cold permafrost conditions in the Canadian high arctic.
- Managed several extensive frost heave and thaw settlement laboratory testing projects for Yukon Pacific natural gas pipeline study. These projects included development of new test cells and testing methodologies.
- Responsible for sediment coring along a proposed 80 mile marine pipeline crossing of the Northwest Passage in 1500 ft. of water.

Large Arctic Civil Projects

- Resident Engineer during winter construction of Northstar Exploration Island, an artificial island in 45 feet of water in the Beaufort Sea, Alaska. A comprehensive construction surveillance and testing program was performed. All aspects of construction QA/QC including ice road construction and maintenance, borrow excavation, fill placement, pile installation and manufacture of concrete slope protection blocks were under his direction.
- Responsible for field crews conducting construction surveillance and field testing of earthworks and concrete foundations for the Endicott Project, Prudhoe Bay, Alaska.

General Northern Projects

- Project Manager for several offshore site investigations conducted in the Beaufort Sea for offshore exploration structures. Projects were performed utilizing heliportable, track mounted, and rolligon mounted drill rigs.
- Project Manager for geotechnical field programs for proposed mobile drilling structures (SSDC, CIDS) and gravel island sites in the Beaufort Sea. Projects included geotechnical drilling, cone penetrometer testing, and foundation conditions analyses.
- Responsible for design and installation of slope movement, settlement, and temperature instrumentation for artificial islands and several onshore projects on the North Slope of Alaska.
- Project Manager for many geotechnical site investigations and construction surveillance projects for pile supported structures in permafrost in numerous arctic communities.
- Was extensively involved with arctic geotechnical exploration programs throughout northern Canada and the Arctic Islands.
- Project engineer responsible for several offshore artificial island investigations in the Mackenzie Delta and Beaufort Sea.

Registrations

Professional Engineer, Assoc. of Professional Engineers Geologists and Geophysicists of Alberta
Nuclear Gauge Safety Training

Education

Queen's University	1972	Geological Engineering, B.Sc.(Honors)
University of Alaska	1984	Arctic Engineering

Affiliations

Member, Associated Soil and Foundation Engineers
Member, American Society of Civil Engineers
Member, American Society of Testing Materials
Member, Alaska Miners Association

Papers

"Arctic Offshore Site Investigations", with Dr. A. Mahmood, Proceedings, Arctic '85 ASCE Specialty Conference, Civil Engineering in the Arctic Offshore, San Francisco, 1985.

"Engineering Geology of Surficial Soils, Eastern Melville Island", with W.D. Roggensack and D.W. Hayley, Proceedings, 4th Canadian Permafrost Conference, 1981.

"Cavendish Township Drilling Program", Geological Survey of Canada, Open File 160, 1973.

"Arctic Stream Scour: A Case History", with J. Barrett, and M. Schlegel, Technical Council on Cold Regions Engineering Monograph, Cold Regions Hydrology and Hydraulics, edited by William L. Ryan and Randy D. Crissman, (1990) pp. 791-803.

"Use of Weathered Rock For Engineered Fill in Permafrost Regions of Alaska", with M. Schlegel, Proceedings of the Fifth Canadian Permafrost Conference, Quebec City, Quebec, Canada, 1990.

Gulshan Dua, P.Eng., MBA

Manager – Process Engineering

Qualifications Overview

Gulshan has over 30 years of experience in Process Design and Engineering, and Project Engineering management, primarily in the oil and gas production and processing industry. His experience includes both engineering and contracting companies (Bechtel and Engineers India Ltd.) and major international oil and gas operating companies (ADCO - a multinational company of ADNOC, Shell, Mobil, Exxon, BP, Partex, and QGPC).

For the last 10 years, many of Gulshan's projects total capital cost are in the range of US$2.0 billion. In the majority of these projects, the experience covers all the project phases from project initiation through to conceptual, basic engineering, detailed engineering, procurement, construction, commissioning and start-up.

Gulshan's experience has acquired him the skills to both perform "hands on" and lead a group of engineers for all phases of project implementation in the areas of process design/engineering and project engineering management.

Highlights

VECO **1999 - Present**

In addition to managing the department (up to 45 process engineers), and the development of Process / System Engineering standards and procedures for the department, have carried out the following specific projects as the Process Lead:

Alaska Gas Producers Pipeline Project

- High level process engineering support to the project process team, including as an interim process lead in the initial phase for the conceptual studies associated with the compressors stations on the dense phase pipeline, transporting over 4 billion scf/day gas from Prudhoe Bay to Alberta. The front-end studies involve gas compression, gas chilling, gas reheating and waste heat recovery systems, including drivers' evaluation.

Qatar Petroleum Halul Fuel Gas Sweetening Study/ Feed

- The study for a 20 mmscfd fuel gas sweetening and acid gas disposal system, and FEED work for the gas sweetening plant, using MDEA for selective removal of H2S to meet with the QP environmental requirements.

Foothills Pipeline Ltd, Canada

- The process design for 3.8-Billion scfd capacity Gas Compression and Chilling Station detailed construction cost estimates of the Alaska Natural Gas Transportation System.

Pluspetrol, Argentina

- The Ramos Field Gas Compression Study (400 mmscfd capacity) based on reservoir data on wellheads pressure decline.

Komi Arctic Oil Company, Russia

- The Process Study to upgrade the existing Amine Unit from 15-mmscfd capacity to 25-mmscfd capacity.

ADCO (ABU DHABI COMPANY FOR ONSHORE OIL OPERATIONS) **1989 – 1999**
Abu Dhabi, UAE **1985 - 1987**

ADNOC's Taweelah Gas Treatment Plant

- Project Engineering Manager / Process Engineering Specialist for the FEED phase of the project, with particular emphasis on all technical aspects of the basic design, including integration of the two Process Licensors designs with the rest of the facilities.

Various Oil and Gas Development Projects

QATAR GENERAL PETROLEUM CORPORATION **1987 - 1989**

- Responsible for leading conceptual process works related to Future Production Facilities, Gas Shortfall Alleviation Schemes, and upgrading of Gas LTX plants and dehydration facilities.

BECHTEL - AREC JOINT VENTURE COMPANY **1984 - 1985**

- Responsibilities included preparation of basic design process packages for ADCO's two major oil field development projects (Bu Hasa and Asab) of 650 MBD and 350 MBD oil capacity.

GAS AUTHORITY OF INDIA LTD (GAIL) **1985**

- Headed the Technical department for the Company, and carried out various technical assignments associated with the HBJ cross-country Pipeline and LPG plants along the route.

ENGINEERS INDIA LTD. (Formerly Bechtel) **1977 - 1984**

- Performed the process design activities, as well as supervised the section's process design activities.

DCM CHEMICAL WORKS **1970 - 1977**

- Worked on an array of jobs related to the Caustic-Chlorine industry including the development of High Amperage Electrolytic Diaphragm Cells, process design and installation of chlorine gas cooling, and drying and liquefaction facilities

Education

- Master of Business Administration, Durham University, UK, 1993
- B.Sc. Chemical Engineering, Punjab University, India, 1970

Affiliations

- The Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA).

Technical Skills

- Various process simulation packages, including Hysys, Amsim, Pipeflo, Pipesim, Pipesys and; process design and system engineering.

E.L. Gene Kulawik

Qualifications Overview

Gene Kulawik has over 41 years of construction experience, gained mainly in Alaska. Peter Kiewit & Son's, Inc. and affiliates have continuously employed Gene for over 28 years in engineering and management positions. During his tenure with Kiewit, he estimated and built many projects in Alaska including the Chena Hot Springs Road extension, the Trans-Alaska Pipeline, Prudhoe Bay Oilfield Development, Terror Lake Hydroelectric Project at Kodiak, Northwest Alaska Gas Line, Seward Highway Reconstruction, Keystone Canyon Highway Realignment, Ketchikan Airport, and the Nome Port Development. The specific project experience presented in this resume is pertinent to the oil and gas industry only.

Highlights

Relevant Oil and Gas Experience

Project Manager **1987-1995**

- Assist peak Oilfield Services as a Project Manager in the estimating and preparation of a response pertaining to the civil construction aspects to a Request for Proposal for various oilfield related projects on the North Slope.

Project Manager **1991**

- Assisted Nabors in the preparation of technical manuals pertaining to oilfield development and access in Arctic and Sub-Arctic areas. Acquired environmental and logistical data and land sat photos of project areas to assist in the development of the Komi Oilfield in Russia.

Consultant **1988- 1989**

- Consultant to Alaska Power Authority and Stone & Webster Engineering Corporation for the development of a cost estimate to install a gas line from Wasilla to Fairbanks. As a member of the three person team which performed detailed construction planning and developed cost estimates for the proposed project his duties included the management of route reconnaissance, providing alternative route advice, evaluating stream crossings, preparation of construction schedule, evaluation of geotechnical conditions and development of quantity take-offs.

Consultant **1990**

- Consultant to Houston/Kiewit assisting with preparation of cost estimate and bid proposal for the Alyeska Corrosion Repair Project at Atigun. Managed all aspects of the civil estimate.

Senior Estimator **1980- 1981**

- A Senior Estimator retained by Fluor/Northwest to prepare a definitive construction estimate for the Alaska portion of the NWAP project. This estimate used to support the costs submitted to FERC in the project filings. The assignment included participation in FERC sponsored cost conferences.

Project Manager **1977- 1978**

- Project Manager for pipe support contract for ARCO for Prudhoe Bay East gathering lines.

Chief Engineer and General Superintendent **1974-1976**

- Kiewit representative on the Joint Venture estimating team, which prepared the estimates for various sections of the Trans Alaska Pipeline Project. After the Kiewit led Joint Venture was awarded Sections 5 & 6 of project in July 1974, Mr. Kulawik served as the Chief Engineer. From August to December of 1976, he completed an assignment as the General Superintendent at Galbraith Lake for the completion of Sections 5 & 6.

Affiliations

Mr. Kulawik previously represented Kiewit on a five-member execution contractor team retained by Fluor Northwest to prepare a definitive cost estimate for the Alaska Section of the Northwest Alaska Gas Pipeline Project. He defended that estimate in proceedings before the Federal Energy Regulatory Commission (FERC).

Mr. Kulawik has been a partner of Argetsinger & Kulawik, Inc. since January of 1986, where he assists clients on various construction related problems including construction management, estimates, contract administrations, dispute resolution, scheduling, and feasibility studies. Some of this work includes service as an expert witness in construction related litigation.

R. Dale Morris

Senior Pipeline Construction Expert

Qualifications Overview

Over forty years of domestic, international, and arctic experience in the pipe line construction industry, including twenty years as a senior officer of one of the larger and more successful contractors.

Working knowledge in the management of large diameter pipe line projects throughout the United States and Overseas, arctic pipeline construction in Alaska, and arctic trenching in Alaska.

Familiar with construction estimating, cost control, equipment management, logistical support for remote locations, as well as both field and corporate management of large pipe line projects.

Over twenty years of labor relations experience in managing projects and companies, plus fifteen years of active participation in contractor associations negotiations of pipeline labor agreements in Alaska and the Lower 48.

Education

Attended University of Kentucky & Western Kentucky University – Civil Engineering

Affiliations

President, Pipe Line Contractors Association, 1996

Director, Pipe Line Contractors Association

Labor Committee, Pipe Line Contractors Association

Labor Committee, Trans Alaska Maintenance Contractors Association

Planning and Studies Committee, INGAA Foundation

John Hutchings

Principal Estimator

Qualifications Overview

Mr. Hutchings has over 18 years experience as a project controls estimator in the oil and gas industry on a wide range of medium to large sized projects.

Highlights

VECO **1999 - Present**

Principal Estimator

- Working within the Project Controls Department and under the supervision of the Chief Estimator, responsible for developing capital cost estimates in accordance with clients and engineering specifications all within VECO's estimating guidelines and procedures. The type of estimates range from conceptual, equipment factored and detailed lump sum proposals.

FLINT CANADA INC. **1993 - 1999**

Senior Estimator

- Reporting to the Vice President – Operations, responsible for the companies overall estimating and project controls systems. Worked closely with field personnel in preparing construction bids for a variety of projects

DELTA CATALYTIC ENGINEERING/CONSTRUCTION 1991 -1993

Projects Controls Specialist

- Assigned to the Caroline Gas Plant Project, initially working on monitoring costs for the offsite modularization and fabrication. Then worked onsite developing and revising budgets for the various construction work packages.

FLINT ENGINEERING/CONSTRUCTION **1985 - 1991**

Estimator

- Within the Project Division, worked with the estimating team in preparing bids for a variety of EPC and construction projects. Duties also included field assignments as cost / scheduler, coordinator and quality controller.

Superintendent Trainee - Whitecourt

- Gained valuable field experience of oilfield construction through a "hands on" approach on a variety of projects. Duties ranged form laboring, pipefitting and general supervision. Projects ranged from oil and gas facility construction, pipeline construction and plant turnarounds and maintenance.

Education

- Bachelor of Science – University of Calgary
- Certificate in Construction Administration – University of Calgary
  - Project Management
  - Cost and Scheduling
  - Contract Law and Documents
  - Corporate Controls
  - Management Communications
  - Dispute Resolutions
  - Bonding and Insurance
  - Pipeline Design and Construction
  - Effective Project Planning

Affiliations

- AACE International – The Association for the Advancement of Cost Engineering
- Canadian Construction Association – Gold Seal Certification - Estimating

Section 9 VECO Profile

Introduction

VECO History

VECO Inc., the original parent company, was formed in 1968 to support offshore oil and gas production in Alaska, U.S. In the early 1970s, VECO extended its offshore support activities to the North Sea, constructing and outfitting huge offshore platforms in Stavanger, Norway for operations in Denmark, Norway, and Scotland. In 1974, VECO pioneered oil field services for the initial development of the 10-billion-barrel Prudhoe Bay oil fields, becoming the first contractor on the North Slope to establish a permanent construction and maintenance facility. At the same time, operations expanded throughout Alaska to include numerous construction and service projects.

Today, VECO is a fully integrated engineering, procurement, and construction (EPC) company operating worldwide with over 4000 personnel. Within its field, VECO is one of North America's largest companies.

ENR Engineering News-Record THE TOP 500 DESIGN FIRMS

31 VECO Corp., Anchorage, Alaska

Using its Alaska program management expertise as a stepping-stone, VECO has grown through a series of strategic acquisitions and alliances. VECO expanded its services to other industries in the past ten years and is now active in the design and construction of projects in the following industrial sectors:

- Refining and Petrochemical
- Gas Projects
- Pipelines and Terminals
- Oil and Gas Field Development
- Mining and Metals
- Power Generation and Electrical Distribution

VECO is a solution-oriented, cost-conscious organization. Our history demonstrates that we have the experience, resources, and qualified personnel to effectively manage major projects up to several billion dollars in value. **In the last ten years, VECO has completed projects totaling over $25 billion.**

VECO is organized in regional centers located across North America and Internationally. These include:

- **VECO Alaska**
  Headquartered in Anchorage, Alaska, U.S.A.
- **VECO Canada (International Headquarters)**
  Headquartered in Calgary, Alberta, Canada
- **VECO Middle East North Africa**
  Headquartered in Abu Dhabi, United Arab Emirates
- **VECO Pacific**
  Headquartered in Bellingham, Washington, USA
- **VECO Rocky Mountain**
  Headquartered in Denver, Colorado, U.S.A.
- **VECO Gulf**
  Headquartered in Baton Rouge, Louisiana, U.S.A.

VECO Corporation
Anchorage, Alaska, USA

Execution Methods

VECO has the flexibility to provide services for a wide variety of projects and scopes of work. VECO's staff has significant project execution expertise and comprehensive systems and procedures in place to aid in ensuring effective and efficient execution of projects. Some of the execution methods and basis for working relationships that VECO has the ability to provide include:

- E, EP, EPCM, or EPC
- Lump sum turnkey
- Reimbursable
- Cost recoverable with incentive based fee
- Fixed price
- Feasibility studies
- FEED and conceptual designs
- Fast track implementations
- Specific discipline only work – project management, mechanical, pipeline, process, electrical, instrumentation, civil/structural, design/drafting, procurement, project controls (estimating, scheduling)

In the execution of any project VECO follows the basic key principles required for successful project execution. VECO's approach to successful project execution consists of the basics of project initiation and scoping, preparing a project specific plan for completion of the project, preparing a design basis memorandum (DBM) document indicating the scope of the project, technical and schedule reviews, squad checks, Quality Assurance and VECO Senior Management Project Reviews. These processes are fully defined in VECO's Procedures Manuals.

VECO Services

Engineering and Design Fields:	Services Provided:
Process and Chemical Engineering	Program & Project Management
Advanced Controls & Instrumentation	Procurement & Logistics Management Planning
Mechanical Engineering	Construction Management & Planning
Electrical Engineering	Operations & Maintenance Management & Planning
Civil/Structural Engineering	Environmental Engineering

Engineering, Procurement, and Construction Services:	
Project Design Development	Construction Execution
Detailed Engineering & Design	Planning, Scheduling & Project Controls
Materials Management	Quality Control & Inspection
Purchasing & Expediting	Safety & Risk Management
Module. Equipment & Material Transport	Contract Administration

In-House Specialists

In addition to the multi-discipline engineering personnel working at VECO, we also have the following specialists in-house:

- Rotating Equipment
- Vessels
- Fired Heaters
- Piping Stress Analysis
- HVAC
- Tanks
- Civil
- Petrochemical Process
- Environmental/Regulatory
- Electrical
- Control
- DCS/Programming

Personnel by Discipline

VECO is a worldwide company consisting of approximately 3000 personnel. The general distributions of the personnel are described in the following:

By Region:

- Alaska 1300
- Canada 1100
- Rocky Mountains 200
- Pacific 200
- Gulf 100
- Middle East North Africa 100

By Specialty:

- Engineering 1500
- Construction 1000
- Operations and maintenance 500

Health, Quality and Environmental Awareness

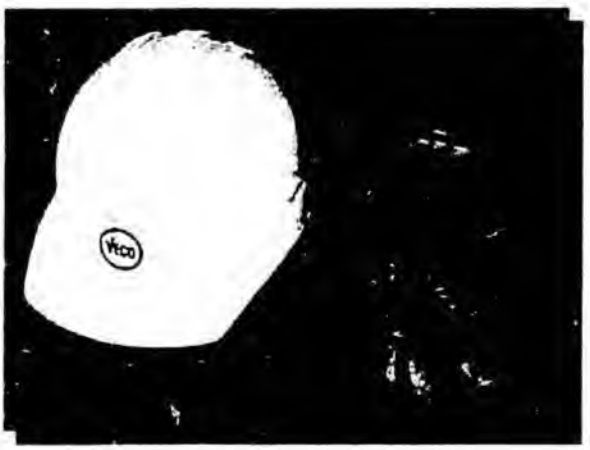
These three interdependent objectives are VECO's primary considerations in every project.

VECO has an excellent safety record, which reflects our professionalism and proves how well our employees work together as a team. It is proof of our commitment to worker safety.

VECO's approach to quality minimizes capital and operating costs while building and maintaining "fit-for-purpose" project and maintenance safety and reliability.

Through the years of experience in fragile northern environments, VECO has developed systems for addressing environmental issues in the early stages of projects. We are very cognizant of regulatory requirements, which we always meet and frequently exceed.

Safety, quality and environmental awareness are synonymous with The TEAM that DELIVERS®.



Quality Assurance

Quality Policy

it is the policy of VECO to provide products and services that meet client's requirements in an efficient, cost-effective and safe manner.

VECO is committed to implementing and maintaining as ISO 9001 program including the provision of training for its staff and the encouragement of continuous improvement at all levels in the organization.

This quality policy has the full support and commitment of VECO's management and staff.

VECO Canada Ltd. has a quality management program that is registered with the Quality Management Institute (QMI) in compliance with the requirements of ISO 9001-1994.

The ISO 9001 international standards for quality management were developed with the goal of effectively documenting the quality system elements to be implemented in order to maintain an efficient quality system. ISO 9001 has built-in flexibility, which allows it to be equally effective for both large and small projects.

Annual compliance audits are conducted by QMI to confirm continued registration to the ISO 9001 standards. Our staff is fully trained in the ISO 9001 system and all Quality Assurance and Quality Control documentation is in place.

CERTIFICATE OF REGISTRATION

VECO Canada Ltd.
#1200, 401 - 9 Avenue SW
Gulf Canada Square
Calgary, Alberta
T2P 3C5 Canada

ISO 9001-1994

Engineering, Procurement and Construction Management in the Oil and Gas, Refining, Petrochemical, Pulp and Paper and Cogeneration Industries.

003069
8711, 1389
October 13, 1994
February 9, 1999
February 9, 2002

Graham Neville
President

Environmental and Regulatory

Program Management

VECO provides a full spectrum of environmental and regulatory services, ranging from total program management to compliance reviews and permitting applications.

What differentiates VECO's service capabilities is our early identification of the pertinent environmental and regulatory issues and the integration of these into the engineering, design and construction components of the overall project. Identification and handling of these issues at the outset, enhances project results and minimizes risk of future liability.

VECO's objective is to help our clients understand the interaction of environmental and regulatory requirements within a project and provide the right level of program management support to enable a successful outcome.

Services

Environmental Planning

- Management Systems
- Issue Scoping
- Impact Assessments
- Cumulative Effects Assessments
- Construction Procedures Development
- Project Management

Regulatory Compliance

- Jurisdictional Assessment and Compliance
- Provincial, Territorial and Federal
- Emissions and Greenhouse Gases
- Gas Processing, Oil Batteries, Pipelines, Compressors

Liability Management

- Inactive Well and Facility Management
- Phase 1 and Phase 2 Site Assessments
- Spill Response Evaluation/Remediation
- Abandonment and Reclamation
- Partnership with WasteCo for Complete Facility Decommissioning Services

Procurement and Inspection Services

The VECO procurement department ensures that the needs for materials, facilities, services (including inspection) and equipment are supplied where and when required, at the lowest cost commensurate with quality and quantity specifications.

Procurement is conducted in a manner designed to build and maintain good client, supplier, interdepartmental, and community relationships. As much as possible and in accordance with client wishes, regional and national content is always maximized within the constraints of quality, price, delivery, performance, and after sales service.

VECO's significant procurement experience includes the provision of services worldwide. We have successfully provided procurement and logistical services for large programs internationally (e.g. multi-year services for Nexen in Yemen) for a complete range of materials and equipment. Services have been provided for projects in over 44 different countries consisting of wide ranges of logistical and geographical conditions.

The Procurement Department has developed the capability of supporting projects ranging from very small non-task force projects to large task force projects. The project procurement organizations are developed on a per project basis to assure that the client's requirements are satisfied in a cost-effective manner. The project specific procurement organization is derived from a standard system that is in accordance with VECO Procurement Procedures entitled "Operating Standards, Volume 2-1 and Volume 2-2", which is an ISO 9001 quality assurance system.

Document Control

VECO's document control is required to control the receipt and distribution of technical documents and data from three sources:

- The Client
- Third Parties (Vendors, Contractors, etc.)
- VECO's internally generated documents

VECO has in place ISO9001 quality assurance procedures to provide a framework for the document control systems.

As a part of VECO's document control process an in-house Document Index software package has been developed. This package enables the system users to accurately track the status and location of all technical project documents, and to archive and retrieve all project drawings upon project completion.

FILENET, Electronic Document Management System

VECO Canada Ltd. has implemented an electronic document management system EDMS, within its Calgary office called Filenet. Filenet EDMS is a system used for electronically tracking all types of documents through their lifecycle from cradle to grave. The system works on an intranet with Internet capabilities. The Internet ability offers the user secure access to all documents in the Filenet system from any computer with Internet access. Filenet is administered locally with a client installed on the users workstations for access. A standard file structure is not used within Filenet. All documents are assigned attributes that enable users to locate documents more efficiently than the current network environment.

This new collaborative environment facilitates information sharing and transferring through using such features as electronic redlining, notification and centralized storage. Increased security and version availability results in less lost document information and restricts the existence of accidental duplication of documents, which is a large problem facing all projects when compiling their deliverables

Through using EDMS such as Filenet, we hope to capitalize on the benefits such as data integrity and consistency. An EDMS system will enhance the productivity of any project whether it is a few people or a few hundred. The flexibility in design and administration allow us to easily address any unique characteristics that a project may require.

Project Reporting

Project reporting procedures are used to provide the project manager with the most recent and accurate project information. VECO has in place an ISO9001 certified set of procedures that control the project reporting functions. These procedures are customized to fit the needs of each individual project. The major components of these procedures include:

- Weekly Project Status Reports
- Task Force Meetings
- Monthly Status
- Cost Reporting
- Cost Variances
- Purchase Order Report
- Needs/Status List

Project Controls

Within VECO, the Project Controls function covers the key elements of Estimating, Cost Control, Project Planning and Scheduling, Progress Measurement and Reporting. VECO has developed, as part of its ISO 9001 registration, a comprehensive set of Project Controls standards that are contained within the VECO Operating Standards Volume 1.2, Project Procedures Manual. These standards have been employed on numerous projects with success.

The primary element to successful project control is to ensure that a clear scope of work is developed followed by an equally clear work breakdown structure. This will ensure that the work is fully understood by all members of the project team.

Facilities Cost Estimate

VECO has extensive experience in the preparation of both project capital and operating cost estimates. VECO has the capability to perform a Cost Estimate Sensitivity Study. This study will examine all components of the project to determine the optimum course of action for the development of the Facilities Cost Estimate. This examination would look at available in-house and historical data for similar recent project work in order to determine whether or not this information is suitable for use in the estimate. This will result in an identification of those components of the work that will need to be issued for bid in order to support the estimate development.

Typically, for the preparation of a +/- 10% estimate, VECO looks to develop the following items:

1. P & ID's
2. Plot Plan with piping layouts transposed
3. Civil quantities (foundations, piles, roads, etc)
4. Equipment budget pricing
5. Major piping item budget
6. Miscellaneous instruments (typically in-house pricing with P & ID markup)
7. Electrical tray routing and cable schedule
8. Major electrical equipment budget pricing
9. Home office man-hour estimate
10. Construction management man-hour estimate
11. Contractor Rates

Using these items as a general guideline, a semi-detailed estimate can be developed to meet the needs of the project.

Project Cost Control

VECO uses a proprietary system known as SIMMS or Seamless Integrated Material Management System.

Information is exported to Excel or MS Access for reporting purposes. Standard reporting templates have been developed which VECO uses with a high degree of success in providing clients with timely, accurate and complete project progress reports.

Project Planning and Scheduling

VECO uses Primavera Project Planner (or MS Project) for detailed planning and scheduling on virtually all its projects. VECO will undertake to prepare in conjunction with the project team, a high-level project master plan, outlining the major activities for each phase of the project. Identification and management to agreed project milestones is the cornerstone of a successful project. Once this schedule is developed and published, further detail development will occur. The level of detail will be determined through the review of the master schedule and identification of all deliverables required for each phase of the project.

The schedule will be "frozen" as a baseline against which all project measurement and performance will be made. Any deviation from this plan will be reflected in the forecast updates. While the formal update is made monthly, a regular schedule review is performed by the project planner and findings conveyed to the project team.

Project Risk Analysis

While VECO will undertake to perform a formal risk analysis once the estimate is complete, elements leading up to this formal process will be performed earlier during the preliminary engineering phase. It is vital that both risks and opportunities be identified, quantified and ranked in order to support the overall decision-making process. VECO regularly employs Range Estimating, also knows as REP/PC, to support this process.

Risk Analysis goes far beyond the simple application of a software package to assist with the process. It entails that the user understand the decision making process. The project team must be able to clearly identify the "soft" spots in order to assess their potential impact on the project.

VECO applies the following basic principles to risk analysis:

1. Identify elements of uncertainty
2. Assess each elements potential impact – favorable or unfavorable.
3. Assign a value to this element of risk – Cost, Schedule, Technical
4. Determine what level of risk is acceptable
5. Conclusions – Contingency.

Software

The typical desktop computer at VECO comes setup with the following software packages:

- Operating System: Windows 95, Windows 98 or Windows NT
- Workstation 4.0
- Microsoft Office 2000
- MS Word - Word Processor.
- MS Excel - Spreadsheet program.
- MS PowerPoint - Slideshow software.
- MS Access - Database program.
- MS Outlook - Email Client, we run a Microsoft Exchange Server for our email needs.
- Microsoft Internet Explorer 5
- Adobe Acrobat Reader - For viewing PDF (Portable Document Format) files.
- WinZip - File compression and extraction utility
- Primavera 3.0, MS Project 98
- On drafting workstations – AutoCAD or Microstation

VECO's CAE/CAD Systems combine leading-edge technology with broad, stable functionality, allowing us to excel in each stage of a project life cycle:

- Enabling users to share engineering data more easily across the entire enterprise
- Empowering users to control the security of their data
- Enhancing the ability to create and communicate our designs

In other words, VECO's CAE/CAD system breaks down the barriers that prevent users from meeting their productivity goals. Our systems provide the foundation for moving from individual engineering productivity to enterprise-wide engineering automation.

The following outlines the software currently in use by VECO.

CAE/CAD Software Summary

Group	Program	Version	Author	Sponsor	Custodian
CAE - Mechanical Engineering					
	FE/PIPE	4.1	Paulin Research Group	Mech	CAD/CAE
	GT-Master		Thermaflow Inc.	Mech	CAD/CAE
	HTFS		AEA Technology	Mech	CAD/CAE
	Compress Vessel Design	6.4	Codeware	Mech	CAD/CAE
	STX-HTC		AEA Technology	Mech	CAD/CAE

CAE - Civil/Structural Engineering					
	S-Frame for Windows	5.02	Softek Services Ltd.	Civil Eng	CAD/CAE
	DYNA5		University of Western Ontario	Civil Eng	CAD/CAE
CAE - Instrumentation Engineering					
	Intools	5.1	Intergraph	Instr Eng	CAD/CAE
CAE - Electrical Engineering					
	ETAP	3.0.2	Operations Technology, Inc.	Elect Eng	CAD/CAE
	SPS			Elect Eng	CAD/CAE
	DesignIT	1.5	Blue Heron Software	Elect Eng	CAD/CAE
	SKM Powertools		SKM Systems Analysis	Elect Eng	CAD/CAE
CAE – PLC Programming Software					
	ICOM PLC-5			Controls	CAD/CAE
	ICOM PLC-2			Controls	CAD/CAE
CAE - Process Engineering					
	GT-PRO		Thermaflow Inc.	Process Eng	CAD/CAE
	HYSIM		AEA Technology	Process Eng	CAD/CAE
	HYSIS - PROCESS SIMULATOR		AEA Technology	Process Eng	CAD/CAE
	HYSIS - Amine Property Package Add-on		AEA Technology	Process Eng	CAD/CAE
	HYSIS - Crude Package Add-on		AEA Technology	Process Eng	CAD/CAE
	PIPEFLO		Neotechnology Consultants	Process Eng	CAD/CAE
	SULSIM		Western Research	Process Eng	CAD/CAE
	AMSIM		DB Robinson Group	Process Eng	CAD/CAE
	STACKS 2			Process Eng	CAD/CAE
	QFLARE			Process Eng	CAD/CAE
	STONER			Process Eng	CAD/CAE
CAE - Piping Stress Analysis					
	AutoPIPE Plus	6.10	Rebis	Stress Eng	CAD/CAE
	CAESAR II	4.2	Coade Inc.	Stress Eng	CAD/CAE
CAD Engine					
	MicroStation J	7	Bentley Systems, Inc.	CAD/CAE	CAD/CAE
	MicroStation SE	SE	Bentley Systems, Inc.	CAD/CAE	CAD/CAE
	AutoCAD R14	14.01	Autodesk, Inc.	CAD/CAE	CAD/CAE
CAD – Piping					
	PlantSpace P&ID	2.1	Bentley Systems, Inc.	Piping	CAD/CAE
	PlantSpace Piping	2	Bentley Systems, Inc.	Piping	CAD/CAE
	PlantSpace Pipe Supports	2	Bentley Systems, Inc.	Piping	CAD/CAE
	PlantSpace Equipment	2	Bentley Systems, Inc.	Piping	CAD/CAE
	ISOGEN	1.0.2	Alias Limited	Piping	CAD/CAE
	Autoplant 97 – Piping	1.11	Rebis	Piping	CAD/CAE
	Autoplant 97 – Equipment	1.11	Rebis	Piping	CAD/CAE
	ProCAD AutoFlow	R14	PRO-CAD Software Ltd.	Piping	CAD/CAE
	ProCAD AutoOrtho	R14	PRO-CAD Software Ltd.	Piping	CAD/CAE
	ProCAD AutoISO	R14	PRO-CAD Software Ltd.	Piping	CAD/CAE
	PSBOM	2	VECO Canada	Piping	CAD/CAE

CAD – Schematics					
	MicroStation Schematics	2.01	Bentley Systems, Inc.	Piping	CAD/CAE
CAD - Site Planning & Roadway Design					
	Eagle Point 98	98	Eagle Point Software Inc.	Civil	CAD/CAE
	Surface Modeling	98	Eagle Point Software Inc.	Civil	CAD/CAE
	Site Design	98	Eagle Point Software Inc.	Civil	CAD/CAE
	RoadCalc	98	Eagle Point Software Inc.	Civil	CAD/CAE
	Profiles	98	Eagle Point Software Inc.	Civil	CAD/CAE
	Data Transfer	98	Eagle Point Software Inc.	Civil	CAD/CAE
CAD - Hydraulics & Hydrology					
	Eagle Point 98		Eagle Point Software Inc.	Civil	CAD/CAE
	Watershed Modeling	97	Eagle Point Software Inc.	Civil	CAD/CAE
	Water Surface Profiling	97	Eagle Point Software Inc.	Civil	CAD/CAE
CAD – Structural					
	Structural for Triforma	7	Bentley Systems, Inc.	Civil	CAD/CAE
	Frameworks Plus	3.1	Intergraph Corporation	Civil	CAD/CAE
CAD - Mapping/Hybrids					
	MicroStation Descartes	7	Bentley Systems, Inc.	Piping	CAD/CAE
	CAD Overlay	R14	Autodesk, Inc.	Piping	CAD/CAE
CAD – Reviewing					
	PlantSpace Enterprise Navigator	5	Bentley Systems, Inc.	Piping	CAD/CAE
	MicroStation Powerscope	7	Bentley Systems, Inc	CAD/CAE	CAD/CAE
	AutoDesk View	2	Autodesk, Inc.	Piping	CAD/CAE
	AutoDesk Volo View	plus	Autodesk, Inc.	CAD/CAE	CAD/CAE
CAD - Clash Detection					
	PlantSpace Interferance Manager	2	Bentley Systems, Inc.	Piping	CAD/CAE

Plotter Descriptions

Plotter ID	Description	Plotter ID	Description
HP 5SI MX	Laser Jet Postscript printer 11"x17" & 8.5"x11" Trays	HP 8000TN	Laser Jet Postscript printer 11"x17" & 8.5"x11" Trays
XEROX 4520 PS & Compaq PageMarq 20	Postscript printer 11"x17" & 8.5"x11" Trays	KIP 9010 Plotter	Flatbed printer (Xerox copier technology)36"x500' Black and White12 - D size plots/min output Connected to online scanner
KIP 3620 Plotter	Flatbed printer (Xerox copier technology) 36"x500' Black and White 9 - D size plots/min output	KIP Starprint 3000	2 Roll Plotter 36"x330' Black and White 3 - D size plots/min output
HP-1055CM Color Ink Jet	Ink Jet roll plotter 36"x200" Color or Black and White	HP-650C Color Ink Jet	Ink Jet roll plotter36"x200" Color or Black and White

Construction Management

VECO is organized and staffed to manage the execution of construction projects in their entirety, from initial concept through to commissioning and start-up.

With over 25 years of construction management experience related to oil, gas, power, pipeline and manufacturing projects, VECO has comprehensive procedures and programs for the management of safety, environmental protection, quality assurance or quality control, cost and schedule control, field contract administration, materials management and commissioning/start-up interface.

VECO can provide experienced construction managers, superintendents and inspectors to manage, supervise and control all the aspects of the construction effort. Two other roles which VECO routinely assume are:

- **Agent for the Client** – in this capacity, VECO acting for the client, will prepare, award and administer procurement and construction contracts, coordinate all construction activities and provide administrative control assistance to the client during the construction phase.

- **Client Representative** – VECO acting for the client, prepares procurement and contract documents for client approval and award. VECO coordinates all construction activities and provides administrative control assistance to the client during the construction phase.

Services

- Provide constructability input during design phase
- Develop a construction execution plan
- Provide on-site safety and environmental control management
- Manage/monitor construction budget and schedule
- Monitor and evaluate contractor performance
- Perform field engineering, inspection and quality assurance activities
- Perform field contract administration.

Construction

VECO Construction Ltd. Is a wholly owned, independently operated VECO company that has been providing full service heavy industrial construction in Western Canada, the North West Territories and the mid-west and western United States since 1989. Working closely with its clients, VECO Construction provides safe, innovative solutions to resource development, processing and distribution industries.

Areas of Expertise

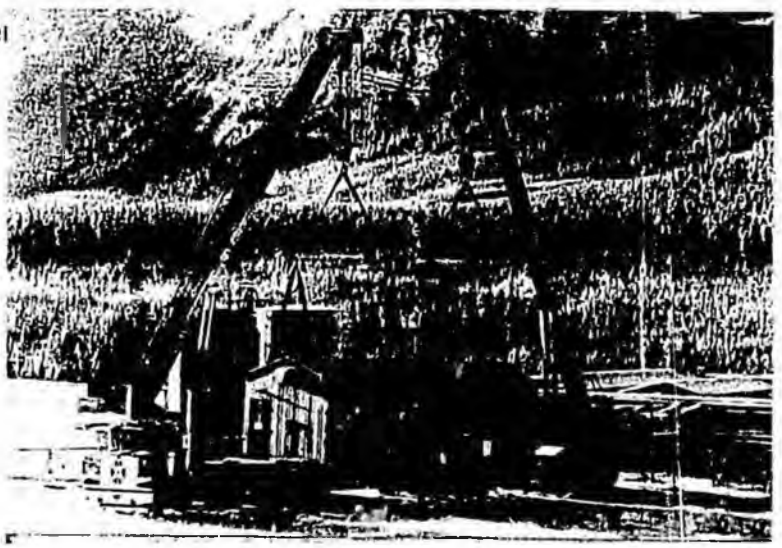
VECO Construction's principal markets include oil and gas processing, power generation and pipeline facilities. Services are provided both independently and in conjunction with other VECO companies.

In more than a decade, VECO has built a successful track record through executing the following project types:

- Compressor Stations
- Power Generation and Utilities
- Gas Storage Facilities
- Oil Batteries and Terminals
- Plant Inlet Modifications
- Water Injection Plants
- Wellsite Facilities
- Flare Systems
- Decommissioning/Dismantlement Projects
- Pump Stations and Terminals

Services

- General Contracting
- Civil and Mechanical Construction
- Equipment Installation and Dismantling
- Site Restoration
- EPC Projects
- Project Management



Project Experience

International Project Experience

VECO's project experience extends to the provision of services worldwide. In addition to coordinating international work activity through our offices in Calgary, we have offices in Abu Dhabi and Mumbai to provide local focus and contact.

We have completed projects in over 44 different countries under a wide range of logistical and geographical conditions. Tabled below is a list of countries where VECO has performed work.

VECO WORLDWIDE

Algeria	Mexico
Argentina	Mozambique
Australia	Nicaragua
Azerbaijan	Norway
Barbados	Oman
Canada	Pakistan
Chile	Philippines
China	Qatar
Croatia	Russia
Ecuador	Saudi Arabia
Egypt	Spain
El Salvador	Sudan
England	Syria
Gabon	Taiwan
Greenland	Tanzania
India	Thailand
Indonesia	Tunisia
Iraq	Turkey
Kazakhstan	United Arab Emirates
Korea, South	United Kingdom
Libya	United States
Malaysia	Yemen

.n today's international arena, it is vital that both risks and opportunities be identified, quantified and ranked in order to support the overall decision-making process. VECO is particularly well positioned to provide feasibility studies, cost estimates, and FEED support to assist our clients.

General Experience Highlights

VECO has extensive client and project experience as provided in the matrix below for ease of reference. We would be pleased to provide detailed project reference for any area, which may be of specific interest to you. We purposely intended this listing not be exhaustive, but rather provide you with an overview of our expertise

Client Name	Field Development	Compressors	Turbines	Gathering Systems	Sweet Gas Processing Facilities	Sour Gas Processing Facilities	Pipelines	SCADA & Controls Automation	Construction	Operations & Maintenance	Heavy Oil	Power Generation	Module Fabrication (Offshore)	Environmental Studies	Refineries
Abu Dhabi Oil Company (ADOC)						x						x			
Alberta Energy Company		x					x	x							
Alberta Natural Gas					x	x									
Alliance Pipeline Ltd.		x	x	x			x	x							
Alyeska Pipeline Service Co							x		x	x				x	
American Natural Resources					x		x	x							
American Resources						x									
Anardarko Petroleum		x		x	x	x									
Aramco											x				
ARCO Alaska, Inc	x			x	x	x	x		x	x		x	x	x	x
BC Gas		x		x						x					
BC Hydro		x	x		x	x									
BP Canada, Ltd	x	x	x	x	x	x	x	x	x	x	x	x		x	
BP Refining															x
BP Exploration, Alaska	x			x			x	x	x	x			x		
Canadian Natural Resources											x			x	
Canadian Occidental	x			x			x	x			x	x			
Central Alta. Midstream		x							x	x				x	
Centurion												x			
Chevron		x		x	x									x	
Consumers' CO-OP															x
Conoco	x	x				x	x	x	x				x		x
Deminex	x				x		x	x			x				
Esso Resources	x	x													
Express Pipeline Ltd.							x	x							
Exxon Ventures (CIS)	x														
FAL Oil					x	x		x							x
GASCO Gas Industries						x	x	x	x						
Island Paper Mill												x			
Japan Canada Oil Sands Limited	x			x			x	x	x		x				
Keyspan		x		x		x	x					x			
Koch Oil	x						x	x	x		x				
KomiArcticOil	x			x			x						x		
Mobil Oil Canada	x	x				x							x		
Nexen	x	x		x			x		x	x					
Nimir Petroleum Company							x	x	x				x		
Northwest Pipeline Corporation					x	x	x	x	x	x					
Oman Refining							x			x					x
PanCanadian Petroleum	x	x		x	x	x	x	x	x				x		
Peace Pipe Line, Ltd							x	x							
Pennzoil	x		x	x			x		x						
PetroCanada	x			x			x		x				x		
Petroleos Mexicanos (PEMEX)							x								
Phillips Petroleum Resources Ltd	x	x		x		x	x								
Primewest			x											x	
Saudi Aramco	x														
Shell Canada Ltd						x	x	x	x					x	
Shell Oil Company	x			x			x	x	x						x
Startech Energy, Inc	x								x						
Suncor, Inc						x	x	x	x						x
Talisman Energy, Inc							x	x			x				
Tesoro	x														x
Tosco	x														x
Trans Mountain P/L Company, Ltd									x	x					
TransCanada PipeLines	x	x	x			x	x		x	x				x	
TransCanada Power			x						x			x			
UMC Petroleum	x			x				x							
Union Pacific Resources, Ltd				x				x							
Unocal, Alaska, USA												x			
Westcoast Petroleum, Ltd							x	x							
Williams Energy		x		x					x	x		x			

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 4th Avenue
Anchorage, Alaska 99501

September 08, 2003

ASRC Energy Services
E & P Technology

September 8, 2003

Alaska Natural Gas Authority
411 West 4th Avenue
Anchorage, Alaska

Subject: Proposal for Conceptual Engineering Studies

Gentlemen:

Attached is ASRC Energy Services' proposal for preparation of Conceptual Engineering Studies for an LNG Plant in support of the Alaska-Initiative LNG Program. As a 100% Alaska Native Owned Corporation, we appreciate the opportunity to participate in this important program.

Our proposal is based on the guidelines outlined by you on August 27: a strictly controlled budget and a need for completion by mid-January 2004. It is our understanding that the study will rely heavily on previous studies, some of which were prepared by ASRC/Parsons and some by other contractors. It should be noted that ASRC Energy Services have not yet had an opportunity to review the LNG facility study prepared by Yukon-Pacific.

You will find that our proposal describes a viable execution plan and a well-qualified organization for accomplishing the work. Under this proposal, all work will be managed and directed by ASRC Energy Services. The focal point of the work will be our offices at 3900 C Street in Anchorage. Due to their in-depth knowledge of gas processing in Alaska, we proposed to 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.

We believe this proposal is consistent with our discussions and offers the best utilization of the previous studies consistent with the potential budget and schedule Should you find areas that require clarification or suggestions for improvement of the effort, please contact our Manager for this proposal, Mr. Gary Clardy at (907) 339-6264.

Sincerely,

David Johnston, President
ASRC Energy Services E&P Technology

ASRC Energy Services, E&P Technology, 3900 C Street, Suite 702, Anchorage, Alaska 99503-5969
Fax: (907) 339-6276

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 4th Avenue
Anchorage, Alaska 99501

September 08, 2003

[redacted]

Table of Contents

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 liquefication 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.

[redacted]

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

[redacted]

Not Included: Cogeneration or Power Sales Studies

Permitting Support Activities (other than schedule allowances)

3.0 Work Plan

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.

[redacted]

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

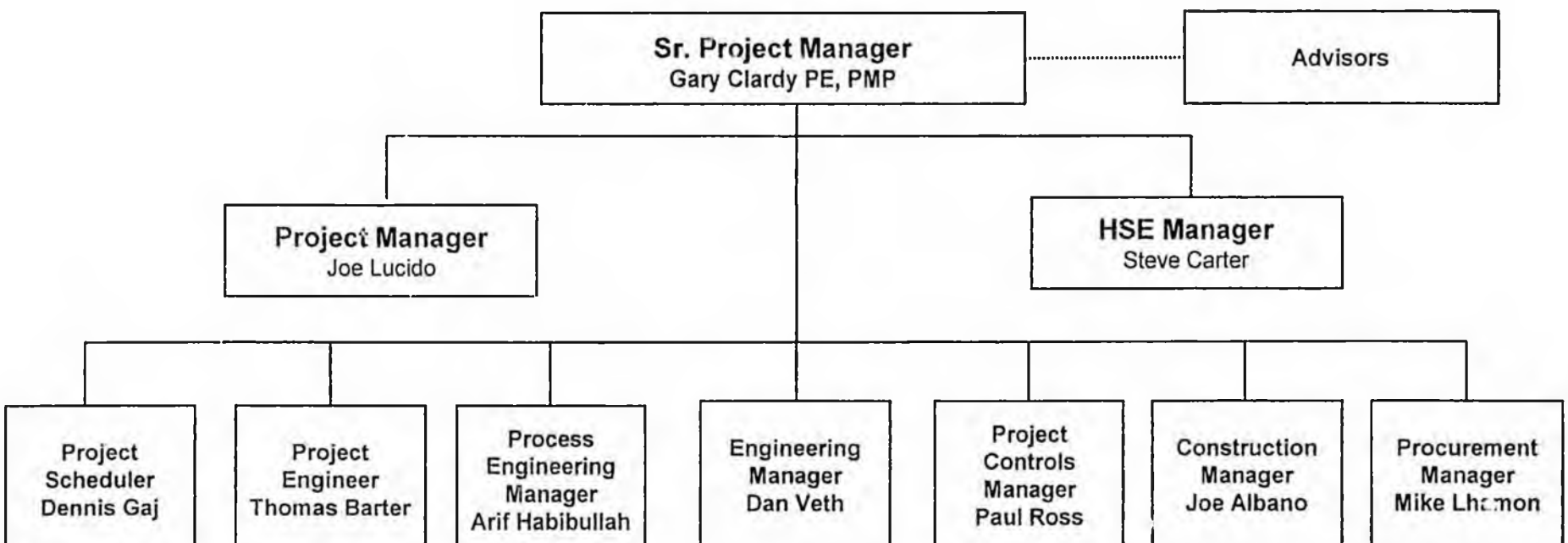
A Level 2 project schedule and capital expenditure forecast will be prepared.

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

ASRC Energy Services
E & P Technology

[redacted]

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.

Name	Project Function
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

Gary A. Clardy, P.E., PMP
Sr. Project Manager

[redacted]

Summary

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 inciuded all facets of engineering, procurement, construction, start-up and turn-over.

Experience

2001 - Currently

General Manager, ASRC Energy Services, Anchcrage, 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 Snamprojetti in Milan, Italy. Included crude pipeline, ballast transfer lines and control and safety systems. TIC approximately $800 million.

[redacted]

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

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

Registrations/Affiliations

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

Joseph P. Lucido
Project Manager

[redacted] **Resume**

Summary

Over 30 years of experience related to project management, engineering, and c 'ruction management of projects in the oil/gas, refinery, and gas utility industries. Project assign.. 's have included the responsibility for overseeing project development, feasibility studies, pre, ration 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

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, EPC 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

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.

[redacted] Resume

Education & Professional Affiliations

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

R. Steve Carter
Safety

Resume

Summary

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

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

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

Dennis E. Gaj
Scheduler

[redacted] Resume

Summary

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

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 light 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

[redacted] Resume

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.

1990 - 1995 **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

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

Thomas L. Barter, P.E., PMP
Principal Engineer

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

Arif Habibullah
Lead Process Engineer

[redacted] **Resume**

Summary

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

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 CO2 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, Ifpexol, 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

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

1991 - 1997

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 for 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.

[redacted] 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® 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

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

Recent Publications

- 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

Daniel R. Veth
Engineering Manager

[redacted]

Resume

Summary

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

- 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 – thr first mechanical drive application for the Frame 6 single-shaft gas turbine engine.
- Lea 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 additon 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 breakeown 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

1988 – 2001 **ARCO/BP (Venezuela, California, Alaska)**

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

[redacted] Resume

1978 - 1988 **Exxon (California, Texas)**

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

Education & Professional Affiliations

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

Paul W. Ross
Project Control Manager

[redacted] **Resume**

Summary

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 faciliti 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

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, Vandenburg 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-

[redacted] **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

- 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

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

Joseph P. Albano
Construction

[redacted]

Resume

Summary

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

Experience

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 implimentation, 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 implimentation, 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 n 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.

[redacted] **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

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

6.0 Rates

Labor Rates:

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

Position	Straight-Time Rate	Over-Time Rate
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.

[redacted]

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.

[redacted]

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.

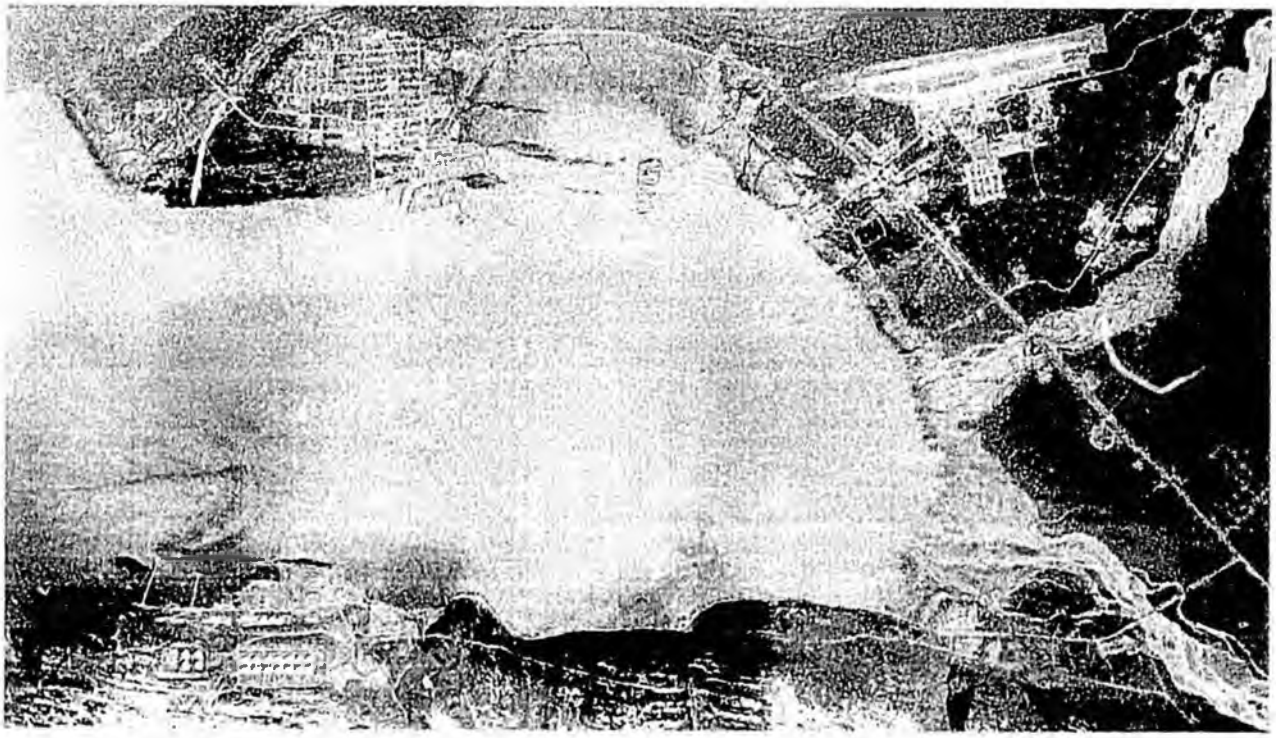
Budget Estimate – LNG Plant & Loading System

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 36lh 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. 4th 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.

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.

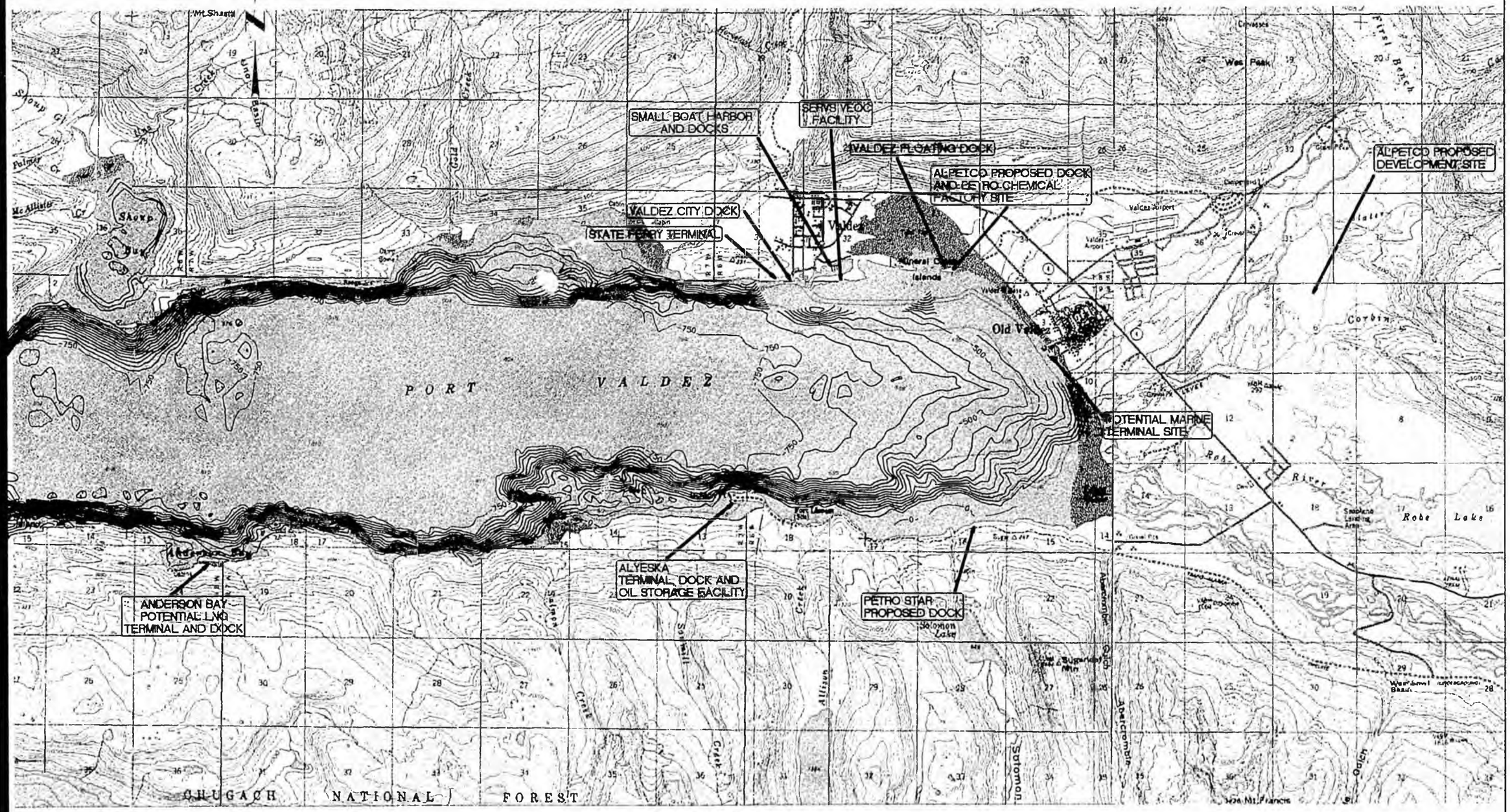
Scope of Work

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.	CKD.	APP.

Petrovich, Nottingham & Drage, Inc.
Engineering Consultants
[508 West 36th Avenue, Anchorage, Alaska 99503] (907) 561-1011

DESIGN: ____ CHECKED: ____
DRAWN: ____ APPROVED: ____

SCALE: 1" = 6000'

DATE: 9/8/2003

PORT VALDEZ AREA

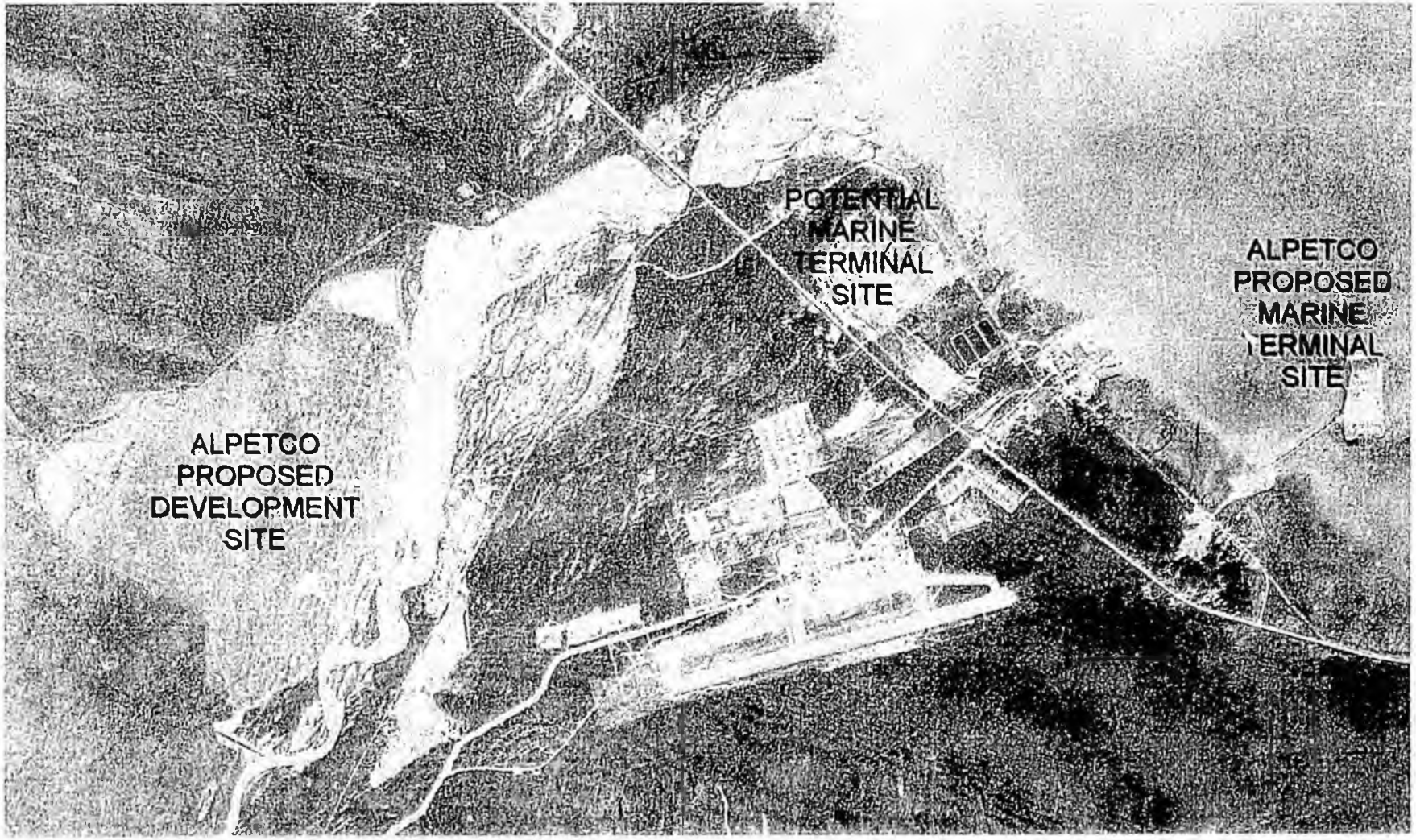
PN&D DOCK AND HARBOR PROJECTS

SHEET TITLE: OVERVIEW

PN&D PROJECT NO.: – | DWG. FILE: –

SHEET 1 OF 1

ALPETCO PROPOSED DEVELOPMENT AND MARINE TERMINAL SITES



Peratrovich, Nottingham & Drage, Inc.
Engineering Consultants

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.

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 involves 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.

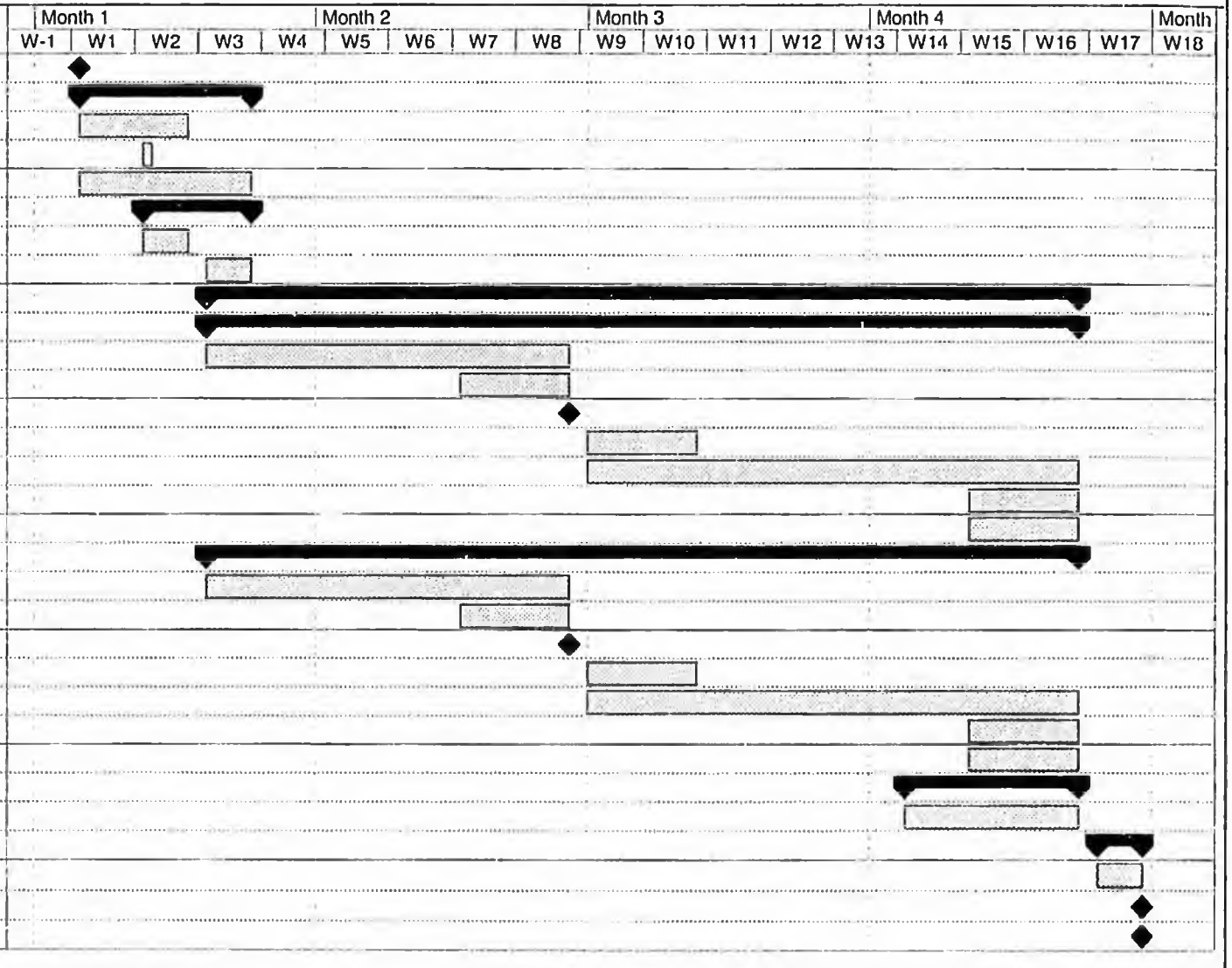
Demolition: PND has provided consulting services on several projects that have involved the removal or demolition of structures. This work has involved demolition engineering of bridges, as well as both building and ancillary structures such as communications structures. We have also been involved in 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
1	**NOTICE TO PROCEED**
2	**SCOPING**
3	Obtain Site Information
4	Site Visit
5	Establish Design Criteria
6	**SURVEY**
7	Field Work
8	Office Work
9	**CONCEPTUAL DESIGN**
10	**Marine Facilities**
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	**Upland Facilities - Site Civil**
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	**PERMITTING REVIEW**
27	Review Permitting Issues
28	**FINAL STUDY**
29	Prepare Final Study for Submittal
30	Submit Final Study to ANGDA
31	**END OF PROJECT**

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			
PROJECT MANAGEMENT (120 Days)															
Prepare Bi-Weekly Progress Reports	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
Subtotal Hrs	*44*	*80*	*20*	*40*	*20*	*20*	*0*	*0*	*0*	*0*	*0*	*15*			*239*
Subtotal $	*$5,940*	*$10,000*	*$1,900*	*$3,600*	*$1,600*	*$1,500*	*$0*	*$0*	*$0*	*$0*	*$0*	*$975*		*$250*	*$25,765*
														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
Subtotal Hrs	*26*	*32*	*16*	*48*	*48*	*8*	*4*	*8*	*8*	*12*	*16*	*4*			*230*
Subtotal $	*$3,510*	*$4,000*	*$1,520*	*$4,320*	*$3,840*	*$600*	*$320*	*$560*	*$520*	*$840*	*$1,360*	*$260*		*$1,160*	*$22,810*
														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
Subtotal Hrs	*4*	*10*	*0*	*0*	*0*	*0*	*108*	*108*	*120*	*0*	*0*				*350*
Subtotal $	*$540*	*$1,250*	*$0*	*$0*	*$0*	*$0*	*$8,640*	*$7,560*	*$7,800*	*$0*	*$0*	*$0*		*$7,500*	*$33,290*
														Check Sum =	$33,290
Geophysical Investigation															
Geophysical Survey													$50,000		$50,000
Coordination and Evaluation of Data	2	8	8							2				*$150*	$2,320
Subtotal Hrs	*2*	*8*	*8*	*0*	*0*	*0*	*0*	*0*	*0*	*2*	*0*				*20*
Subtotal $	*$270*	*$1,000*	*$760*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$140*	*$0*	*$0*	*$50,000*	*$150*	*$52,320*
														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
Subtotal Hrs	*4*	*16*	*180*	*40*	*0*	*0*	*0*	*0*	*0*	*24*	*0*				*264*
Subtotal $	*$540*	*$2,000*	*$17,100*	*$3,600*	*$0*	*$0*	*$0*	*$0*	*$0*	*$1,680*	*$0*	*$0*	*$50,000*	*$12,400*	*$87,320*
														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			
Aerial Photography and Topography															
Aerial Photography and Topography													$30,000		$30,000
Coordination and Evaluation of Data	2	8					16			16				*$150*	$3,820
Subtotal Hrs	*2*	*8*	*0*	*0*	*0*	*0*	*16*	*0*	*0*	*16*	*0*				*42*
Subtotal $	*$270*	*$1,000*	*$0*	*$0*	*$0*	*$0*	*$1,280*	*$0*	*$0*	*$1,120*	*$0*	*$0*	*$30,000*	*$150*	*$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
Subtotal Hrs	*108*	*220*	*102*	*438*	*142*	*112*	*0*	*0*	*0*	*100*	*50*	*24*			*1,296*
Subtotal $	*$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
Subtotal Hrs	*56*	*118*	*20*	*88*	*20*	*166*	*0*	*0*	*0*	*64*	*20*	*20*			*572*
Subtotal $	*$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
Subtotal Hrs	*16*	*24*	*60*	*40*	*0*	*40*	*0*	*0*	*0*	*24*	*0*	*4*			*208*
Subtotal $	*$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
Subtotal Hrs	*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			
Subtotal $	*$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
Subtotal Hrs	*2*	*8*	*0*	*12*	*40*	*0*	*0*	*0*	*0*	*0*	*0*	*8*			*70*
Subtotal $	*$270*	*$1,000*	*$0*	*$1,080*	*$3,200*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$520*		*$250*	*$6,320*
														Check Sum =	$6,320

Grand Total Hrs	**280**	**564**	**466**	**746**	**270**	**386**	**128**	**116**	**128**	**242**	**86**	**81**			**3,493**
Grand Total $	**$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
Subtotal P.M. Expenses				*$250*

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
Subtotal Scoping Expenses				*$1,160*

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
Subtotal Survey Expenses				*$7,500*

Geophysical Investigation Expenses

Phone, Fax, photo copies, etc.	L.S.		$150	$150
Subtotal Geophysical Investigation Expenses				*$150*

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
Subtotal Geotechnical Investigation Expenses				*$12,400*

Aerial Photography & Topography

Phone, Fax, photo copies, etc.	L.S.		$150	$150
Subtotal Aerial Photography & Topography				*$150*

PHASE III - CONCEPTUAL DESIGN

Marine Facilities

Design Expenses

Phone, Fax, photo copies, plans, report etc.	L.S.		$500	$500
Subtotal Marine Design Expenses				*$500*

Uplands Facilities - Site Civil

Design Expenses

Phone, Fax, photo copies, plans, report etc.	L.S.		$400	$400
Subtotal Civil Design Expenses				*$400*

Review Seismic Issues

Seismic Review Expenses

Phone, Fax, photo copies, plans, report etc.	L.S.		$300	$300
Subtotal Permitting Review Expenses				*$300*

Comparison of Preferred Site to Anderson Bay Cost Estimate

Comparison Expenses

Phone, Fax, photo copies, plans, report etc.	L.S.		$150	$150
Subtotal Comparison Expenses				*$150*

Permitting Review

Permitting Review Expenses

Phone, Fax, photo copies, plans, report etc.	L.S.		$250	$250
Subtotal Permitting Review Expenses				*$250*

TOTAL EXPENSES **$23,210**

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

		Regular Rate	*Overtime Rate*
Professional:	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
Survey:	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
Technician:	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.

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, ADNR land and water use permits, sewer and water

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.

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

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.

- 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 Tatitlek 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.

Alyeska 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 (HAZWOPR) 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 30,00 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.

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.

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 HAZWOPER 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 68th 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

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,

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.

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.

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 Taxilane 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.

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 DeArmoun 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.

- 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.

R&M 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.

JOHN W. PICKERING, P.E.
Principal/Senior Engine .r
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 Amer:can Military Engineers
Member, NACE International – The Corrosion Society
Member, American Welding Society
Member, United States Section of the International Navigation Association (PLANC)
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.

- 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 ortho-rectified 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 Tatitlek 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 glu-lam, 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.

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 Sourdugh 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.

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.

CHRIS WEST, EIT
Staff Engineer
Peratrovich, Nottingham & Drage, Inc.

Engineer-in-Training, 2001, Alaska

B.S., Civil Engineering, 2001, Brigham Young University, Provo, UT

Chris West is a staff civil engineer with 1-1/2 years of Alaska design experience. Since joining PND upon graduation, he has worked in varying capacities on a wide range of projects including schools, roads, churches, industrial facilities and master plans. His assignments have encompassed site layouts, road design, and construction administration.

The following are representative of Mr. West's experience:

- Valdez Harbor Upland Improvements, Valdez – Involved with site design for this upland improvements project.
- Arctic Boulevard, Anchorage – Assisted with road design of Arctic Boulevard.
- Ron Larson Elementary School, Wasilla – Involved with site design for the school, including the design of a ½-mile entrance road.
- Meadow Lakes Elementary School, Wasilla – Assisted with on-site well and septic system design, as well as access road design.
- Denali Elementary School, Anchorage – Involved with site design of this facility, which is currently under construction; also providing construction administration services .
- Unalaska Elementary School – Assisted with site civil design tasks.
- Sherrod Elementary School, Palmer – Involved with site design of this school.
- Good Shepherd Lutheran Church, Wasilla – Served as project manager for this project, which included site renovations and improvements.
- Kasitsna Bay Research Facility, near Seldovia – Involved with site design for this new facility. The project included the design of a short entrance road and staging area.
- Boy Scouts of America Camps Master Plan, Mirror Lake – Served as project manager for BSA in the preparation of a master plan for 40+ acres of Boy Scout camps. The master plan included the conceptual layout and design of access road and trails throughout the camps.

References: Larry Peek, Architect, Lawrence H. Peek Architects, Anchorage, (907) 562-6001; Blase Burkhart, Architect, Kumin Associates, Anchorage, (907) 272-8833; Floyd Sheesley, City Engineer, City of Valdez, (907) 835-4313

JENNIFER WILSON
Senior Environmental Scientist
Peratrovich, Nottingham & Drage, Inc.

Certificates, 40 Hour HAZWOPER and 80 Hour Hazardous Worker Training
Confined Space & HAZCOM Certificates
Registered Washington State Site Assessor

MES, Environmental Studies, 2000, The Evergreen State College, Olympia, Washington
BS, Environmental Science, Western Washington University, 1995, Bellingham, Washington
AAS, Science, 1993, Tacoma Community College, Tacoma, Washington

Ms. Wilson is an environmental scientist with seven years of professional experience specializing in transportation issues. She has a variety of experience including permitting in Washington, Oregon, and Alaska; project management; and hazardous material investigations and cleanups. Her permitting experience includes Oregon's Joint Permit, US Army Corps of Engineer permits, Coastal Zone Consistency in Oregon and Alaska, and easement and tideland procurement from several states. Ms. Wilson works with many different clients including municipalities, cities, villages, state and federal agencies, and private sector clients. She also supports other environmental projects including environmental documentation for hazardous materials sites, spill prevention programs, Environmental Assessments, and Environmental Impact Statements. Ms. Wilson was previously with the Washington State Department of Transportation Hazardous Materials Program, where she received training and exp e in working with hazardous materials both in the design and cleanup phases. Her experience includes work g on projects where RCRA, CERCLA, and related state regulations apply.

Ms. Wilson's relevant project experience includes the following:

- Hazardous Materials Specialist, various projects. Ms. Wilson's experience with the WSDOT Hazardous Materials Program included conducting site investigations and documenting results. The documentation and recommendations were integrated into design to minimize risk to the department while maximizing the design and available funds. Ms. Wilson was also the lead developer and trainer for the department's Spill Prevention Program. This was a ground breaking program designed to reduce and eliminate unnecessary and preventable spills and violations of permits during construction. The program included training for contractors in writing and implementing the plan and training for engineers in reviewing and enforcing plan components. The key factor in this program is to identify potential waste and spill sources and to implement operating procedures, including having the necessary equipment on hand, to prevent, contain, and cleanup spills.
- Project Lead and Lead Writer, Glacier Bay National Park and Preserve Environmental Impact Statement on Vessel Quotas and Operating Requirements for Ecology & Environment, Inc. Coordinated writing of three subjects in this EIS for the National Parks Service, including Coastal Geomorphology, Oceanography, and Fjord Dynamics. The project included a Technical Memorandum on Vessel Wakes, which required the development of a model to determine the effects of vessel generated wakes on a large coastline. Ms. Wilson wrote and/or edited all sections of the Technical Memorandum and the EIS for publication. She worked with other PND Engineers and sub-consultants to complete the content of the Technical Memorandum.
- Project Lead, AUFS-W Fiber Optic Telecommunications project, Oregon and Alaska. PND Engineers is responsible for obtaining all required permits to land fiber optic telecommunication cables in Oregon and Alaska. Ms. Wilson is responsible for obtaining all permits and coordinating the survey activities in Oregon and Alaska. The survey includes working with our in-house survey crew for the upland survey and coordinating with the deep marine survey firm. The surveys conducted by both firms were combined into a single map and report.
- Project Lead, various Gunderboom, Inc. projects. Coordinate PND Engineers staff with Gunderboom staff for project development, design, and implementation. Projects are in many states (New York,

California, Washington) and involve many different staff members. Each project is unique and with different needs and requirements. The Gunderboom system is designed and engineered for each site. Projects include a noise attenuation report for the CalTrans East Span Oakland Bay Bridge, Marine Life Exclusion System™ projects in California and New York, and Contaminant Exclusion system in Washington.

Permitting Specialist, various projects. Ms. Wilson was responsible for obtaining all permits for the following projects:

- Kasitsna Bay NOAA Laboratory Redevelopment, Alaska. Coastal Consistency Determination, USACE Section 404 permit, Tidelands Easement, Critical Habitat Area Permit, and Wastewater & Water System upgrade approval.
- Skagway Railroad Dock Extension, Alaska. Coastal Consistency Determination, USACE Section 404 permit, and Tidelands Easement.
- Coffman Cove Road, US Forest Service, Alaska. Coastal Consistency Determination and USACE Section 404 permit.

References: Hal Dryer, Gunderboom, Inc., (907) 349-7008; Terry M. Stephens, Washington Department of Transportation (360) 570-6656; Bruce Rein, GCI Communication, Inc. (907) 868-5633.

VALDEZ PETROCHEMICAL FACILITY FEASIBILITY STUDY
PND RELEVANT PROJECTS

PND is familiar with all aspects of marine feasibility and site-civil studies relative to potential development of a petrochemical complex in Valdez. The following projects exemplify PND's experience relevant to the proposed study and the Valdez area.

ANDERSON BAY LNG PORT, Valdez, AK

PND provided Yukon Pacific Corp. in 1986 with refined conceptual layouts for a proposed deep-water liquid natural gas port facility at Anderson Bay, located along the south shore of Valdez Arm, immediately west of the Alyeska Pipeline Service Company Terminal. Work included development of conceptual plans for a main berthing facility to accommodate 1,000-foot-long, 125,000-cubic-meter vessels; a combination cargo and fuel dock; a ferry loading facility; and a barge landing facility. Conceptual site grading plans, including dock layouts, staging areas and roadway positioning, were provided for the 200-acre site, as were preliminary spoils disposal plans to accommodate over 7 million cubic yards of fill composed of till, rock, and waste material. Seven locations, each within 1-1/2 miles of the facility, were identified by the client as potential disposal sites, and three alternate disposal plans were furnished. Total estimated construction costs for the terminal were approximately $900+ million.

TRANS-ALASKA GAS SYSTEM RIVER ENGINEERING, Alaska statewide

A proposed Trans-Alaska Gas System (TAGS) Pipeline would cross a variety of river and stream types from Prudhoe Bay to Valdez. River engineering considerations for buried pipeline crossings were just one aspect of a design study completed by PND for Yukon Construction Company in 1986. The information provided through this study was used during the pipeline route selection process, and subsequently in preparation of the Environmental Impact Statement. General criteria for design and construction of buried crossings on rivers and streams were identified with the benefit of PND's extensive experience in a wide range of settings - from small, deeply-incised streams, to wide, braided rivers. A classification system was developed based primarily on morphology and flow potential characteristics, since design criteria are strongly affected by these basic variables. River processes were outlined, with specific reference made to the effects and potential hazards of these processes on a buried pipeline crossing. The primary river processes included in the study area were river bed degradation, local scour, lateral channel migration, floodplain scour, river ice and aufeis effects, channelization of flow, sedimentation, and effects of nearby man-made structures. PND presented general criteria for design of river and stream crossings, including crossing location, alignment, burial elevation, determination of degradation and local scour, determination of the active floodplain, design flow considerations, and erosion control. Finally, recommendations for construction criteria were presented with special emphasis on techniques and procedures to minimize the short-term and long-term impact of construction on the existing natural river regime.

CHIGNIK DOCK PROJECT, Chignik, AK

The ongoing Chignik Dock Project is a 7.4-acre open cell sheet pile fill dock being developed for the City of Chignik. The use of inexpensive spoils from dredging of the Chignik small boat harbor will provide for a very inexpensive and functional facility. The eventual $8.5 million dock will comprise a ferry dock, a ship lift capable of lifting 100-ton boats, and substantial uplands that will include ferry staging, transient container storage and maintenance areas. This project is significant because the City of Chignik is planning to tie together three local villages - Chignik Lakes, the City of Chignik and Chignik Lagoon - by road within the next few years, and Chignik will serve as the regional port for the area.

WILLIAMS ANCHORAGE PORT DEVELOPMENT, Anchorage, AK

This project involved expansion of an existing waterfront at the Port of Anchorage. The 1,100-foot retaining surface had to be capable of resisting extreme ice, waves and erosion. The expansion was necessary to provide room for a railroad track loop suitable for turning and staging an entire fuel car train. Fuel delivered by train to the Port of Anchorage is stored and dispensed through marine, pipeline and land links. Alternative

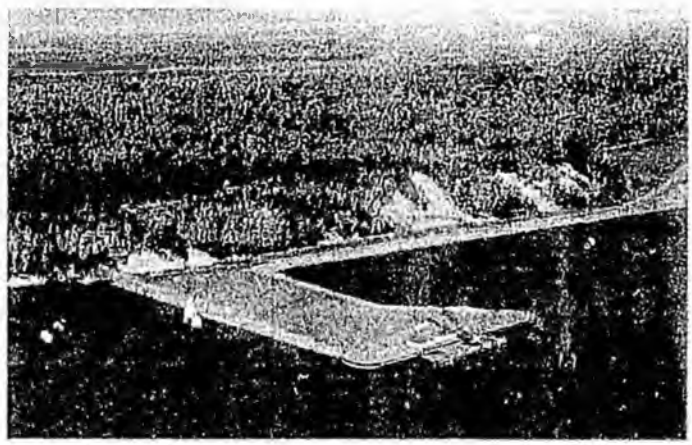
designs initially included a rock-armored buttress and an anchored 'Z' pile bulkhead. However, the open cell bulkhead solution offered an approximate 25% savings ($1 million). About 1,200 tons of flat sheet pile was used in the project. Other open cell structures built over the past 20 years have collectively endured more than 3,500 earthquakes and weathered extreme environments of moving ice masses 6 feet thick and the cyclical loading of waves 14 feet in height. PND provided design and contract documents, including plans and specifications, suitable for contractor bidding or negotiation. Assistance in materials procurement and contractor selection was also provided. This project was completed in 2001 for $3 million.

DOCK UPGRADE STUDY, Kenai, AK

PND performed a study to upgrade Kenai Pipeline (KPL) Dock to allow berthing of 125,000 dwt vessels. This project included completing a structural analysis and preparing a report on the platform, supporting piles, pile-soil interface, outer and intermediate finder assemblies and mooring dolphins regarding their ability to withstand the controlling loads imposed by berthing a 125,000 dwt, 150-foot-wide vessel and a 70,000 dwt, 140-foot-wide vessel, with a maximum berthing velocity of 0.15 m/sec.

PORT MACKENZIE DEVELOPMENT, Southcentral Alaska

Development of Port MacKenzie, in the Matanuska-Susitna Borough in Southcentral Alaska, included design by PND and construction of a cost-effective gravel and sheet pile bulkhead dock, to –20 feet MLLW. The $8.25 million development project, with $6.75 million appropriated by the Alaska Congressional Delegation, plus 20% matching funds from the State of Alaska and the Matanuska-Susitna Borough, was a Federal Highway Administration high priority project. An additional federal appropriation of $4.5 million would enable making ferry service between Anchorage and the new port a reality. Port MacKenzie offers 1800 acres of industrial and commercial development opportunity. Adjacent lands offer more than 7,000-acres for residential and commercial development. Potentially, Port MacKenzie could become an international port and industrial site with the following features:



- Access to the Pacific Rim transportation routes
- Natural Resources such as gas, oil, minerals, gravel, timber, and agriculture
- Infrastructure such as ferry service, road access, low cost electricity, natural gas, telecommunications, and water.
- The site is currently under consideration to support module fabrication and loading operations for oilfield development.

The port facility was dedicated in December 1999. Final cost was $7.1 million, which is more than 10% below the Engineer's Estimate.

NIKISKI DOCK FEASIBILITY STUDY, Nikiski, AK

In early 1990, PND performed a feasibility study and furnished preliminary designs for a major multiple-use refinery dock to be located near an existing dock in Nikiski, near Kenai, Alaska. In order to achieve the 50-foot water depth at pierhead line, necessary to accommodate 140,000-ton 900-foot-long tankers, as well as barges and smaller vessels, the solution required nearly 1/2-mile of trestle approach dock. Two alternatives were presented. The first was a light-capacity dock, designed to accommodate HS20 trucks and normal highway loads, and the second was a heavy-duty dock able to sustain normal vehicular loads, 988 front-end loaders, and a 150-ton mobile crane. The light dock featured a 16-foot-wide approach, and a 200-foot-long by 60-foot-wide dock head with heavy fender systems, two breasting and four mooring dolphins, power capstans

and quick-release hooks, catwalks, fuel lines, and associated utilities such as lighting. The heavy dock was of similar design, however, the dock approach was 30 feet wide and the dock head measured 90 feet wide by 300 feet long. Both docks were designed to withstand strong currents, high winds, and floating ice forces, which are expected to exceed 200 tons per pile. Estimated construction cost was $26 million for the light dock, and $29 million for the heavy dock.

SEWARD COAL PORT DESIGN, Seward, AK –This project (right) was necessary to support an 80,000-ton-per-year coal export operation, and PND's participation was distinguished by receipt of a national award from the James F. Lincoln Arc Welding Foundation. PND engineered the ship basin and marine facilities, in addition to foundations for upland coal-handling facilities. The port incorporated five breasting dolphins, one of which was located in excess of 100 feet of water, and a slip-over fender system, which rests on the dolphins, and which safely moors the 130,000 DWT bulk cargo carriers that transport Alaska coal to Korea. Illumination, and electrical and water systems were also devised, as were modifications to the ship loader and trestle. Fast-track design enabled the $20 million development, Alaska's first joint venture with a Pacific Rim neighbor, to be constructed and operational within a year.

ALASKA GAS LINE HYDROLOGY STUDY, Alaska to Alberta, Canada

In anticipation of construction of the North American Natural Gas Pipeline Project (Alaska to Alberta), PND identified data gaps in existing data sources, conduct winter and summer fieldwork to fill the gaps that are identified, and produce an early assessment of stream crossings along the proposed pipeline routes appropriate to supporting application requirements. The work will consist of tabulating and categorizing stream crossings, noting major or problematic streams, and collecting field observations of winter conditions at selected streams.

ALASKA PIPELINE CO. PIPE REBURIAL NEAR BURNT ISLAND, Burnt Island, AK

During a routine pipeline inspection, representatives of the Alaska Pipeline Company, a subsidiary of Enstar Alaska, Inc., observed exposure of approximately 300 feet of their dual 12-inch-diameter concrete-coated gas pipelines. The pipelines were installed in 1960 in an active Cook Inlet channel near Burnt Island and provide transmission of the primary natural gas supply from the lower Cook Inlet offshore gas field to Southcentral Alaska, mainly Anchorage. Scour appears to have occurred in this area in the past, but has never before caused exposure of the pipelines, although the area settled an estimated five feet during the 1964 earthquake. The pipelines are buried in unusually fine-grained soil comprised of glacial sediments and are subject to a unique flow phenomenon resulting from Cook Inlet tides. Specifically, when the tide drops below -4 feet MLLW (approximately 25 times or 6 hours annually), the incoming tide is delayed from entering this side channel. When the water begins flowing into the channel, it travels at velocities ranging from 12-16 fps. The force of the incoming rush of water results in extreme vibration of the unsupported pipelines, subjecting the exposed pipelines to large amplitudes ranging from several inches to approximately one foot, and frequencies of 40-50 cycles per minute. Each event usually lasts for less than 15 minutes but subjects the unsupported pipelines to large stresses. The combined team of civil contractor Conam, marine contractor American Marine and PND presented a work plan and target budget that was accepted by the owner. The plan, as implemented by the team with the full support of the owner, is presented in this paper. The results of the repair included both onshore excavation of silts and sand by conventional methods and offshore dredging

using a jet sled towed from an anchored barge. The pipelines were partially reburied and further protected by 2-cubic-yard fabric bags filled with native soil, which were installed over the pipelines by helicopter. The results of the repair appear satisfactory, and Enstar will continue to monitor the site.

FUEL-LOADING FACILITY REJUVENATION, Anchorage, AK

Tesoro retained PND to design and administrate repairs to their bulk loading facility at the Port of Anchorage. This one-acre paved area straddles the old meander line of Cook Inlet, and the soils are a combination of imported sand and gravel along with the original clay, silt and organics. PND's design, which is presently nearing completion, provides for improved drainage and better soils; utilization of geotextiles to support durable long-lasting pavement; and an oil spill containment area consisting of a heavily-reinforced concrete slab (to support tanker truck traffic), and a concrete and asphalt berm. Work has included topographic surveys and soils exploration services. Total estimated construction cost in 1990 is under $300,000.

MAPCO PIPELINE PROJECT, Fairbanks, AK

PND worked with Associated Pipeline Contractors, Inc. in support of MAPCO Pipeline Company's investigation of a new 390-mile, 16-inch-diameter products pipeline from the MAPCO Refinery at North Pole, Alaska to MAPCO's tank farm at Anchorage, Alaska. The proposed route follows the Alaska Railroad alignment. The project included the following tasks:

- Preliminary route reconnaissance.
- Conceptual designs for pipe burial in permafrost, discontinuous permafrost, silts, clays, glacial outwash, peat, and sands.
- Investigation of subsea pipe burial for the Cook Inlet route portion.
- Base maps for environmental assessment of the route.
- Conceptual design for typical pipe burial, crossing of existing DOT&PF bridges, new crossings and Cook Inlet subsea pipeline.
- Right-of-way verification and lease hold maps.
- Ownership research base maps for utilization by title search.
- Survey ground truthing at crossings, bathymetry for rivers, topography for valleys.
- Data research for corridor, met with landholders, and collected data base.
- Rough-order-of-magnitude cost estimates for the project.
- A similar route was previously investigated for a different client.

WEST NORTHERN LIGHTS PIPELINE REROUTE, Anchorage, AK

When the Municipality of Anchorage rerouted West Northern Lights Boulevard to pass under the Alaska Railroad, Tesoro was required to relocate approximately 1,000 linear feet of 8-inch-diameter pipeline. PND prepared plans and specifications for repositioning the petroleum products pipeline; assisted in bid evaluation; provided inspection services; and supported Tesoro by coordinating with the City, various contractors, and utility companies. This fast-track project was constructed in less than one month in 1986, for a construction cost of $150,000.

TESORO PIPELINE PROJECT, Fairbanks to Kenai, AK

An engineering study was performed to build a pipeline to carry fuel from Fairbanks to Kenai. As part of the preliminary design engineers required river crossing information for all streams that would be crossed by the proposed pipeline. Smaller streams were measured, profiled and cross sectioned using a tag line, waping rod and level to obtain information. Intermediate streams were cross-sectioned using an inflatable rubber raft with a 25' fiberglass rod for depth and position.The larger rivers such as the Susitna River were cross sectioned using a jet boat equipped with a Raytheon survey fathometer to determine river depth. The boats position as it ran from bank to bank; was obtained with a shore based total station shooting constant angles and distances to prisms mounted on the transducer.

TRANS-ALASKA GAS SYSTEM RIVER ENGINEERING, Statewide

The Trans-Alaska Gas System (TAGS) Pipeline crosses a variety of river and stream types from Prudhoe Bay to Valdez. River engineering considerations for buried pipeline crossings were just one aspect of a design study completed by PND. The information provided through this study was used during the pipeline route selection process, and subsequently in preparation of the Environmental Impact Statement. General criteria for design and construction of buried crossings on rivers and streams were identified with the benefit of PND's extensive experience in a wide range of settings--from small, deeply-incised streams, to wide, braided rivers. A classification system was developed based primarily on morphology and flow potential characteristics, since design criteria are strongly affected by these basic variables. River processes were outlined, with specific reference made to the effects and potential hazards of these processes on a buried pipeline crossing. The primary river processes included in the study area were river bed degradation, local scour, lateral channel migration, floodplain scour, river ice and aufeis effects, channelization of flow, sedimentation, and effects of nearby man-made structures. PND presented general criteria for design of river and stream crossings, including crossing location, alignment, burial elevation, determination of degradation and local scour, determination of the active floodplain, design flow considerations, and erosion control. Finally, recommendations for construction criteria were presented with special emphasis on techniques and procedures to minimize the short-term and long-term impact of construction on the existing natural river regime.

TERMINAL OIL SPILL RESPONSE FACILITIES PRELIMINARY MASTER PLAN, Valdez, AK

In June 1989, PND and its subconsultant, Kumin Associates, were retained to formulate a preliminary master plan for proposed oil spill response facilities at the Valdez Terminal. The purpose of this effort was to clarify issues and delineate critical decisions that must be made prior to starting more detailed planning, or preliminary design. The ensuing product would consist of conceptual building and harbor layouts, with order of magnitude cost estimates and appropriate narrative descriptions of planned facilities included as well. A series of interviews and meetings was held in Anchorage and Valdez in order to ascertain the needs of both management and operations personnel. During the course of these meetings, it was decided that separate facilities were needed for terminal-area spills and offshore spills. Following these initial discussions, a "Space Requirements Program" was developed to identify marine and building component spaces, and their individual needs, sizes and concerns. Concept designs for the support buildings were derived from this program. It was determined that the terminal response area would require upgrades to the existing small craft harbor; utilities extended to dock-side vessels; and a 26,418-square-foot response building which would accommodate warehouse, boat repair and clean-up facilities on the lower level, and communications/dispatch and administrative support on the upper level. The offshore response base would consist of a sheltered location for mooring barges and SERVS (Ship Escort Response Vessel System) craft; utilities extended to dock-side vessels; new uplands near Saw Island; a proposed Tug Operations Building; and a 36,682-square-foot response building with warehouse, equipment repair and clean-up facilities on the lower level, and communications/dispatch and administrative support on the upper level. The response buildings were proposed as steel-framed structures, with metal wall and roof panels. Existing utilities will be extended to the new buildings wherever possible. It was anticipated that the cost of the facilities would be in the $100 million range.

PRELIMINARY TANK FARM LAYOUT, Unalaska, AK

In 1986, PND conducted a study and prepared plans for development of an 800,000-gallon bulk fuel storage facility to be located behind the city dock in Dutch Harbor. The design involved positioning two 400,000-gallon tanks in a limited space between the dock and a steep mountainside. PND's solution minimized the need for rock excavation and incorporated vertical reinforced concrete containment dikes to minimize space requirements.

SERVS/VEOC CENTER, Valdez, AK

Subsequently, PND was design team leader for Alyeska's Ship Escort Response Vessel System/Valdez Emergency Operations Center (SERVS/VEOC) design/build project. The PND team consisted of civil,

structural, marine, architectural, mechanical, electrical and corrosion expertise. SERVS/VEOC is a 25,000-sq-ft facility on the Valdez waterfront, the first permanent home for SERVS since it began operation in 1989 following the Exxon Valdez oil spill. The project included offices, shop facilities, a training center, state-of-the-art communications, and agency offices for the Coast Guard and Alaska Department of Environmental Conservation. The marine component comprises a 200 ft-by-60 ft post-tensioned concrete floating dock, secured by 200-ft-long mooring dolphin systems constructed with 48" diameter piles and struts. The docking face is approximately 600 ft. The 4,000-ton dock, built in Washington, was towed by tug to Valdez. East mooring dolphin piles are anchored to shallow bedrock with 2 1/2-in-diameter threaded rod. West-side dolphins are conventional design spin-fin piles in alluvium soils. The dock and dolphins can easily handle two 400 ft-by-100 ft barges of equipment moored end-to-end along with other SERVS response craft. At each shoreside corner of the dock, steel and timber wave barriers were installed toward the beach to reduce wave action behind the dock. A concrete float system provides moorage for small craft. The dock face and mooring dolphins are fendered with high-energy rubber bumper systems. The dock itself is secured with fender units to allow soft breasting in all directions. The dock is equipped with electrical and water utilities along with two cranes. It is accessed by a 120-ft transfer bridge constructed of six girders and prestressed concrete panels. Both ends of the bridge float on slide bearings. The transfer bridge is connected to a 450-ft fixed platform trestle, supported at each bent by two 48" diameter piles. The prestressed concrete deck is supported and grouted to twin heavy steel girders between pile bents. Bent spacing is approximately 45 ft. The upland site is approximately 5 acres. Improvements included pavement, storm drainage, heliport, guard shacks, lighting, security fencing, a 100-ft communications tower, and emergency power generation. Ancillary work included a high capacity offshore mooring buoy and an oil boom protection system surrounding the local salmon hatchery. The project cost was estimated at $14 million in 1994. Site work included drainage design, paving, fencing, guard control buildings, utility connects to the City of Valdez, and a helipad.

MODULAR PROCESS BUILDINGS, Beluga, AK

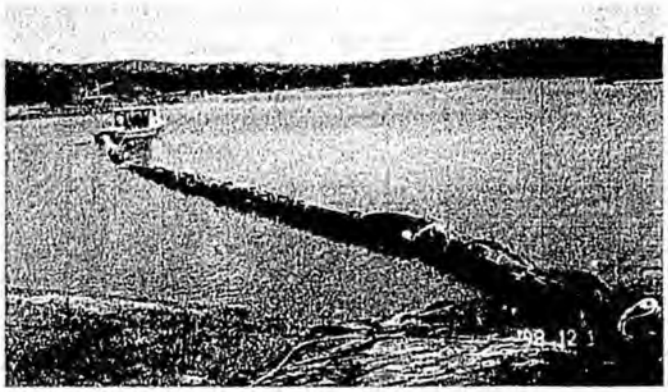
PND provided 1989 structural design services and construction administration for three modular process buildings located in the Beluga-area oil and gas fields. This vicinity is coastal, and is therefore subject to high winds, heavy snow loads, and a harsh marine environment. The modules, the largest of which was 70 tons, were shop-constructed, with all mechanical and electrical equipment-in-place. Due to this, they could be barged to the project site and connected with a minimum of field labor. All modules were permanently mounted on steel skids, and were designed to be either dragged from the barge landing, or picked by a crane and placed on flatbed truck for transport. The completed structures were pile-supported, allowing for erection over marginal subsurface soils and for easy reuse of the buildings at other locations. Design was completed in less than four weeks from receipt of the client's Notice to Proceed.

VALDEZ MARINE TERMINAL FIELD SUPPORT, Valdez, AK

PND provided civil/structural field engineering services during construction of approximately $40 million worth of capital and expenses projects at the Valdez Marine Terminal. These projects included construction, renovation, and inspection of crude oil, ballast water, fire water, and waste piping systems; structural modifications and additions to four marine tanker berths; installation of offshore remote mooring facilities for oil spill response vessels; construction of an onshore oil spill response base by constructing new office facilities, and modification and renovation of an existing dock and warehouse.

GUNDERBOOM AND SANSORB INVENTION AND USES

Over the years, PND has provided environmental engineering services to a variety of clients. Our extensive, hands-on field experience has been critical to the success of numerous projects, and has allowed us to develop systems that are carefully engineered to satisfy site-specific requirements. One such system, the "Gunderboom," is a waterborne pollutant and debris barrier system. Many shoreline construction projects involving fill, dredging, and underwater blasting have been granted permits because of the reliability of the "Gunderboom" at halting the spread of materials produced by these operations. The "Gunderboom" has also proven highly efficient at containment of petroleum spills, and as such was used extensively in the aftermath of 1989's Exxon "Valdez" catastrophe. Permanent booms are now in-place to protect environmentally



sensitive areas from all kinds of pollutants, ranging from medical waste to fecal bacteria, and additional applications for the boom are continually being explored. PND provided environmental engineering services and applied research to a unique petroleum-based absorbent material used for removing spilled oil, grease, and chemicals. The non-toxic, non-hazardous, and biodegradable plastic material was invented in Finland in the 1980's; however, with our applied engineering research many practical applications of the material were developed. "Sansorb" rapidly absorbs liquids lighter than water by capillary action, depending on minute pressure differences at either end of micron-sized tubes, and the phenomena of surface tension. Sansorb also floats indefinitely. "Xemsorb," also utilizing capillary action, absorbs most liquids, including water and heavier liquids. Once absorbed, the liquid, and even some of the associated gasses, are neutralized, because they are in effect "locked" into the plastic granulates. The two products create an opportunity to pick up nearly all liquids, with the exception of strong organic acids that deteriorate the physical structure of the absorbents. It is not harmful to most natural environments.

VALDEZ OIL CONTAINMENT CLEANUP, Valdez, AK

For a 10-week period during 1989, PND served as engineering manager to Veco, Inc., the prime contractor overseeing clean-up operations associated with the Exxon "Valdez" spill. PND provided 15,000 linear feet of Gunderboom, and staff support also included supervising boom deployment operations; participating in assessment of beach conditions; and assisting in coordination of contingency equipment mobilization.

VALDEZ BOAT LAUNCH & RAMP

The City of Valdez contracted PND in 1996 to provide design and construction management services for the replacement of the existing boat launch ramp floats and related improvements at the City's small boat harbor. The project consisted of replacing the dilapidated precast concrete floats with modern timber floats, installing cast-in-place underwater concrete, earthwork and rip rap slope protection. The timber floats were unique in that they were required to fit around existing driven piles. A high strength hinged gate was designed to allow the floats to be easily installed and removed at a later date if required. The floats utilized timber glu-lam beams with sawn cross-members and timber decking. All structural hinges and connecting members were galvanized steel. Foam billets with a long lasting polyurethane coating provided floatation. UHMW PE rub strips were used to protect the dock and boats from damage. Cast-in-place concrete was installed on the ramp underneath the float to provide impact resistance and prevent erosion. Much of the concrete placement was successfully installed underwater using a modified mix design. This project was a great success and has proven to be a good investment for the busy Valdez small boat harbor.

VALDEZ COMMERCIAL BOAT HARBOR EXPANSION

Accomplished in four phases, modifications to the Valdez Harbor consisted of renovation and expansion efforts which focused on increasing berthing capacity, storage space, and waterfront acreage. PND first conducted a feasibility study and needs assessment to determine the expansion requirements of the harbor over the next ten years, as well as an approach for implementing these goals. The study identified user groups, the type of facilities which would best serve future requirements, and the physical requirements of the present harbor which would require modification in order to meet projections. Work also included assistance in permitting, soils investigation, and topographic and bathymetric surveys. A five-year capital improvement plan was developed and prioritized for projects based on overall cost and importance to the harbor expansion project.

During Phase I, the existing basin was enlarged and the dredge spoil placed within a riprapped containment dike. By recycling the fill in this manner, approximately 15 acres of new staging area was created to accommodate projected industrial growth and storage of commercial fishing gear. Shoals and other navigational hazards were removed, and the entrance channel was widened and protected from erosion with rock revetment, as part of Phase II. Also as part of this phase, the southern slopes of the inner harbor were protected with a layer of shot rock riprap. In Phase III, a concrete float moorage system was installed in the basin excavated within Phase I. Phase IV work encompassed removing an existing boat-launch ramp, courtesy float, floating fuel dock, and timber float system. These items were replaced with a new 500-linear-foot open-cell sheet pile bulkhead and a new boat-launch ramp, a modern 12- x 75-foot floating fuel dock, and a high-capacity concrete float system capable of mooring 110-foot tour ships. Also included in this phase were design of a new fuel system, a high-mast lighting system, potable water and fire-protection systems, dock-side electrical service, and shore-side landscaping.
Total construction costs were approximately $12 million, and the project was completed in 1987.

VALDEZ MARINE TERMINAL PROJECTS

PND furnished a field engineering supervisor to Alyeska to oversee an on-site staff of discipline field engineers during construction of over $30 million worth of capital and expense projects. These various projects are being constructed on the Valdez Marine Terminal at the south end of the Trans-Alaska Pipeline. Projects include recoating of tanker loading berths; upgrading terminal-wide cathodic protection systems; inspection, renovation, and repair of ballast water piping from the berths; relocation and functional check-out of hydraulic gangway systems; renovation and repair of berth fendering and catwalk systems; inspection and repair of terminal fire water piping systems; renovations of existing oily-water sewer manholes and sumps; repair and replacement of crude oil tank farm dike liners; construction of new underground concrete vaults for piping access; and construction of new piping systems for inhibitor injection and tank deluge operations.

VALDEZ HARBOR PEDESTRIAN PLAZA, MARINA AND ACCESS

The City of Valdez retained PND to create an uplands pedestrian plaza and vehicular parking area and marina floats with gangway access. An open cell sheet pile bulkhead filled with harbor dredge spoils was constructed that expanded the uplands area adjacent to the harbor. A concrete plaza was constructed with a timber boardwalk along the perimeter of the bulkhead. The boardwalk has been described as a scenic attraction for the harbor, and has resulted in increased foot traffic in the area. Concrete floats and an aluminum truss gangway all combine with the plaza for integral pedestrian amenities.

PIPELINE BRIDGE INSPECTION / INVENTORY

PND was chosen by Alyeska Pipeline Service Company (APSC) to provide engineering services for bridge and marine work in an alliance of specialty companies for service of the Trans-Alaska Pipeline (TAPS). In 1994, the Alliance asked PND for assistance in evaluating 46 of its access road and workpad bridges. Many of the bridges were built as temporary bridges during TAPS construction in the 1970s for access to the pipeline from the main haul road. Many of the bridges were aging and APSC needed to assess some of the bridges for providing continued access. PND initially prepared a report (Phase I) based upon a search of existing structural, hydraulic and hydrologic information to determine what information was available and what additional information was needed to properly evaluate the bridges. PND then prepared a second report (Phase II) that provided assessment of the structural, hydraulic, and hydrologic conditions. This information was intended to assist APSC in determining priority of maintenance, repair, replacement, or removal. PND provided estimated wheel, axle and gross vehicle capacities for superstructures based on the information available. Qualitative assessment of the substructures were made as information on substructures was typically scant. Types of bridges included: Acrow (19), Bailey (1), timber (5), GLB (6), and steel stringer (15). Seven bridges were multi-span bridges. All of the bridges were analyzed according AASHTO prescribed loads and materials. The multi-span bridges were analyzed for seismic loads using both pseudo-static and 3-d dynamic Finite Element Analysis. Ice loads were investigated on piers subjected to ice loads using TAPS and AASHTO criteria. The steel bridges were also investigated for Fracture Critical Members utilizing AASHTO

and FHWA recommendations. PND made additional recommendations and observation for: upgrading, improved operation and maintenance, weak-link elements that could easily be repaired or replaced, etc. PND also performed hydrologic analyses on a number of bridges where existing information was inadequate or contradictory. Hydraulic analyses were performed to determine the 50-year flood water surface elevation for a number of bridges. Additional recommendations where made regarding scour and erosion protection.

COMMERCIAL FISHERMEN'S DOCK

Valdez Fishermen's Dock was designed as a multipurpose commercial dock with fixed cranes and a boat grid. Constructed using open cells for fill containment of both the boat grid and dock portion, this project was both economical and has functioned without significant maintenance.

SPILL CLEAN-UP CAMP MOBILIZATION

In the early stages of 1989's Exxon "Valdez" clean-up campaign, PND personnel provided site reconnaissance and civil engineering services to locate and plan for field housing facilities, including coordinating the logistics associated with transshipping self-contained mobile housing units. Due to the urgency associated with this effort, we were granted 24-hour access to helicopter support and were therefore able to rapidly complete necessary field work.

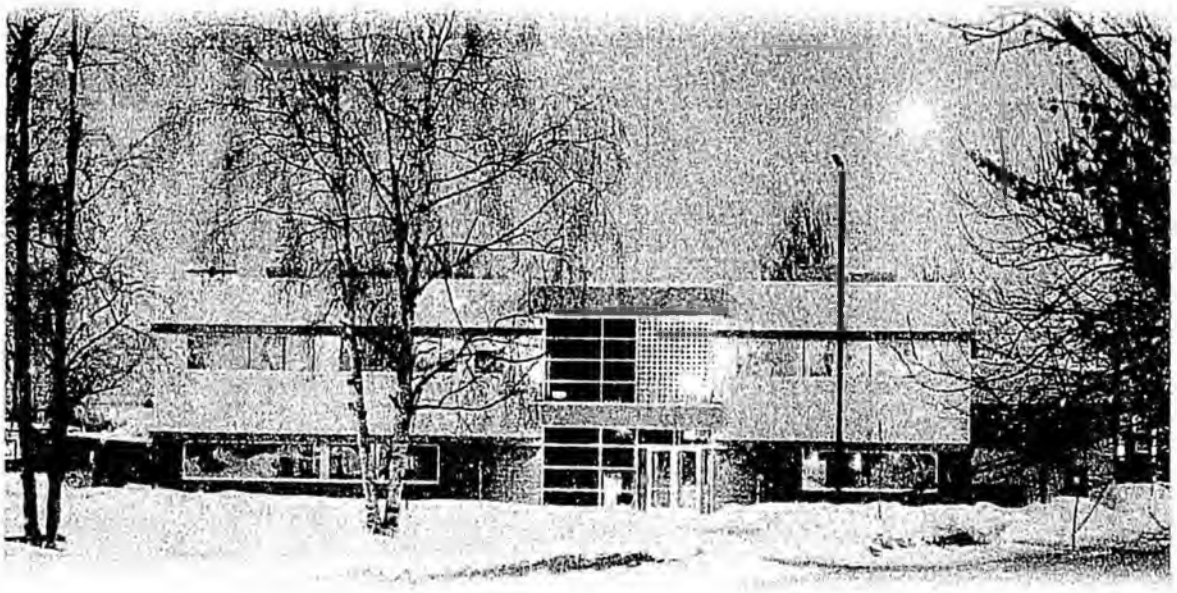
VALDEZ HARBOR IMPROVEMENTS

Upon completing a Master Plan for the Valdez Harbor in 2000, PND was contracted by the City of Valdez to provide survey, geotechnical, environmental, design, and construction administration services for an upland portion of the harbor. Improvements included 5 acres of paved parking, boat storage areas, and boat wash down and maintenance stations. The boat washdown and maintenance stations are unique in that each concrete surfaced pad has service pits, which provide the user with both water and electricity to service boats up to 60-feet in length. Due to Valdez being an environmentally sensitive locale, federal and state permitting was considered and coordinated throughout the design process. Construction for the improvements, which increased upland capacity by 130 %, was completed in 2002.

OTHER VALDEZ-AREA PROJECTS

1997 Pallet Rack Seismic Review
Allison Point Recreational Facility Improvements
Analysis of VMT Berths 4 & 5 for Maximum Tanker Load
APSC Boom Pads
APSC Small Boat Float System
APSC Vapor Recovery Slabs
As-Built Drafting
Boat Grid Repair
Container Dock Inspection
Container Dock Maintenance
Corp Permit Modification
D&E Bulkhead Alternatives
Dock Layout
Dock Point Marine Recreation Facility Development
Fill Dike
Fisherman's Dock Phase IV
Float Permit Modification
Floating Fish Rearing Pen Design
Gangway Damage Assessment
Harbor Inspection
Hartech Bathymetry
Landfill Litigation
Lowe River Bridge
Marine Slope Modification
Museum Expansion Review
Oil-Water Separator Cofferdam
Old City Dock Fender System
Old City Dock Repairs
Old City Dock Repairs Inspection
Old Town Harbor Site
Peter Pan Dock Inspection
Peter Pan Float Permit Modifications
Port Etches
Port Valdez Mooring Buoy No. 2
Port Valdez Test Holes
S/V Fender Review
Saw Island Mooring Buoy Locate Petro Star VPT Dock

SERVS (Tesoro) Dock/Valdez Insp.
SERVS Buoy Modification
SERVS Dock Electric Capston
SERVS Fender Modifications
SERVS Port Valdez Mooring
SERVS Prince William Sound Docks Old City Dock Fender System
SERVS Warehouse Inspection
Solomon Gulch & Mooring Buoy #2 As-built
Solomon Gulch Fish Hatchery Modifications
Solomon Gulch Fish Hatchery Protection
Solomon Gulch Fish Hatchery Protection
South Harbor Drive Realignment
Taylor Rigging Berth 4 & 5 Dock Analysis and Drawings
Teen Center Structural Design
Tesoro Dock Inspection
Tesoro Dock Inspection & Building
Tug / Barge / Mooring Facility
Valdez Boat Grid Alternatives
Valdez Boat Grid Study
Valdez Boat Harbor
Valdez City Dock Inspection
Valdez Community Dock
Valdez Container Terminal Annual Inspection
Valdez Crude Oil Terminal
Valdez Dock Refendering
Valdez Dock Spec Review
Valdez Dry Dock
Valdez Engineer Loan - BD
Valdez Fisheries Buoy Survey
Valdez Fisheries Warehouse
Valdez Float Inspection
Valdez Fuel Dock
Valdez Gangway and Dock Shelter
Valdez Gangway Retrofits
Valdez Glacier Creek Bypass Permits
Valdez Harbor ADA Access
Valdez Harbor Cost Review
Valdez Harbor Feasibility Study
Valdez Harbor Mobile Pumpout
Valdez Harbor Planning
Valdez Harbor Sewer Pumpout
Valdez High School Avalanche Risk Assessment
Valdez High School Pool Addition
Valdez Old City Dock Master Plan
Valdez Pipe Fish Pass
Valdez Port Expansion
Valdez Private Harbor with Launch Ramp and Float
Valdez Small Boat Harbor - Master Plan
Valdez Small Boat Harbor Study
Valdez Street Maintenance
Valdez Trail Bridge Study
VCT Inspection
VEFA Onshore Rearing Facility
VFDA Wildlife Rehabilitation Center
VFT Dock As-Builts & Bathymetry
VPT Catwalks
VPT Deck Loan Analysis
VPT Dock Repair
Waterkist Building Evaluation
Waterkist/Nautilus Foods Building Expansion Project



PND, Inc.

Engineering Consultants

Civil • Structural • Marine • Geotechnical • Environmental • Surveying

Anchorage, AK
1506 West 36th Avenue
Anchorage, Alaska 99503
Ph: 1.907.561.1011
Fax: 1.907.563.4220

Juneau, AK
3220 Hospital Dr., Suite 200
Juneau, Alaska 99801
Ph: 1.907.586.2093
Fax: 1.907.568.2099

Seattle, WA
811 First Avenue, Suite 570
Seattle, Washington 98104
Ph: 1.206.624.1387
Fax: 1.206.624.1388

Benefit Analysis for the Alaska Natural Gas Development Authority Project

A Proposal

Prepared for

Alaska Natural Gas Development Authority

September 2003

Prepared by

northerneconomics inc.

880 H STREET, SUITE 210, ANCHORAGE, ALASKA 99501
T: 907.274.5600 F: 907.274.5601
E: norecon@norecon.com • www.northerneconomics.com

PROFESSIONAL CONSULTING SERVICES IN APPLIED ECONOMIC ANALYSIS

Anchorage

880 H St., Suite 210, Anchorage, AK 99501
TEL: 907.274.5600 FAX: 907.274.5601

President & Principal Economist: Patrick Burden, M.S. **Vice President & Senior Economist:** Marcus L. Hartley, M.S. **Senior Consultant, Planning Services:** Caren Mathis, MCP, AICP **Economists:** Leah Cuyno, Ph.D., Ken Lemke, Ph.D., Jonathan King, M.S. **Policy Analyst:** Nancy Mundy, Ph.D. **Socioeconomic Analyst:** Don Schug, Ph.D. **Analysts:** Michael Fisher, MBA, Cal Kerr MBA **Office Manager:** Stephanie Cabaniss **Document Production:** Terri McCoy

Bellingham

1801 Roeder Ave., Ste. 124, Bellingham, WA 98225
TEL: 360.715.1808 FAX: 360.715.3588

Associate Economist: Hart Hodges, Ph.D.
Economist: Tamer Kirac, M.A.
Analyst: Kelly Baxter-Porteen, M.S.

northerneconomics inc.

E-mail: norecon@norecon.com **Web:** www.northerneconomics.com

Contents

1 Introduction and Background

The Alaska Natural Gas Development Authority (ANGDA) was created by a vote of the people of Alaska in the November 2002 general election. The Authority has broad powers to:

- Acquire, condition, transport, and market North Slope natural gas
- Construct, operate and maintain a natural gas pipeline
- Buy property or use eminent domain
- Issue state tax-exempt revenue bonds

The gasline route would be from Prudhoe Bay to tidewater on Prince William Sound with a spur line from Glennallen to the Southcentral gas distribution grid. The project concept includes a liquefied natural gas (LNG) plant in Prince William Sound with leased tankers transporting the LNG to U.S. West Coast markets or the Pacific Rim..

The U.S. market is particularly dynamic at this time as North American gas supply is unable to expand at a rate sufficient to meet the growing demand for natural gas. Since Alaska has an advantage over other global LNG suppliers in shipping cost to U.S. West Coast markets, this market is of particular interest to the Authority.

The LNG concept has been evaluated over a number of years and is relatively well-defined as a result of efforts by Yukon Pacific, ConocoPhillips, and others. To date, the project as defined offers marginal economics for producers and, as a result, has not advanced beyond the study phase. However, the ANGDA has the ability to issue tax-free revenue bonds, which improves the project economics and reduces the cost of service for LNG delivered to U.S. West Coast markets. At this concept level of analysis, the tax advantages of the ANGDA project make it very competitive in the marketplace, and suggest that further efforts should be undertaken to move the project forward.

In addition to the major export component of the project for LNG, natural gas liquids (NGL), and petrochemicals, ANGDA also anticipates development of other facilities to ensure maximum benefits are derived from the project. These other components include:

- CO_2 removal for enhanced oil recovery
- Discovery and development of new fields
- Development of Pt. Thompson
- Natural gas-fired electric power plants with transmission lines to interior and river communities

- Local gas distribution in Fairbanks
- Liquid propane gas (LPG) barged to river and Southeast Alaska communities, and trucked to smaller interior communities
- A smaller capacity "spur" line to the Southcentral gas distribution system, augmenting Cook Inlet gas supplies and providing gas for heating, electric power, and the petrochemical and LNG facilities at Nikiski

As part of the next steps in the evaluation process, the ANGDA will be asking the Alaska legislature to fund significant engineering and design efforts beginning in early 2004. Prior to that time, the Authority will be developing the materials necessary to support that request. Part of the development effort entails identification of the benefits of the project concept, including all of the various components. The Authority has asked Northern Economics to prepare a proposal describing the work to be done in identifying the benefits of the various components, as well as other benefits that may be created as a result of the project, and a cost for completing this work by the end of 2003.

The following sections describe the work to be done based on our current understanding of the project and a cost estimate for completing the work.

2 Approach

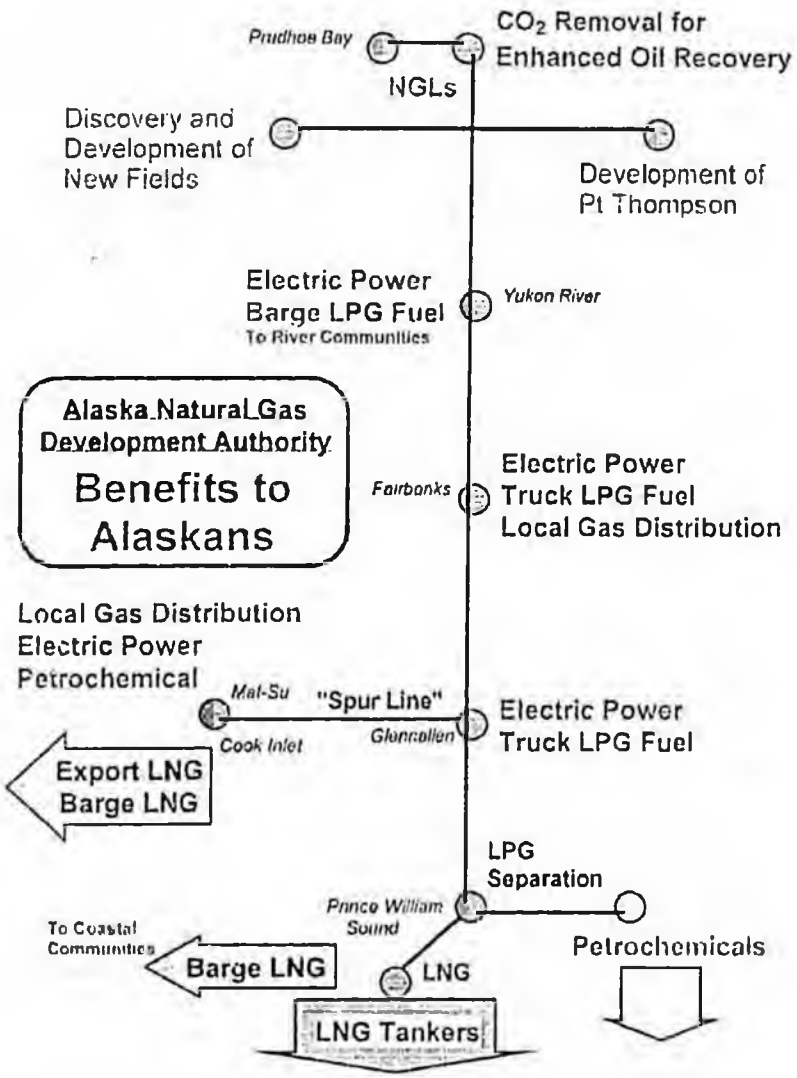
The general approach is to develop information necessary for analysis of each of the project components and then undertake the analytical steps of quantifying the economic benefits, fiscal benefits, and other benefits such as cost savings, and additional production from new fields or enhanced oil recovery. The following sections provide more detail on these tasks.

2.1 Develop Project Component Information

The first task in the approach will be to obtain and review previous studies and reports, including those prepared by Northern Economics, Inc., for each component identified in the project concept (See Figure 1). We will also identify proprietary studies that others or we have completed which may be useful for the ANGDA project, and a person the ANGDA may contact to see if the results or output of this prior work can be made available. We assume that each of the project components will be described earlier in the report as part of the project description. However, the descriptions in earlier sections of the report may not contain some of the information necessary for the benefit analyses. We will prepare a summary that provides the economic and financial information

for each component that is necessary for our analyses. Where such information is not available from previous reports we will develop assumptions based on our professional judgment and telephone conversations or interviews with members of the ANGDA project team, and industry experts. Where data need to be updated we will describe the methods or assumptions used to update the information. In addition to information for each component we will also evaluate the ability of the state labor force to provide the number of persons needed in major occupational skill categories. We will work closely with the Alaska Department of Labor and Workforce Development to incorporate their recent work on the pipeline proposal by the AGPPT.

Figure 1. ANGDA Project Concept



All of this information will be incorporated into a technical memorandum and submitted to the ANGDA for review and comment to ensure consistency between our work and those of other team members. **Our schedule for delivering this technical memorandum would be 4 weeks after receiving a notice-to-proceed.**

2.2 Analytical Approaches

The analytical approaches outlined in this section will quantify the benefits to Alaska resulting from the ANGDA project concept. The benefits to "Alaska" include those accruing to the State of Alaska, other local governments, State residents, and businesses operating in the state. These benefits will be quantified using the following categories:

- **Economic Benefits.** Construction and operation of the different components of the project concept will result in additional employment, labor income, increased economic output (sales), and increases in gross state product.
- **Fiscal Benefits.** The state and local governments will receive revenues from production of the natural gas, property taxes, and other sources related to the project development and operation. Subsequent spending of these revenues by the government sector and households will result in additional employment, labor income, increased economic output (sales), and increases in gross state product.
- **Other Project-Related Benefits.** This category involves evaluating additional benefits associated with cost savings to consumers, additional production from new fields or enhanced oil recovery, maintenance or expansion of the petrochemical and LNG facilities on the Kenai Peninsula, and similar factors. The following subsections provide further detail on each major benefit category.

2.2.1 Economic Benefits

The approach used for this subsection identifies the direct, indirect, and induced effects associated with construction and operation of the project concept. Indirect and induced effects are often called secondary or multiplier effects and the latter two terms are used interchangeably in the following discussion to reference indirect and induced effects.[1] The multiplier effects will be developed using

[1] Indirect effects are the result of additional spending by businesses associated with the ANGDA project (for example, construction companies building the natural gas pipeline), and induced effects are the result of spending by governments, and households whose members are employed as a result of the project.

input-output analysis, specifically the IMPLAN software maintained by the Minnesota IMPLAN Group. Northern Economics routinely uses this software for major project analysis, including work for the Alaska Gas Producers Pipeline Team, Foothills Pipeline Company, Anadarko Petroleum Corporation, and others.

The following matrix depicts the items that will be evaluated for construction and operation of each component of the project concept. The estimates in the shaded cell will depict the effects at the state level (e.g., 1000 direct jobs in the State of Alaska and 800 secondary jobs in the state with a total of 1800 jobs created by each project component). The sum of this information for all project components would provide the total statewide estimates for employment and the other items.

Figure 2. Effects Matrix

Effects	Employment	Labor Income	Output (Sales)	Gross Regional Product
Construction Period				
Direct	1000			
Secondary	800			
Total	1800			
Operations Period				
Direct				
Secondary				
Total				

In order to estimate these benefits with the IMPLAN model it is necessary to have information on the amount that is spent for the primary expenditure categories of each component. This would entail the percent or amount for labor, equipment, right-of-way, and similar factors. If this type of information is not available, expert opinions will be solicited and assumptions will be developed to fill the gaps.

2.2.2 Fiscal Benefits

We understand that the Alaska Department of Revenue and other state agencies will be involved in developing revenue estimates associated with the project concept. To develop the fiscal benefits we will need revenue estimates (direct effects) accruing to the State of Alaska (including distribution among the Permanent Fund, the state general fund, education and other programs), and property taxes and other revenues accruing to each local government where project facilities would be located. The local governments would include the North Slope Borough, the Fairbanks North Star Borough, the City of Valdez, and other communities with taxing authority.

Based on this information, we will use the IMPLAN input-output model to estimate the secondary effects at the state level, including the subsequent spending by government entities, and spending of Permanent Fund Dividend checks. The output of this model will be a data set comparable to that shown in the previous matrix for the State government, and each taxing authority.

2.2.3 Other Project-Related Benefits

The availability of a natural gas pipeline project to transport North Slope natural gas to market will result in a number of other benefits that are not captured in the previous two benefit categories. These benefits cover a wide range of activities including:

- The joint production of oil and gas from existing fields which reduces the costs that must be covered by oil production, resulting in additional oil production from these fields
- Improving the viability of yet-to-be-discovered fields that would be uneconomic if joint production were not possible
- The use of CO_2 removed from the natural gas for enhanced oil recovery in existing and yet-to-be discovered fields
- The development of the Pt. Thompson field that is currently struggling to achieve viability because of the high cost required to reinject the produced gas into the reservoir at very high pressures; a natural gas pipeline would reduce the need to reinject this gas production into the reservoir
- Cost savings to residents and business in communities where the availability of North Slope natural gas-fired electric power plants could result in lower electricity prices;[2] concomitantly, a reduction in power cost equalization payments by the State for subsidizing electric power rates in rural communities
- The cost savings to Southcentral Alaska consumers when the cost of service for delivered gas through the ANGDA project would be less than the Henry Hub price that will be required in the future under existing contracts
- Cost savings to residents and businesses in communities where natural gas would be available through local (piped) gas distribution or trucked/barged LPG for heating at costs less than anticipated Henry Hub prices or diesel fuel
- The maintenance or expansion of the existing petrochemical and LNG facilities in Nikiski in the event that Cook Inlet gas supplies are insufficient to maintain the facilities or, with the

[2] The lower electricity prices could result from larger gas-fired power plants and transmission of that electricity to individual communities.

availability of North Slope natural gas, to expand the facilities with associated employment and local tax increases

A substantial amount of these benefits have been addressed in previous studies. However, there are some potential benefits that have not been thoroughly addressed. For example, some previous reports have suggested that the proximity of a natural gas pipeline through certain portions of highly mineralized zones will transform the viability of some mining projects by providing lower cost energy to the mine sites and thus creating greater employment estimates and revenues to the state and other entities. We will investigate this concept further and include the benefits of this and other developments that could occur with implementation of the ANGDA project.

Where appropriate, the IMPLAN model will be used to estimate the secondary effects associated with these other benefits. Some benefits, for example, household cost savings may not have secondary effects since the household would be expected to spend the savings on other goods or services with limited effect on the overall economy. In other cases, inclusion of potential benefits may result in double counting. The output would be a dataset comparable to the previous matrix. Where such benefits cannot be added to the previous data because of the issues noted above they will still be identified and reported.

2.2.4 Total Benefits

This section of the report will present the benefits associated with each major component, and sum and report the total benefits associated with construction and operation of the ANGDA project.

2.2.5 Report Preparation and Schedule

To ensure efficient use of our limited time in writing the report, we will submit an electronic version of a detailed draft report outline to ANGDA by November 3, 2003 for review and comment. This submittal date assumes a notice-to-proceed is issued by September 29, 2003. This outline will identify each section and subsection of the report, stating the topics to be addressed in the section or subsection, and the purpose for each section or subsection. Each table and figure will be identified with the table or figure number and caption included in each section. An electronic version of the draft report will be presented to the ANGDA by December 15, 2003, again assuming a start date of not later than September 29, 2003. We will provide an electronic copy of the final report within 5 working days of receiving the comments.

3 Price of Services

The estimated hours and price by major task is presented in the following table. The table summarizes the anticipated time requirements for assessing each of the project components. Northern Economics presents this estimated budget with the understanding that it is open to negotiation to best suit the Authority's needs.

Table 1. Project Budget

	Staff Members					
Task	Burden	Cuyno	Kirac	Porteen	Staff	Total
1. Obtain/Develop Project Component Information						
Hours	72	0	32	144	16	264
Labor budget ($)	11,520	0	3,520	10,800	960	26,800
2. Economic Benefits						
Hours	24	264	12	80	0	380
Labor budget ($)	3,840	26,400	1,320	6,000	0	37,560
3. Fiscal Benefits						
Hours	8	104	0	0	0	112
Labor budget ($)	1,280	10,400	-	-	-	11,680
4. Other Project-related						
Hours	98	64	24	92	0	278
Labor budget ($)	15,680	6,400	2,640	6,900	-	31,620
5. Sum to Total Benefits						
Hours	2	0	0	16	0	18
Labor budget ($)	320	-	-	1,200	-	1,520
6. Report Preparation						
Hours	80	68	60	168	52	428
Labor budget ($)	12,800	6,800	6,600	12,600	3,120	41,920
Total Labor Hours	284	500	128	500	68	1,480
Total Labor Budget ($)	45,440	50,000	4,080	37,500	4,080	151,100
Expenses (copies and misc.)						500
Total estimated project						**151,600**

September 8, 2003

Preliminary Scope of Work -- Alaska Natural Gas Development Authority

[This preliminary scope and order-of-magnitude cost estimate is not intended as a binding bid, nor is it to be construed as any representation of work that will be performed by Wood Mackenzie at the costs specified. **This document is for discussion purposes only.** The commencement and performance of work will be governed by a formalized scope and agreement to be executed by the parties ANGDA and Wood Mackenzie.]

Wood Mackenzie has a proven track record in global energy project evaluation. Our industry knowledge and insights combined with a foundation of proprietary data has enabled Wood Mackenzie to assist global energy companies and governments in developing LNG and marketing strategies.

Project elements proposed by ANGDA : Gas treatment, 800 mile 36 inch pipeline, Liquefaction Train(s), Marine terminal, Shipping.

Project elements for initial evaluation:

- Infrastructure
  - Benchmark Cost Assumptions for each segment of the project by region and by complexity, using WM Proprietary Economic Model, against other Existing LNG Projects (eg. ALNG, NLNG, ENLG) and Proposed Projects (eg. Sakhalin, Gorgon, Pacific LNG, Camisea LNG) check costs correspond to industry norms
- Competition
  - Using WM Proprietary database Evaluate ANGDA Competitive Position to Other Pacific Basin Supplies Existing, Expansions, New Entrants (eg. Lumut, Bintulu, Bontang, Tangguh, Gorgon, N.W. Shelf, Qatar, Oman, Iran, Pacific LNG, Camisea LNG)
  - Provide Cost Stack for Each Project vs. ANGDA

With a commencement date of October 1, 2003, our target date for completion of the work outlined is December 31, 2003. The Wood Mackenzie team will consist of senior staff and associates, drawing upon a foundation of knowledge and experience, together with additional contributions as needed from other Wood Mackenzie staff that will support and contribute in developing analyses and review of certain project tasks.

- Wood Mackenzie North American InSight Service
  - One Year License Agreement for service is $25,000 US

Estimated Cost:

Our initial estimate of cost for Wood Mackenzie to complete the work, excluding North American Insight service, outlined, herein is $75,000 to $120,000.

ALASKA NATURAL GAS AUTHORITY
PROJECT SYNOPSIS

GAS TREATMENT

Natural gas will be treated at the producer's Gas Treatment plant in the Prudhoe Bay field. Treatment involves separation of the CO2 for enhanced oil recovery. The resultant gas is chilled and pressurized for shipment through the natural gas line.

PIPELINES

The Alaska Natural Gas Authority will support the producer-led highway pipeline as far as some location in the Fairbanks/Delta area where the producer line will follow the Alcan Highway and the ANGDA pipeline will continue along the TAPS route to Valdez.

The Authority expects to contribute financial support proportional to the portion of the highway mainline it wants to utilize.

Branch-offs at the Yukon River will provide energy for natural gas-fired electric power plants with transmission lines to interior and river communities.

There will be a branch-off spur line from Glennallen to Anchorage to bring gas to the Anchorage domestic market and provide feedstock for the Kenai industrial users. Gas will be treated at a location to be determined for sales into the existing South Central domestic market.

LNG PLANT

The pipeline will terminate at an LNG plant located in Valdez. The plant will separate LPGs for petro-chemicals and provide storage of LNG until shipment in leased tankers to west coast markets or the Pacific Rim. LNG or propane will also be shipped in barges and distributed to coastal communities on the west coast of Alaska.

MARINE

Previous studies have located the LNG plant at Anderson Bay about 5 miles west of the TAPS Marine Terminal. The conceptual study will investigate locating the LNG plant near Old Valdez. The plant will be fabricated on barges at existing Cook Inlet fabrication facilities as a way to increase Alaska hire, barged to Valdez and permanently moored.

LNG MARINE TERMINAL
- Including DOCKS -

- Review and Analyze YPC Concepts
- Review and Analyze ANGPA Concepts
- Develop System Alternatives and Innovations

Anderson Bay
Old Town Site

- Physical Location Comparisons

Site Investigation	Uplands Survey
Design Criteria	Marine Terminal Review
Offshore Bathymetry	Borehole Review

- Foundation Alternatives with Seismic Design Resolution

Earth and Rock
Modularization
Barge Mounted Option

- Foundation Cost Estimate Comparisons and Site Layout

Anderson Bay
Old Town Site

- Preliminary Construction Schedule
- Identify Permitting Concerns and Risks
- Identify Long Lead Item Procurement
- Final Report

LNG PLANT AND CRYROGENIC STORAGE

- Review and Analyze YPC Concepts
- Review and Analyze ANGPA Concepts
- Develop System Alternatives and Innovations

Security	Communication Requirements
Assess modularization, components and siting	Proximity to Alyeska
SCADA (Conceptual Control System)	Barge Mounted with Cook Inlet Fabrication

- Provide summary of Major Compression, Drivers and a description of all systems
- Block Flow Diagram
- Process Flow Diagrams of LNG Plant, Storage Tankage, Power Generation
- Export Gas QC Recommendation
- Preliminary Module Layouts
- Preliminary Electrical Power, Compression horsepower and fuel gas consumption estimates for conversion of gas to LNG
- Preliminary Capital Cost Construction Estimate (CAPEX)
- Preliminary Construction Schedule
- Preliminary Operations Estimate (OPEX)
- Identify Permitting Concerns and Risks
- Identify Long Lead Item Procurement
- Final Report

PIPELINE AND COMPRESSOR STATIONS

- Emphasis on SPUR LINE -

- Review and Analyze YPC Concepts
- Review and Analyze ANGPA Concepts
- Develop System Alternatives and Innovations

Communications	Assess Modularization
Automatic vs Manned Compressor Stations	Proximity to Alyeska
Security	SCADA Review
Shared Services Potential	Non-Workpad Option

- Expand Information RE: Glenallen to Anchorage SPUR LINE

ENSTAR Deliverables	Soil Characteristics
Determine Line size	Land Ownership
Topographic Review	Economic Evaluation

- Block Flow Diagrams
- Process Flow Diagrams of Typical Compressor Station
- Pipeline Profiles
- Preliminary Compressor Station horsepower and fuel gas consumption estimates
- Preliminary Capital Cost Construction Estimate (CAPEX)
- Preliminary Construction Schedule
- Preliminary Operations Estimate (OPEX)
- Identify Permitting Concerns and Risks
- Identify Long Lead Item Procurement
- Final Report

IN-STATE USES AND BENEFIT ANALYSIS

- In-State Demand
- Economic Impacts
- Community Multipliers
- Life Cycle Evaluation
- Benefits to the State
    - Revenues to the State
    - Revenues to the Local Government
    - Construction Employment
    - Operating and Maintenance Jobs
    - Energy Costs and Availability
    - Economic Growth
    - New Business Creation

MARKETING / COMPETITOR ANALYSIS

- Outside Validation that We Do Have a Project
- Board Interaction with Customers
- Travel and Hosting

SPECIALIZED LEGAL OPINIONS

- Jones Act
- Tax Free Status
  - Obtain IRS Ruling
- Alaska Rail Road Bonds
  - Ability to Issue Tax Free Bonds
- Export Permit

STAFF AND ADMINISTRATIVE

- Salaries and Overhead
- In-House Expertise and Contractor Coordination
- Board Meetings
- Donated In-Kind Services
- Travel
- Miscellaneous

ALASKA NATURAL GAS DEVELOPMENT AUTHORITY
411 West 4th Avenue
Anchorage, AK 99501
Tel: (907) 257-1347

Mr. Ward Whitmore, Director of Project Development
Yukon Pacific Corporation
1400 W. Benson Blvd, Suite 525
Anchorage, AK 99503

September 2, 2003

SUBJECT: Conceptual Study Alaska Gas Line Project

Dear Mr. Whitmore:

We are in the process of developing a conceptual study for the Alaska Gas Line Project which includes the Gas Treatment Plant at Prudhoe Bay, an 800-mile high pressure gas pipeline from Prudhoe to Valdez, a spur line from Glennallen to Anchorage, and the LNG plant at Valdez. The purpose of the study is to identify the costs and schedule, and the benefits to Alaska in developing the project.

Yukon Pacific Corporation has already completed cost estimates, construction schedules and has developed a project execution plan for the project. Rather than duplicate this work, ANGDA is requesting permission to use the YPC study as a baseline from which the costs and economics can be reviewed. ANGDA will update where necessary and those areas warranting additional study will be identified and developed.

We understand that you are willing to make your studies available to our study team under the following conditions:

1. Elements of the YPC study will be clearly identified. Any work performed by the ANGDA will be separated from the YPC work to ensure that the YPC work is not co-mingled .
2. YPC will make available in electronic form summaries of the cost studies, economic studies and material balances.
3. Hard copy volumes of the YPC study can be inspected at the YPC Anchorage offices but photocopying any pieces of the study will not be allowed.

We anticipate that the study will start in early September 2003 and be completed by early January 2004.

We appreciate your willingness to assist us in the conceptual study and ask your confirmation with these conditions.

Sincerely,

Harold C. Heinze
Chief Executive Officer

ALASKA NATURAL GAS DEVELOPMENT AUTHORITY
411 West 4th Avenue
Anchorage, AK 99501
Tel: (907) 257-1347

Mr. William M. Walker, Attorney at Law
Walker & Leveque LLC
731 N Street
Anchorage, AK 99501

September 2, 2003

SUBJECT: Conceptual Study Alaska Gas Line Project

Dear Mr. Walker:

We are in the process of developing a conceptual study for the Alaska Gas Line Project which includes the Gas Treatment Plant at Prudhoe Bay, an 800-mile high pressure gas pipeline from Prudhoe to Valdez, a spur line from Glennallen to Anchorage, and the LNG plant at Valdez. The purpose of the study is to identify the costs and schedule, and the benefits to Alaska in developing the project.

The Alaska Gasline Port Authority has already completed cost estimates, construction schedules and has developed a project execution plan for the project. Rather than duplicate this work, ANGDA is requesting permission to use the AGPA studies as a baseline from which the costs and economics can be reviewed. ANGDA will update where necessary and those areas warranting additional study will be identified and developed.

We understand that you are willing to make your studies available to our study team. You also mentioned that you would make arrangements for the Bechtel project manager to make a presentation on the cost and schedules prepared by Bechtel. We suggest that a convenient time for this presentation would be sometime in September.

We anticipate that the study will start in early September 2003 and be completed by early January 2004.

We appreciate your willingness to assist us in the conceptual study and we will keep you informed of our activities.

Sincerely,

Harold C Heinze

Harold C. Heinze
Chief Executive Officer

AGDA

My Documents/Gas Line/LETTER WMC 9-2-03